

Weed flora of Kaam area of Al-Khums city – Libya

Najat Beleed AL-Sheef

Department of Biology- Faculty of science- EL-Mergib University– AL Khums- Libya

Email: mohmdalgesh@yahoo.com

Abstrac

Kaam area is located in the city of Al-Khums, about 140 km from the city of Tripoli. There are some few studies of Kaam area, Although Kaam area it has been one of the most fertile and productive areas in Libya since ancient times, currently there are no publications available on weed flora of the area.. The present study aimed to determine its weed flora. The plants were identified with the help of available literature and through comparison with the already identified plant species. Data inventory has been documented in the form of family, Botanical name, life form, The total of 149 species of flowering weed plants representing by 116 genera and 40 families have been collected. Dicotyledons were represented by 34 families, 73 genera and 125 species whereas; Monocotyledons were represented by 6 families, 20 genera and 24 species. The richest families were Fabaceae (21 species) 14.9%, Asteraceae (20 species) 13.42 Poaceae,(15 species) 10.6% , Chenopodiaceae(10 species) 6,7% , Brassicaceae (6 species) 4.02%, Therophytes with 99 species were the dominant life form.

Keywords: Weeds- Kaam area- flora of Libya , life form.

الملخص :

تقع منطقة كعام في مدينة الخمس وتبعد عن مدينة طرابلس حوالي 140 كم، وهناك بعض الدراسات القليلة عن منطقة كعام، ورغم أن المنطقة من أكثر المناطق خصوبة وإنتاجية في ليبيا منذ القدم، إلا أنه لا يوجد حالياً أي منشورات متاحة عن الحشائش الضارة في المنطقة. وتهدف الدراسة الحالية إلى تحديد الحشائش الضارة في المنطقة. تم في هذه الدراسة التعرف على النباتات باستخدام موسوعة النباتات الليبية وغيرها من المصادر التصنيفية والفلورات العربية ومن خلال المقارنة مع الأنواع النباتية التي تم تحديدها سابقاً. من نتائج هذه الدراسة تجميع وتصنيف 149 نوعاً من نباتات الحشائش الزهرية تتبع 116 جنساً و 40 فصيلة. ذوات الفلقتين تم تمثيلها بعدد 34 فصيلة و 73 جنساً و 125 نوعاً؛ تم تمثيل أحاديات الفلقة بعدد 6 فصائل و 20 جنساً و 24 نوعاً. وكانت السيادة في هذه الدراسة للفصيلة البقولية Fabaceae بعدد (21 نوعاً) 14.9%، تليها الفصيلة المركبة Asteraceae بعدد (20 نوعاً) تليها الفصيلة النجيلية Poaceae بعدد (15) نوعاً 13.42%. أظهرت نتائج التحليل لأشكال الحياة السيادة المطلقة لنباتات Therophytes بعدد 99 نوع.

الكلمات المفتاحية: الحشائش الضارة- منطقة كعام- موسوعة النباتات الليبية- أشكال الحياة.

Introduction

Weed is a general term used to describe a plant growing in unwanted areas, also defined as any plant that is objectionable or interferes with the activities or welfare of man. weeds are

considered an important biotic constraint to food production (AL-sherif et al., 2018). This definition can apply to crops, native plants as well as non-native species. Weeds can effectively compete with crop species, can lower yields, increase labor requirements and, ultimately, increase food costs for the consumer (Klingman and Ashton, 1975). Weeds belong to all plant families, but certain families particularly Asteraceae, Poaceae, Brassicaceae and Fabaceae constitute the worldwide major weed flora. There are about 30,000 species of weeds in the world, of which 50 to 200 usually cause appreciable damage to the major food crops (Marwat et al., 2013). Weed problems in Libya have become very important not only in the coastal belt with its higher rainfall but also in the newly established irrigation projects in the desert where it was very difficult to find a single weed in the past (Eltaguri et al., 2020). As a result, no systematic research has been done on regular bases, some experiments, carried out during the late 1970s and early 1980s in the agriculture research center, particularly in Tripoli and AL-Jabal AL-Akhdar region (Omar et al., 2020). Arab Organization for Agriculture Development (1981) reported 134 of important weed species recorded in agriculture fields in Libya, Saleh (1988), published a book of weeds in Libya. Ghanuni (1998) has prepared country weed list (Eltaguri et al., 2020). Al-Zerbi (2004) conducted a study on weed species in Al-Maltitaih region and reported a total of 69 weed species. Al-Aieb and Al-Shiekhy (2008) have surveyed weed species in GMR (Great Man-Made River) agricultural barley fields in Sirte and recorded a total of 105 weed species (Omar et al., 2020). Nasef et al. (2017) and Naseef et al. (2019) published a list of a common weed species in Libya, about 58 species were presented. Omar et al., (2020) have reported 80 weed species growing in barley fields of GMR agricultural project in Jardina - Soloq region. Some of the recorded species accidentally introduced became invasive species such as weeds and were found to cause great losses for cultivated crops through competition with crops such as (*Cyperus alternifolius* L., *Senecio vulgaris* L., *Conyza canadensis* (L.) Cornq., *Silene gallica* L., *Euphorbia heterophylla* L., *Veronica persica* Poiret., *Cassia occidentalis* L., *Amaranthus retroflexus* L., *Raphanus raphanistrum* L., *Cenchrus incertus* M. A. Curtis., *Bidens pilosa* L. *Xanthium spinosum* L.) (Al-Zerbi et al., 2020).

Libya occupies an area of about 1.7 million km², but most of which is desert. The most important areas for plant diversity are the coastal strip and mountains of the Mediterranean coastline which is 1900 km long, the longest of any African country bordering the Mediterranean coastline (Al Sheef, 2015). Kaam area is located in the city of Al-Khums, about 140 km from the city of Tripoli. There are some few studies of Kaam area, In 2005, Al Sheef conducted a taxonomic study of the plants of the Kaam area In this study, 342 plant species belonging to 229 genera belonging to 64 families were collected. In 2017, Bahri surveyed the Wadi Kaam areas and collected 158 plant species belonging to 40 families (Bahri, 2017) In 2020, Al Sheef surveyed the medicinal plants in the Kaam region, the results revealed presence of 118 species. Almushghub et al., 2022 carried out study deals with the vegetation analysis of Wadi Kaam and 152 species belonging to 117 genera and 38 families were recorded. Sherif et al , 2023 surveyed the plant species diversity of Al- Khoms - Misrata province, a total number of 375 different plants have been collected representing 62 families, 241 genera, and 375 species.

Although Kaam area it has been one of the most fertile and productive areas in Libya since ancient times, currently there are no publications available on weed flora of the area. This work represents an original approach who aims to determine the weed flora in Kaam areas.

Study area

The Kaam area is located in Al-Khums in the north-western of Libya, between latitude 32° 2'3.21" and 32° 32' 53.41" N, and longitude 13° 49 '52.23" and 14° 26'47. 85, about 140 km from Tripoli (Figure 1) (Salim, 2016). The Kaam area is considered one of the most fertile agricultural areas, ancient and modern, and evidence for this is the presence of more than ten historical dams dating back to the era of the Romans and the presence of many artifacts in the region. The mountain area reaches a height of 100-800 m. The length of Kaam valley is 80 km and it deviates to the northeast to pour into the sea. Among the most important trees in the Kaam area are *Acacia cyanophylla*, *Casuarina sp*, *Eucalyptus camaldulensis*, and *Pinus halepensis* (Ministry of Agricujture, 1971).

The climate of the area follows the climate of the Mediterranean region, which is cold & rainy at the winter with an a verge rainfall, ranges between 100-300 mm annually, and hot - dry at the summer with a mean of 18°C (Sherif et al., 2023).

Two kinds of soil represent mainly the north-western valleys of Libya, including Wadi Kaam Valley alluvial soil: deposits cover most of the valley land, which is the result of flood accumulation over a continuous-time, ranging from clay and sandy, with proportions of gravel, stones, dissolved salts, calcium carbonate and gypsum (Almushghub et al., 2022).

Materials and methods

The study was in 2016-2017, the field trips were more frequently made from September to May. The plant specimens were collected in flowering or fruiting conditions then identified with the help of available literature, first, the family of the plant was determined by the use of a key to the families of flora of Libya (Erteb, 1994), the genus and species were identified by the utilization of available taxonomic literature (Ali and Jafri, 1976-1977; El-Gadi, 1988-1989; Jafri and El-Gadi, 1977-1986) (Boulos ,1972, 1999,2000,2002). and by comparing with the already identified plant specimens of the herbarium, of the Botany Department, Faculty of Science at EL-Mergib University. Plants with botanical name , family and life form, were listed in (Table 4,5).



Fig. 1. Showing location of the study area.

Results and Discussion

From this study a total of 149 species of flowering weed plants representing 116 genera and 40 families have been collected (Table 4, 5).

Dicotyledons were represented by 34 families, 73 genera and 125 species whereas.

Monocotyledons were represented by 6 families, 20 genera and 24 species (Table 1).

Table (1): Different taxonomic groups present in the study area

Palnt group	No. of families	No. of Genera	No. species
Dicotyledons	34	73	125
Monocotyledons	6	20	24
Total	40	93	149

The richest families were Fabaceae (21 species) 14.9%, Asteraceae (20 species) 13.42 Poaceae,(15 species) 10.6% , Chenopodiaceae(10 species) 6,7%, Brassicaceae (6 species) 4.02%, whereas 4 families were recorded in (5 species) 3.35%, (Polygonaceae, Euphorbiaceae, Boraginaceae, Apiaceae), whereas 4 families were recorded in (4 species) 2.68 % , 6 families were recorded in (3 species) 2.01%, 5 families were recorded in (2 species) 1.34%, whereas 16 families were recorded as mono species 0.67% of the total recorded families (Table 2). In comparison with the largest families in the flora of Libya fabceae is the largest family in the study area while Asteraceae is the largest in the flora of Libya. The second-largest family in the study area was Asteraceae whereas Asteraceae is the largest in the flora of Libya. The family poaceae come in third place in the study area whereas it is the second in the flora of Libya. Brassicaceae has 6 species that come in fourth place in the study area as well in the flora of Libya (Table 2).

Table 2. Shows the dominant families

family	No. of species	%
Fabaceae	21	14.9
Asteraceae	20	13.42
Poaceae	15	10.6
Chenopodiaceae	10	6.7
Brassicaceae	6	4.02

Genera with the highest number of species were *Euphorbia* (4 species), *Amaranthus* (4 species) , *Chenopodium* (3 species), *Medicago* (3 species), *Plantago* (3 species), *Urtica* (3 species) and *Bromus* (3 species).

The analysis of life form spectrum of the species based on Raunkiaie system (Ph) = Phanerophyte, (Ch) = Chamaephyte, (He) = Hemocryptophyte, (Ge) = Geophyte and (Th).The results of analysis showed the absolute dominance of Therophytes with 99 species, followed by Hemicryptophytes with 21 species, Geophytes with 14 species Chaemephytes with 9 species, and Phanerophytes with 6 species (Table 3).

Table 3. Shows life forms and number of plant species collected from the aerea

Life Form	No. of species	%
Therophytes	99	66.4
Hemicryptophytes	21	14
Geophytes	14	9.39
Chamaephytes	9	6
Phanerophytes	6	4.02

Table 4. The Genera and species in each family of Dicotyledons.

Family	Weed species scientific name	Life forms
Amaranthaceae	<i>Amaranthus blitoides</i> S.Watson	Th
	<i>Amaranthus hybridus</i> L.	Th
	<i>Amaranthus retroflexus</i> L.	Th
	<i>Amaranthu sviridis</i> L.	Th
Apiaceae	<i>Bupleurum lancifolium</i> Hornem	Th
	<i>Daucus capillifolius</i> Gilli.	Ch
	<i>Pituranthos tortuosus</i> (Desf.) Benth.	Ch
	<i>Pseudorlaya pumila</i> (L.) Grande	Th
	<i>Torilis nodosa</i> (L.) Gaertn.	Th
Asclepiadaceae	<i>Calotropis procera</i> (Aiton) W. T. Aiton	Ph
Asteraceae	<i>Anacyclus monanthos</i> (L.) Thell.	Th
	<i>Anthemis secundiramea</i> Biv	Th
	<i>Atractylis cancellata</i> L .	Th
	<i>Calendula arvensis</i> L .	Th
	<i>Cardus getulus</i> Pomel, Nouv .	Th
	<i>Carthamus lanatus</i> L .	Th
	<i>Chrysanthemum coronarium</i> L .	Th
	<i>Cichorium pumilum</i>	Th
	<i>Conyza Canadensis</i> (L.) Cornq.	Th
	<i>Cynara cardunculous</i> L.	He
	<i>Echinops galalensis</i> Schweinf	Th
	<i>Lactuca saligna</i> L.	Th
	<i>Launaea resedifolia</i> (L.) O.Kuntge	Th
	<i>Onopordum arenarium</i> (Desf.) Pomel	He
	<i>Pallenis spinosa</i> (L.) Cass .	He
	<i>Reichardia tingitana</i> (L.) Roth .	Th
	<i>Senecio gallicus</i> Chiaux .	Th

	<i>Silybum marianum</i> (L.) Gaertn.	Th
	<i>Sonchus oleraceus</i> L.	Th
	<i>Xanthium spinosum</i> L.	Ch
Boraginaceae	<i>Echium angustifolium</i> Mill.	Ch
	<i>Echium plantaginium</i> L.	Th
	<i>Elizaldia calycina</i> (Roem&Schultes) Maire	Th
	<i>Gastrocotyle hispida</i> (Forsk) Bunge	Th
	<i>Heliotropium europaeum</i> L.	Th
Brassicaceae	<i>Brassica tournefortii</i> Gouan	Th
	<i>Enarthrocarpus clavatus</i> Del. ex Goder.	Th
	<i>Eruca longirostris</i> Uechtr.	Th
	<i>Hussonia pinnata</i> (Viv.) Jafri.	Th
	<i>Rapistrum rugosum</i> (L.) All.	Th
	<i>Sisymbrium irio</i> L.	Th
Caryophyllaceae	<i>Silene apetala</i> Willd.	Th
	<i>Spergula fallax</i> (Lowe) E.H.L.Krause	Th
	<i>Spergularia marina</i> (L.) Griseb.	Th
	<i>Vaccaria pyramidata</i> Medik.	Th
Chenopodiac	<i>Atriplex halimus</i> L.	Ph
	<i>Bassia muricata</i> (L.) Aschers.	Th
	<i>Beta vulgaris</i> L.	Th
	<i>Chenopodium album</i> L.	Th
	<i>Chenopodium ambrosioides</i> L.	Th
	<i>Chenopodium murale</i> L.	Th
	<i>Kochia indica</i> Wight	Th
	<i>Kochia scoparia</i> (L.) Schrad	Th

	<i>Salsola kali</i> L.	Th
--	------------------------	----

	<i>Suaeda vera</i> Forssk. ex J. F. Gmel.	Ch
Cistaceae	<i>Helianthemum lippii</i> var . <i>sessiliflorum</i> (Desf.) Murb.	Th
Convolvulaceae	<i>Convolvulus althaeoides</i> L .	Th
	<i>Convolvulus arvensis</i> L.	He
	<i>Cressa cretica</i> L.	Th
Cuscutaceae	<i>Cuscuta pedicellata</i> Ledeb.	Th
Euphorbiaceae	<i>Euphorbia exigua</i> L.	Th
	<i>Euphorbia helioscopia</i> L.	Th
	<i>Euphorbia peplus</i> L.	Th
	<i>Euphorbia terracina</i> L.	Th
	<i>Ricinus communis</i> L.	Ph
Fabaceae	<i>Argyrolobium uniflorum</i> (Dence.) Jaub . & Sapach	Ch
	<i>Astragalus cabrinus</i> L.	He
	<i>Astragalus peregrinus</i> Vahl	Th
	<i>Coronilla scorpioides</i> (L.) Koch	Th
	<i>Hippocrepis bicontorta</i> Lois.	Th
	<i>Hippocrepis multisiliquosa</i> L.	Th
	<i>Lathyrus clymenum</i> L.	Th
	<i>Lotus edulis</i> L.	Th
	<i>Lotus halophilus</i> Boiss&Spruner.	Th
	<i>Medicago polymorpha</i> L.	Th
	<i>Medicago tornata</i> (L .) Mill.	Th
	<i>Medicago truncatula</i> Gaertn.	Th
	<i>Melilotus indicus</i> (L.) All	Th
	<i>Melilotus sulcatus</i> Desf.	Th
	<i>Ononis serrate</i> Forsk.	Th
	<i>Scorpiurus muricatus</i> L.	Th

	<i>Trifolium tomentosum</i> L.	Th
	<i>Trigonella maritima</i> Delile ex poiret	Th
	<i>Trigonella stellate</i> Forsk.	Th
	<i>Vicia monantha</i> Retz.	Th
	<i>Vicia sativa</i> L.	Th
Frankeniaceae	<i>Frankenia pulverulenta</i> L.	He
Fumariaceae	<i>Fumaria densiflora</i> DC .	Th
Geraniaceae	<i>Geranium molle</i> L .	Th
Illecebraceae	<i>Paronychia Arabica</i> (Linn.) Dc.	He
Lamiaceae	<i>Marrubium vulgare</i> L .	Ch
	<i>Salvia lanigera</i> Poir.	Th
	<i>Salvia verbenaca</i> L .	He
Malvaceae	<i>Malva parviflora</i> L.	Th
	<i>Malva sylvestris</i> L.	He
Oxalidaceae	<i>Oxalis pes – caprae</i> L.	Ge
Papaveraceae	<i>Glaucium corniculatum</i> (L.) Rud	Th
	<i>Papaver hybridum</i> L.	Th
	<i>Papaver rhoeas</i> L.	Th
Plantaginaceae	<i>Plantago albicans</i> L.	He
	<i>Plantago lanceolata</i> L .	He
	<i>Plantago major</i> L.	He
Polygonaceae	<i>Emex spinosus</i> (L). Campd	Th
	<i>Polygonum aviculare</i> L .	He
	<i>Polygonum equisetiforme</i> Sibth. And Sm.	He
	<i>Rumex pictus</i> Forsk.	Th
	<i>Rumex vesicarius</i> L.	Th
Portulacaceae	<i>Portulace oleraceae</i> L.	Th

Primulaceae	<i>Anagallis arvensis</i> var. <i>caerulea</i> (L.) Gouan	Th
Ranunculaceae	<i>Adonis dendata</i> Delile	Ge
Resedaceae	<i>Reseda alba</i> L.	Th
Rubiaceae	<i>Galium aparine</i> L.	Th
	<i>Galium verrucosum</i> Huds.	Th
	<i>Sherardia arvensis</i> L.	Th
Scrophulariaceae	<i>Kickxia aegyptiaca</i> (L.) Nabelek ssp. <i>Aegyptiaca</i>	He
	<i>Linaria tarhunensis</i> Pamp.	Th
Solanaceae	<i>Nicotiana glauca</i> R.C. Graham	Ph
	<i>Solanum nigrum</i> L. var. <i>nigrum</i>	He
Tamaricaceae	<i>Tamarix nilotica</i> (Ehrenb.) Bunge	Ph
Utricaceae	<i>Urtica dioica</i> L.	Ch
	<i>Urtica pilulifera</i> L.	Th
	<i>Urtica urens</i> L.	Th
Verbenaceae	<i>Lantana camara</i> L.	He
Zygophyllaceae	<i>Nitraria retusa</i> (Forssk.) Asch.	Ph
	<i>Zygophyllum album</i> L.	Ch

Table 5. Genera and species in each family of Monocotylons

Family	Weed species	Life forms
Alliaceae	<i>Allium ampeloprasum</i> L.	Ge
	<i>Allium roseum</i> L.	Ge
Cyperaceae	<i>Cyperus rotundus</i> L.	Ge
Juncaceae	<i>Juncus acutus</i> L.	He

Liliaceae	<i>Asphodelus fistulosus</i> L.	Ge
	<i>Asphodelus microcarpus</i> Salzm. & Viv.	Ge
	<i>Muscari comosum</i> (L.) Mill.	Ge
	<i>Scilla Preuviana</i> L.	Ge
Poaceae	<i>Aeluropus lagopoides</i> (L.) Trin. ex Thwaites	Ge
	<i>Arundo donax</i> L	Ge
	<i>Avena barbata</i> Pott ex Link	Ge
	<i>Bromus diandrus</i> Roth	Th
	<i>Bromus rigidus</i> Roth	Th
	<i>Bromus rupens</i> L.	Th
	<i>Cynodon dactylon</i> (L.) Pers.	Ge
	<i>Dactyloctenium aegyptium</i> (L.). P. Beauv	Th
	<i>Eleusine indica</i> (L.) Gaertn	Th
	<i>Hordeum murinum</i> ssp <i>murinum</i> L.	Th
	<i>Imperata cylindrical</i> (Linn) Raeuschel	Ge
	<i>Lolium rigidum</i> Gaud.	Th
	<i>Phalaris minor</i> Retz.	He
	<i>Phragmites australis</i> (Cav) Trin. Ex Stend	Th
	<i>Poa annua</i> L.	He
Typhaceae	<i>Typha domingensis</i> (Pers.) Poir. ex Steud.	He

References

Alaib, M. A. and Ihsaeen, N. O. (2008) Weed Flora of Great Man-Made River agriculture Project (Sirte), *Journal of Agriculture and Environment for International Development*, 102(3), pp. 241-257.

Alaib, M. A. El-Shakhy N. O. (2008). Weed Flora of Great Man-Made River Agriculture Project (Sirte).

Almushghub , F., Ahmed, D., Sharaf El-Din, A., Shaltout, K. (2022) Vegetation analysis of Wadi Kaam at northwest Libya. *Journal of Basic and Environmental Sciences*, 9. 20-37.

Al Sheef, N.B. (2015).Micromorphological and cytological analysis of trichomes and biological effects of extracts of *Salvia aegyptiaca*L., *S. fruticosa* Mill. and *S. lanigera*Poir. (Lamiaceae) from Libya Doctoral Dissertation Belgrade.

Al Sheef, N. B (2005). Taxonomic study of Kaam area. (Master Thesis) Almergab University-Alkhoms Libya. (In Arabic).

Al Sheef N.B(2020) Medicinal plants in the Kaam area of Al-Khums city – Libya. *Al Namaa Journal of Science and Technology*. 1(1),75-91.

AL-sherif, E.A., Ismael, M.A., Karam, M. A., Elffayomi, H. H.(2018)WEED FLORA OF FAYOUM (EGYPT), ONE OF THE OLDESTAGRICULTURAL REGIONS IN THE WORLD. *Planta Daninha*; ISSN 0100-8358 (print) 1806-9681 (online).

Alzerbi, A. K., Alaib, M. A., Naser O. O. (2020) Introduced species in Flora of Libya. *Libyan Journal of Science & Technology*. 11:2 (2020) 65-72.

Bahri, N. M., (2017). Identify, Limit and Determine the Vegetation Types of Wadi Ka'am Areas, Libya. *Journal of Marine Science and Environmental Technologies*. 2(3), 12-26.

Boulos, L. (1972). our present knowledge on the Flora and Vegetation of Libya. Bibliography. *Webbia*, 26 (11), 365- 400.

Boulos , L. (1999) Flora of Egypt –vol One. *Al Hadara publishing Cairo – Egypt*.

Boulos , L. (2000)Flora of Egypt – vol Two. *Al Hadara publishing Cairo – Egypt*.

Boulos , L. (2002) Flora of Egypt –vol Three. *Al Hadara publishing Cairo – Egypt*.

Eltaguri, H.M., Elmogasapi, A. M., Y. M. El-Barasi (2020) Weed Flora of Man-Made river agriculture project (Masiklo). *Libyan Journal of Science & Technology*. 11:1 61-64.

Erteb, F. B. (1994). A key to the families of flora of Libya. (Tripoli International Scientific Bookshop.

Ghanuni, A. M. (1998).Country weed list. *CAB.International*. , 31.

Jafri, S.& Ali,S.I.(1976),Jafri,S. & A. El-Gadi.(1977-1986). & El-Gadi, A. (1989).Flora of Libya Vols. 1-152. Department of Botany. Al-Faateh Univ. Tripoli.

Klingman, G.C., and F.M. Ashton (1975). *Weed Science: Principles and Practices*. 2nd ed. *John Wiley & Sons*, New York, NY, 2nd ed.

Marwat, S.K., Usman, K., Khan, N., Khan, M.U., Khan, F.A., Khan, M.A., Rehman, A.U. (2013) Weeds of Wheat Crop and Their Control Strategies in Dera Ismail Khan District, Khyber Pakhtunkhwa, Pakistan. *American Journal of Plant Sciences*, 4, 66-76.

Ministry of Agriculture (1971). Wadi Kaam Project. Vol II, part 4. *Energoprojekt*, Beograd.

Nasef, M.A., Ghanuni, A.M., Gatanesh, O.M. and Nafais, A.A. (2017) 'Survey of weed species in the Research Station of the Faculty of Agriculture-University of Tripoli', *The Libyan Journal of Agriculture*, 22(1), pp. 35-46.

Nasef, M.A., Alharari, H.M., Abdulhamid, M.D., Zlitni, A.M., Elmezoghi, S.M. (2019) Identification of weed species in the Research Station of the Faculty of Agriculture University of Tripoli, *The Libyan Journal of Agriculture*, 24(2), pp. 55-62.

Omar, N., Alaib M. A. and Al-Zerbi, A. K. A(2020) Survey of Weed Species of Barley Crop Fields in Farms of GMR Agricultural Project in Jardina - Soloq Region, *Libya. Libyan Journal of Basic Sciences (LJBS)*. Vol: 11, No: 1, P: 29- 38, August., <https://ljbs.omu.edu.ly/> eISSN 6261-2707.

Raunkiaer C. (1934). *The Life Forms of Plants and Statistical Plant Geography*. Oxford: The Clarendon Press.

Salim, M. S., (2016). Analysis of the morphometric characteristics of Wadi Kaam basin-Libya using geographical information systems. International Geospatial Conference and Exhibition - Libya Geotech, 2. Tripoli, Libya, 195-211 (In Arabic).

Sherif, A. S., Mahklouf, M. H., Betelmal, A. G., El-Wasif, A.(2022) Plant diversity of Al-Khoms – Misrata Province in Libya *The Libyan Journal of Science- University of Tripoli* Vol. 25, No. 01 35-45.

