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Weed Flora of the Barley Field (Hordeum vulgare L.) in Ghot El Sultan, Al Abyar Region, Libya

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فلورا الحشائش في حقل الشعير (*Hordeum vulgare L.*) في غوت السلطان، منطقة الأبيار، ليبيا

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Abstract:
In the farms of Ghot El Sultan, located in the Al Abyar Region, barley is the predominant crop. However, this crop faces significant challenges, particularly in terms of weed management, which greatly affects yields. To address this issue, a field survey was conducted over two seasons (2024 to 2026) to identify the most problematic weeds in barley crops. The study used field research methods, including surveys and quadrat sampling, to record the most prevalent weed species. Weed density and frequency were then calculated based on these findings. Samples from the fields of the barley crop were taken using a quadrat of size 1 m × 1 m randomly thrown at multiple points in the fields. The plants were identified using available literature and by comparison with previously identified plant species. Data inventory has been documented in the form of family, Botanical name, vernacular name and life form. A total of 86 weed species were identified, belonging to 70 genera and 22 families of angiosperms. The most dominant families, based on the number of species, were Asteraceae (20 species), Fabaceae (18 species), Poaceae (10 species), and Brassicaceae (8 species). The results also showed that the highest densities were recorded for Oxalis pes-caprae (25 m^{-2}), Sinapi's alba (18 m^{-2}), and Avena sterilis (17 m^{-2}). Additionally, the highest frequency was observed for Brassica tournifortii and Oxalis pes-caprae, with 57% each. These results provide valuable insights into the database in terms of its density and distribution in the District Ghot El Sultan, Al Abyar Region, Libya.

Key words: Density, Frequency, Life form, Barley, Weed species.

الملخص:
يُعدّ الشعير المحصول الرئيسي في مزارع غوط السلطان، الواقعة في منطقة الأبيار، إلا أن هذا المحصول يواجه تحديات كبيرة، لا سيما فيما يتعلق بمكافحة الحشائش، مما يؤثر بشكل كبير على الإنتاجية. ولمعالجة هذه المشكلة، أُجري مسح ميداني على مدار موسمين (2024 إلى 2026) لتحديد أكثر الحشائش إشكالية في محاصيل الشعير. استخدمت الدراسة أساليب البحث الميداني، بما في ذلك المسوحات وأخذ العينات باستخدام مربعات، لتسجيل أكثر أنواع الحشائش انتشارًا. ثم حُسبت كثافة الحشائش وتكرارها بناءً على هذه النتائج. جُمعت عينات من حقول الشعير باستخدام مربعات قياسها متر مربع واحد، وُضعت عشوائيًا في نقاط مختلفة من الحقول. حُددت النباتات بالرجوع إلى المراجع العلمية المتاحة وبالمقارنة مع أنواع نباتية سبق تحديدها. وُثّقت البيانات في شكل عائلة، واسم علمي، واسم محلي، وشكل الحياة. حُدد ما مجموعه 86 نوعًا من الحشائش، تنتمي إلى 70 جنسًا و22 عائلة من كاسيات البذور. كانت العائلات النباتية الأكثر انتشارًا، بناءً على عدد الأنواع، هي المركبة (20 نوعًا)، والبقولية (18 نوعًا)، والنجيلية (10 أنواع)، والصليبية (8 أنواع). كما أظهرت النتائج أن أعلى كثافة سُجلت لنباتات Oxalis pes-caprae (25 م²)، و Sinapis alba (18 م²)، و Avena sterilis (17 م²). بالإضافة إلى ذلك، لوحظ أعلى تردد لنباتي Brassica tournifortii و Oxalis pes-caprae بنسبة 57% لكل منهما. تُقدم هذه النتائج رؤى قيّمة حول قاعدة البيانات من حيث كثافتها وتوزيعها في منطقة غوط السلطان، بلدية الأبيار، ليبيا.

الكلمات المفتاحية: الكثافة، التردد، أشكال الحياة، الشعير، أنواع الحشائش.

Introduction:

In no other parts of the world does uncontrolled weed growth cause as great a reduction in crop yields as it does in dry areas where soil moisture is the limiting factor, and weeds compete significantly with the crop for available moisture [1]. Weeds are unwanted plants that grow alongside crops, competing for sunlight, space, and nutrients, ultimately leading to a decrease in crop yield [2].

Its variety and distribution differ from crop to crop and generally has no any aesthetic and economic values. Such vegetation is found abundant in cultivated fields of great financial and biological significance [3]. These unwanted plants grow along with agricultural plants and cause gradual and important loss in crop yield because they can compete with crop plants for want of available nutrients, space, water contents, sunlight etc. [4]. Weeds and crops usually have the same requirements, but weeds make their living at the expense of the crop by competition for nutrients, moisture, light, carbon dioxide, and space [5]; [6]; [7]. 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 [8].

In Libya, the discipline of weed science has been overlooked, despite its significance being on par with other crop protection disciplines such as entomology and plant pathology [9]. While there have been numerous studies on weeds in different regions of the country, such as Sirte [1], Jardina-Soloq Region [10], Beir Bullerjam, Soloq Region [11], and [12], the recognition of weed science as a distinct discipline has been lacking. The purpose of this study was to identify various weed species and document their frequency and density in barley crops.

Materials and Methods:

The study area is located approximately 50 km east of Benghazi city, adjacent to Al Abyar city at approximately 32º 08′ N latitude and 20º 32′ E longitude. The area has an elevation of approximately 250 m above sea level (figure 1). The study was conducted over a two-year period, from 2024 to 2026. After selecting the fields to be surveyed, the surveyor followed a "w"-designated set pattern to count the weeds in each farm. The size and number of 1 m² quadrats used varied depending on the size of the farms. For areas with high-density weeds, smaller quadrats of 0.25 m² were used and then extrapolated to estimate the number in a full square meter. The data were recorded on the following parameters:

$$\text{Density} = \frac{\text{Total number of individuals per pecies in all quadrats}}{\text{Total number of quadrats studied}}$$

$$\text{Frequency} = \frac{\text{Total number of quadrats with the species}}{\text{Total number of quadrats studied}} \text{ x } 100$$

The collected plants from the study areas were identified based on available taxonomic literature, such as [13], [14], [15], [16], [17] and [18]. The specimens were identified by observing their morphological and sometimes anatomical features of reproductive parts.

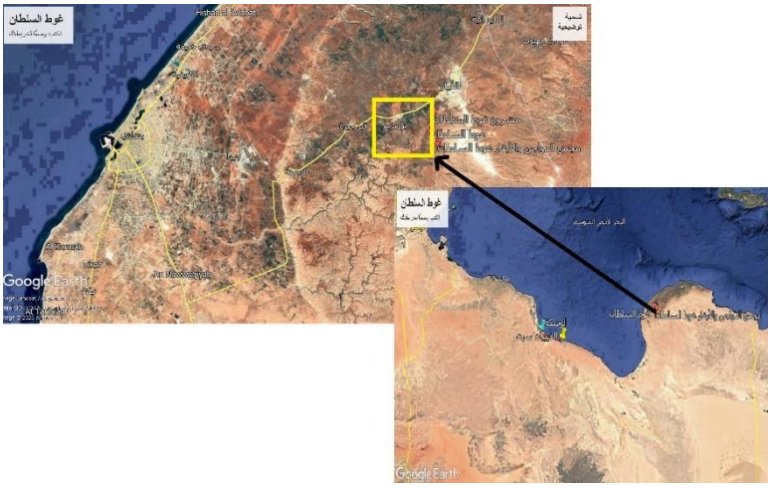

Figure (1): The study area and location (source: Bing Maps and Google Earth)

Results and Discussion:

The study area's weed flora consists of 86 species of flowering weeds, which belong to 70 genera and 22 families. A comprehensive list of the weed species found in the barley crop of the study area, including their scientific names, families, vernacular names, and life forms, is presented in Table 1 below.

Table (1): Weed species, their vernacular names and life form of the barley crop recorded in the study area. (THE. = Therophytes, CHA. = Chaemophytes, HEM. = Hemi-cryptophytes, and GEO. = Geophytes.)

Scientific Name	Family	Vernacular name	Life form
Allium erdelii Zucc.	Amaryllidaceae	Korath	Geo.
Allium nigrum L.	Amaryllidaceae	Thom Bary	Geo.
Foeniculum vulgare Mill	Apiaceae	Kammun	HEM.
Scaligeria napiformis (Willd. ex Spreng.) Grande	Apiaceae		HEM.
Scandix pecten-veneris L.	Apiaceae		THE.
Arisarum vulgare O.Targ.Tozz.	Araceae	Eshlaket etheeb	GEO.
Filago contracta (Boiss.) Chrtek & Holub	Asteraceae		THE.
Anthemis secundiramea Biv.	Asteraceae		THE.
Bombycilaena discolor (Pers.) M.Laínz	Asteraceae	Bseda	THE.
Carduus getulus Pomel	Asteraceae	Qurtum Bariy	THE.
Calendula arvensis L.	Asteraceae	Ain-esh-shams	THE.
Catananche arenaria Coss. & Durieu	Asteraceae	Geez Elghazal	THE.
Centaurea alexandrina Delile	Asteraceae	Mrrier.	THE.
Cynara cornigera Lindl.	Asteraceae	Gaamool	HEM.
Dittrichia viscosa (L.) Greuter	Asteraceae		CHA.
Echinops galalensis Schweinf	Asteraceae	Shembet Elgatoos	HEM.
Glebionis coronaria (L.) Cass. ex Spach	Asteraceae	Gahwan	THE.
Launaea resedifolia (L.) O.Kuntze	Asteraceae	Adeeda	THE.
Matricaria aurea (Loefl.) Sch.Bip.	Asteraceae	Flaya	THE.
Notobasis syriaca (L.) Cass.	Asteraceae		THE.
Onopordum arenarium (Desf.) Pomel	Asteraceae	Libid	HEM.
Pallenis spinosa (L.) Cass	Asteraceae	Schok- es- sera	HEM.
Reichardia tingitana (L.) Roth.	Asteraceae	Sahani	THE.
Rhagadiolus stellatus (L.) Gartner	Asteraceae	Njm eddib	THE.
Senecio gallicus Chiax	Asteraceae	Daraita, Mourare.	THE.
Sonchus oleraceus L.	Asteraceae	Tefaf	THE.
Echium horridum Batt	Boraginaceae	Kehla	CHA.

Echium angustifolium Mill	Boraginaceae	Henna alagrab,	CHA.
Biscutella didyma L.	Brassicaceae	Ain Al Hanash	THE.
Coincya tournefortii (Gouan) Alcaraz, T.E.Díaz, Rivas Mart. & Sánchez-Gómez	Brassicaceae	Shultam	THE.
Didesmus bipinnatus (Desv.) Dc	Brassicaceae	Lislis	THE.
Enarthrocarpus pterocarpus (Pers.) DC.	Brassicaceae	Shultam	THE.
Eruca sativa Mill.	Brassicaceae	Gargeer Barry	THE.
Matthiola fruticulosa (L.) Maire	Brassicaceae	Eshegara	THE.
Sinapis alba L.	Brassicaceae	Khardal, Harra	THE.
Sisymbrium irio L.	Brassicaceae	Fegeela	THE.
Gypsophila vaccaria (L.) Sm.	Caryophyllaceae	Ful el Arab	THE.
Silene gallica L.	Caryophyllaceae		THE.
Convolvulus althaeoides L.		Ullag	GEO.
Convolvulus arvensis L.		Muddad	GEO.
Euphorbia helioscopia L.	*Euphorbiaceae*	Lebbena	HEM.
Astragalus boeticus L.	Fabaceae	Grambushia	THE.
Astragalus caprinus L.	Fabaceae	Shaewit Erraie	HEM.
Astragalus hamosus L.	Fabaceae	Katai, kedad	THE.
Astragalus peregrinus Vahl.	Fabaceae		THE.
Coronilla scorpioides (L.) W.D.J. Koch	Fabaceae		THE.
Hippocrepis multisiliquosa L.	Fabaceae	Hadhwat Alhisan	THE.
Lathyrus aphaca L.	Fabaceae		THE.
Medicago Littoralis Rohde ex Lois	Fabaceae	Nefal	THE.
Medicago polymorpha L.	Fabaceae	Nefal	THE.
Melilotus sulcatus Desf.	Fabaceae	Gharat	THE.
Onobrychis crista - galli (L.) Lam	Fabaceae		THE.
Trifolium purpureum Lois	Fabaceae		THE.
Trifolium tomentosum L.	Fabaceae		THE.
Tripodion tetraphyllum (L.) Fourr.	Fabaceae		THE.
Vicia villosa Roth	Fabaceae	Jelbana Hmam	THE.
Vicia monantha Retz	Fabaceae	Jilban	THE.
Vicia sativa L.	Fabaceae	Jilban	THE.
Vicia narbonesis L.	Fabaceae	Jilban	THE.
Erodium moschatum (L.) L'Hér.	Geraniaceae	Missaykah	THE.
Erodium neuradifolium Delile ex Godr.	Geraniaceae	Henet El-Ghula	THE.
Salvia lanigera Poir.	Lamiacea	Sag en naga	CHA.
Thymbra capitata (L.) Cav.	Lamiacea	Zaater	CHA.
Malva parviflora Linn	Malvaceae	Khobaiz	THE.
Malva sylvestris	Malvaceae	Khobaiz	THE.
Oxalis pes-caprae L.	Oxalidaceae	Hummdha	GEO.
Fumaria officinalis L.	Papavaraceae	Sfinari el homar	THE.
Papaver hybrium L.	Papavaraceae	Bugraun, Talma	THE.
Papaver rhoeas var rhoeas	Papavaraceae	Garun, Bugraun	THE.
Plantago lagopus L.	Plantaginaceae	Widna	THE.
Plantago notata Lag	Plantaginaceae	Aenm	THE.
Linaria tarhunensis Pamp.	Plantaginaceae		THE.
Aegilops ventricosa Tausch	Poaceae		THE.
Avena sterilis L.	Poaceae	Spulet el- aghreb	THE.
Briza maxima L.	Poaceae		THE.
Bromus rigidus Roth.	Poaceae	Summa	THE.
Hordeum marinum Huds.	Poaceae	Bu Shterta	THE.
Lolium rigidum Gaudin	Poaceae	Bomanjor.	THE.
Phalaris minor Retz.	Poaceae	Zewan	THE.
Poa annua L.	Poaceae		THE.
Setaria adhaerens (Forssk.) Chiov.	Poaceae		THE.
Trisetaria macrochaeta (Boiss.) Maire	Poaceae		THE.

Lysimachia arvensis (L.) U.Manns & Anderb.	Primulaceae	Ain Al-Gatuus	THE.
Adonis aestivalis L.	Ranunculaceae	Zeghalil	THE.
Caylusea hexagyna (Forssk.) M.L.Green	Resedaceae	Fattolet El Holi	THE.
Galium tricornutum Dandy	Rubiaceae	Dibbaykah	THE.

In this study, a total of 86 species of flowering weed plants were collected, representing 70 genera and 22 families. Of these, 20 families, 59 genera, and 74 species were dicotyledons, while two families, 11 genera, and 12 species were monocotyledons (Table 2). This results in a ratio of approximately 6:1 between dicotyledons and monocotyledons.

Table (2): Different taxonomic groups present in the study area.

Plant group	No. of families	No. of Genera	No. Species
Dicotyledons	20	59	74
Monocotyledons	2	11	12
Total	22	70	86

The families with the highest number of species in the study area were Asteraceae with 20 species, followed by Fabaceae with 18 species and Poaceae with 10 species. The next largest family was Brassicaceae with eight species, while Apiaceae, Papaveraceae, and Plantaginaceae each had three species. Previous studies on the Libyan flora have also reported these families as having the largest number of species [14]; [15]; [1]; [10]; and [12]. Seven families, including Amaryllidaceae, Boraginaceae, Convolvulaceae, Caryophyllaceae, Geraniaceae, Malvaceae, and Lamiaceae, had two species each, while the remaining families were represented by only one weed species each.

Based on the number of species in each genus in the study area, it was determined that *Astragalus* and *Vicia* were the only two genera with four weed species each. Ten genera, including *Allium*, *Echium*, *Malva*, *Erodium*, *Convolvulus*, *Papaver*, *Trifolium*, *Plantago*, and *Medicago*, were represented by two species each. The remaining seventy-four genera were each represented by only one species.

The plant life forms in the study were classified into four categories: Therophytes with 67 species (78%), Hemicryptophytes with 8 species (9%), Geophytes with 6 species (7%), and Chamaephytes with 5 species (6%) (Figure 2). Therophytes were found to be the most dominant life form in the study area. These results are consistent with previous studies by [10] and [12], which also reported the prevalence of therophytes over other life forms.

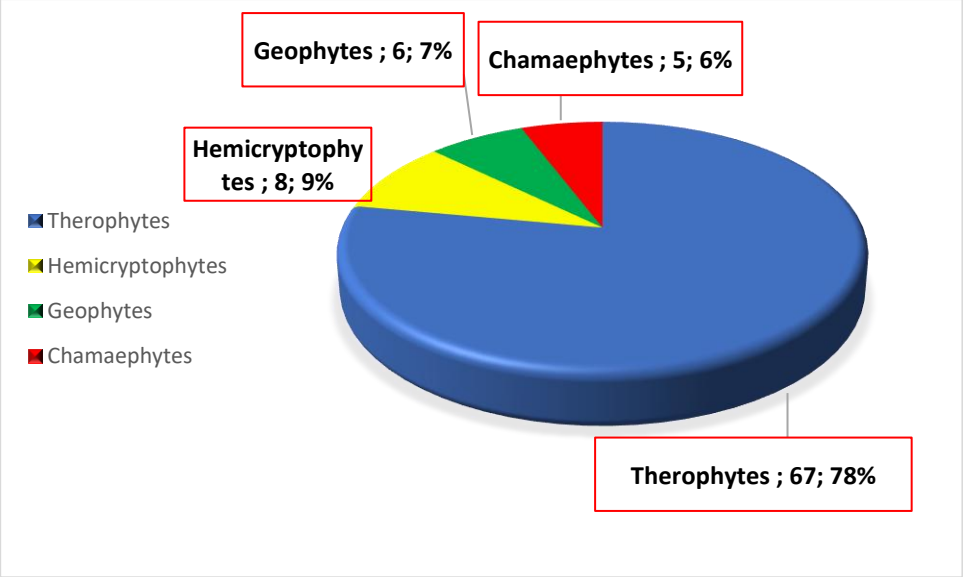

Figure (2): Life form spectrum of the recorded species in study area.

The survey data revealed that 15 weed species were present in the quadrates that were studied. However, species with low densities (less than 1.5 plants in all quadrates) were not considered in the analysis. The results of the weed density for each species can be found in Table 3. The data indicated that the surveyed fields were primarily infested with *Oxalis pes-caprae*, *Sinapis alba*,

Avena sterilis, *Malva parviflora*, *Brassica tournifortii*, *Lolium rigidum, Matricaria aurea*, *Poa annual*, *Bombycilaena discolor*, *Malva sylvestris*, *Lysimachia arvensis*, *Anthemis secundiramea*, *Notobasis syriaca*, *Hordeumm marinum* and *Aegilops ventricosa*. Furthermore, the study revealed that the field contained a mixture of both broadleaf and grass species.

Table (3): Weed density (m^{-2}) and weed frequency (%) for the individual weed species of barley crop in the study area.

Species	Density (m^{-2})	frequency (%)
Oxalis pes-caprae	25	57
Sinapis alba	18	31
Avena sterilis	17	34
Malva parviflora	15	23
Brassica tournifortii	7	57
Lolium rigidum	7	23
Matricaria aurea	5	17
Poa annual	4	9
Bombycilaena discolor	3	17
Malva sylvestris	2	23
Lysimachia arvensis	2	11
Anthemis secundiramea	2	17
Notobasis syriaca	2	43
Hordeumm marinum	2.2	31
Aegilops ventricosa	1.7	6

Based on the findings of this study, it was determined that the Oxalis pes-caprae species is the most prevalent in the study area, with an estimated density of 25 plants/m^{-2}. This species of pest is considered invasive and toxic to livestock, making it a priority for controlling alien plants [19], followed by *Sinapis alba* with 18 plants/m^{-2} and *Avena sterilis* with 17 plants/m^{-2}, while the lowest weed density was calculated for *Aegilops ventricose* with 1.7 plants/m^{-2} in the barley fields. The observed rise in weed density can be attributed to the lack of a weed-control practice mindset among farmers in the study area. There is a previous study conducted on barley crop in District Beir Bullerjam, Soloq Region, Libya by [11], which showed that the highest density of grasses was for the species *Lolium rigidum*, followed by *Melilotus indicus*, then *Melilotus indicus*.

Weed frequency is the most effective indicator for the prevalence of weed species in a study area. The frequency percentages for each species are presented in Table 3. According to the data, *Brassica tournifortii* and *Oxalis pes-caprae* had the highest frequency at 57%, followed by *Notobasis syriaca* at 43%. The lowest frequency was recorded for *Aegilops ventricosa* at 6%. This study differs from previous studies conducted by [11] and [10] in terms of the most frequently observed species. Unlike those studies, which primarily focused on *Eruca sativa, Melilotus indicus, Lolium rigidum,* and *Bromus rigidus*, this study found a higher frequency of different species in crop fields across Libya.

Conclusion:

It is necessary to conduct regular surveys to identify potentially problematic weed species and shifts in weed populations. This will allow for targeted research to be directed towards developing new and improved methods of weed control.

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Conflict of Interest:

The authors declare that there are no conflicts of interest.

References:

1. 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): 241-257.
2. Dangwal LR, Singh A, Singh, T., Sharma A. and Sharma C. (2010a). Common Weeds of Rabi (Winter) Crops of Tehsil Nowshera, District Rajouri (Jammu & Kashmir), India. Pak. J. Weed Sci. Res. 16(1): 39-45 ISSN (2225-7942) and Print ISSN (1815-1094).
3. Jabeen T, Ahmed SS. (2009). Multivariate analysis of environmental and vegetation data of Ayub National Park Rawalpindi. Soil Environ. 28(2):103-112.
4. Dangwal LR, Singh A, Singh T, Sharma A, Sharma C. (2010b). Effect of weeds on the yield of wheat crop in Tehsil Nowshera. J American Sci. 6(10):405-407.

5. Abdul Ghafoor, A. and R. A. Shad (1995). Relative competition of Grasses, Broad leaved and Mixed Weed population with Wheat. Emir.J.Agric.Sci.7:55-64.
6. Klingman, G. C., F. M. Ashton and L. J. Noordhoff (1975). Weed Science: principles and practices. John Wiley & Sons, Inc. New York.
7. Muzik, T. J. (1970). Weed biology and control. Mc Graw- Hill.Inc. New York.
8. Mahmood, T.Z. and S.A., Niaz (1992). Weeds in Cropped Land at Islamabad," NARC, Identification and Control of Weeds Manual, National Training Course, Pakistan Agriculture Research Council, Islamabad. p. 79.
9. Kukula, S. and A. M. Ghanuni (1992). Weed management practices and weed management research in Great Socialist People's Libyan Arab Jamahiriya (Libyan) proceeding of the first national workshop on weed management in the Jamahiriya, 24-26 March, 1990.
10. Omar, N., Alaib, M. A., and Al-Zerbi, K. A. (2020). A Survey of Weed Species of Barley Crop Fields in Farms of GMR Agricultural Project in Jardina - Soloq Region, Libya. Libyan Journal of Basic Sciences. 11 (1): 29 – 38.
11. Omar, N., A.A. Alhursh, S.O. Alajeeli and A.K. Alzerbi (2022). Identification of the Most Important Weed Species in Barley Crops in Beir Bullerjam Region – Soloq, Libya. Scientific Journal for the Faculty of Science-Sirte University SJFSSU 2 (1): 15-22.
12. Al Sheef, N.B. (2023). Weed flora of Kaam area of Al-Khums city – Libya. Al academia journal for Basic and Applied Sciences (AJBAS). 5(5):1-13.
13. Erteb, F. B. (1994). A key to the families of flora of Libya. Tripoli intl. Scientific Bookshop Tripoli-Libya and Intl. pub.& Dist. House Cairo- Egypt.
14. Ali, S. I. and Jafri, S. M. H. (1976-1977). Flora of Libya, Vols. 1-24 Department of Botany, University of Tripoli, Tripoli.
15. El-Gadi, A. (1988-1989). Flora of Libya. Vols. 145-147. Department of Botany, Al-Faateh Univ., Tripoli.
16. Keith, H. G. (1965). A preliminary check list of Libyan flora. 2Vols. The Government of Libyan Arab Republic, Ministry of Agriculture and Agrarian Reform, Tripoli.
17. Jafri, S. M. H. and A. El-Gadi (1977-1986). Flora of Libya. Vols. 25-144. Department of Botany, Al-Faateh Univ., Tripoli.
18. Tackholm, V. (1974). Students' flora of Egypt. 2nd. Cairo University, Cairo.
19. Lazzaro, L., Ferretti, G., Bianchi, E., and Benesperi, R. (2018). Treatment by glyphosate—Based herbicide allowed recovering native species after Oxalis pes-caprae L. invasion: Indications from a Mediterranean island. Plant Biosyst., 153, 651–659.

Illustrative Images Appendix:

Calendula arvensis (Asteraceae)

Echinops galalensis (Asteraceae)

Matricaria aurea (Asteraceae)

Onopordum arenarium (Asteraceae)

Echium angustifolium (Boraginaceae)

Oxalis pes-caprae (Oxalidaceae)

Biscutella didyma (Brassicaceae)

Coincya tournefortii (Brassicaceae)

Sinapis alba (Brassicaceae)

Avena sterilis (Poaceae)