

Original article

# Checklist of Poisonous Plants of Cyrene (*campus apollo*) Shahat-AL-Jabal AL-Akhdar, Libya

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## ABSTRACT

**Aims.** The aim of the present study was to identify the poisonous plants of Cyrene (*campus Apollo*) Shahat- AL-Jabal AL-Akhdar, Libya. **Methods.** The study was carried out in the period from October 2021 to May 2023. The plant specimens were collected in flowering or in fruiting condition. Data inventory has been documented in the form of family, botanical name, vernacular name, life form, and Used part. **Results.** The study revealed the presence of 50 species of poisonous plants distributed in 41 genera and 27 families. Two family of Gymnosperms and remaining 25 families are belonging to Angiosperms. Dicotyledons are represented by 39 species 2 sup species 33 genus 20 families. Monocotyledons are represented by 6 species 6 genus 5 families. The most dominant life forms of the poisonous plants were Therophytes having 20 species (40%) followed by Geophytes 9 species (18%), Phanerophytes 8 species (16%), Nano-phanerophytes 6 species (12%), Chamaephytes 5 species (10%), and Heleophytes 2 species (4%). **Conclusion.** This study is considered the first of its kind to document poisonous plants in the region, and to prepare a list of them, as they have not been studied before, and came to fill the lack of information. Further studies are needed towards to a better understanding of the detailed mechanism of action of these poisonous plants, as well as their role in curing a variety of diseases.

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## INTRODUCTION

The documented usage of plants for both eating and medical purposes [1,2]. Is as old as human presence on earth [3]. According to the World Health Organization's (WHO) study report, nearly 80% of the population in underdeveloped nations relies on traditional medicine for primary healthcare [4]. Alkaloids, phenolics, flavonoids, terpenoids, and glycosides are just a few of the numerous secondary metabolites found in medicinal plants that function to shield them from harmful circumstances [5].

Most plant products have therapeutic qualities that make them physiologically and pharmacologically valuable, yet some are hazardous to both people and animals because they contain dangerous byproducts [3]. Due to their toxic properties, these plants, which are widely dispersed and used by indigenous people for fishing, hunting, and the treatment of various illnesses, are known as poisonous plants [6,7].

The toxicity of a plant species varies from species to species and is influenced by a variety of factors, including chemical, physical, biological, and environmental ones (such as the presence and concentration of chemical substances, the age of the plant, the use of its parts, the stage at which its fruits are ripening, the type of soil, temperature, and humidity, etc.) [8]. Toxins can enter the body by touch, which can irritate the skin, ingestion, which can be poisonous internally, absorption, or inhaling through the respiratory system [9].

Some toxic compounds can even be used as effective treatments for human diseases [10]. The toxicity of poisonous plants is in some cases in the whole plant, and in some cases in some parts of the plant, such as shoots, leaves, flowers,

seeds, bark or even latex [11]. Continuous research and development of plant knowledge has promoted the recognition and utilization of plants for medicinal purposes [12]. And their toxicological profiles [13].

Most people are not aware of the toxicity of most of the plants around them, which can be harmful if they come into contact or even ingest. In animals, most poisonous plants cause poisoning when accidentally grazed by [14]. Thus, the best way to minimize accidental poisoning from poisonous plants is to make people aware of the toxicity of plants and their harmful effects on them and other animals.

Sometimes, the lack of knowledge and unawareness from inhabitants means that they use these plants for food, fodder and medicinal purposes, or are even subjected to accidental exposure, which is sometimes life threatening to both humans and animals. Poisonous plants are harmful for livestock and causes of economic loss to the livestock sector.

Al-Jabal Al-Akhdar has a unique, relatively high biodiversity that acts as a refuge for many species. The background of the area shows that it was free of all natural resources except natural vegetation because it was relied on for the livelihood of the local population. The main activities throughout history have been grazing, gathering wood for fuel, honey production for bees, gathering medicinal species and wood products.

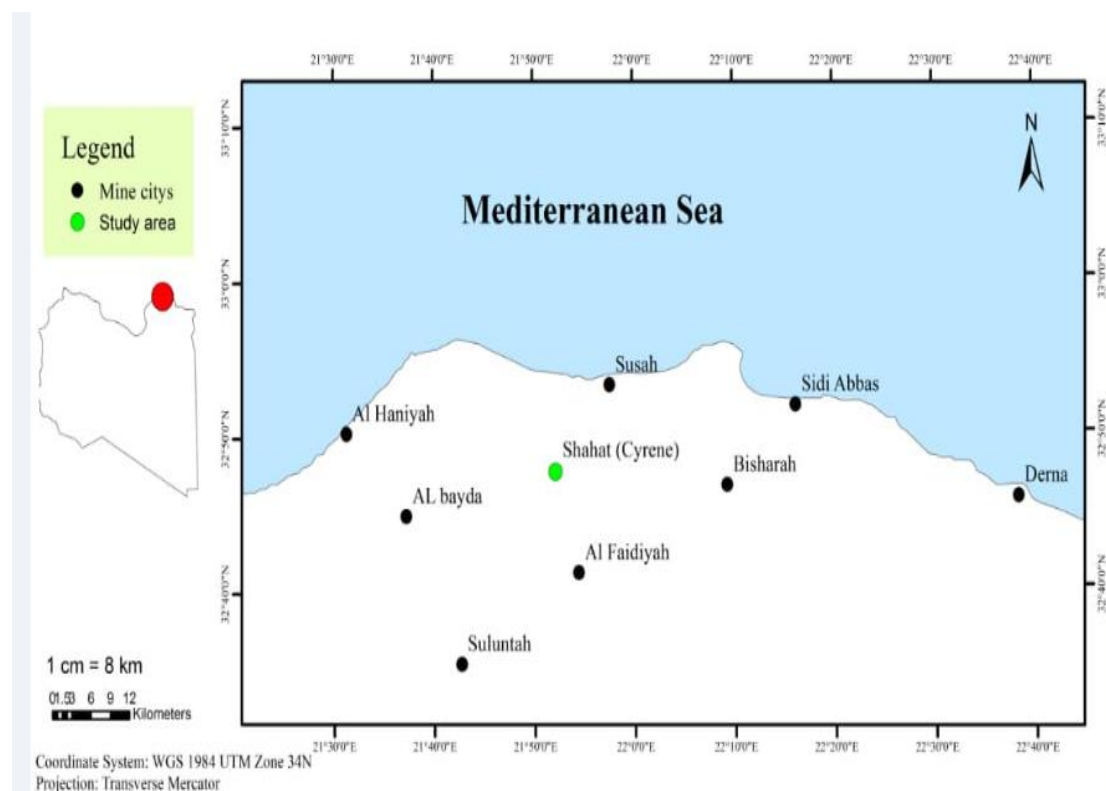
Many plant species were a source of food for people, and at the same time, the natural vegetation is a refuge for many birds and wild animals, which are also a source of food and medicine for the inhabitants. In fact, the study area is rich in medicinal and aromatic species, some of which are poisonous plants.

Cyrene is located about 10Km east of the city of Al-Bayda, in the north east of Libya [15]. It is found on the second terrace of Al- Jabal Al- Akhdar, at an elevation of around 600 meters, this historic city was established in 631 BC by Greek dealers who frequented the coasts of eastern North Africa [16]. It is regarded as one of the most beautiful spots in the world, having been placed first at the London International Tourism Fair. It was the home of the now- extinct silphium plant, which had tremendous medical and economic value [15]. This study came to fill the lack of information and aims at the initial inventory of the types of poisonous plants in the region, defining them, preparing a list of them, and distributing these species within groups such as species, genera, and forms different life.

## METHODS

### *The study area*

Cyrene is located in the city of Shahat, which is located east of the city of Al-Bayda, 10 km away in the north-east of Libya. [15]. It is located on the second terrace of Al- Jabal Al- Akhdar, at an altitude of approximately 600 meters. The area of the study area is about 11,306561 hectares. Its height is between (555: 578) meters. It lies between N 32 49°23.952" E21°51'11.1888". Latitude on the North East region, Al Jabal Al-Akhdar (Figure 1).



**Figure 1. The study area**

### Specimen Collection and Identification

The study included many field observations to identify the vegetation cover, where the study area was visited during the seasons of the year (2021-2022). Poisonous plants were counted and recorded scattered in this area and pictures were taken of the types of plants present.

The samples were dried for two weeks with presses, plant samples were preserved in a weed leaf by glue. The plant samples were identified in the silphium herbarium, Department of Botany, College of Science, Omar Al-Mukhtar University, using the Libyan Flora Books.

### RESULTS

The results of preliminary survey of Shahat, Al-Jabal Al-Akhdar show that the region has flora of 50 species of flowering plants distributed in 41 genera and 27 families. Two family of Gymnosperms and remaining 25 families are belonging to Angiosperms. Dicotyledons are represented by 39 species 2 sup species 33 genus 20 families Monocotyledons are represented by 6 species 6 genus 5 families.

Our results revealed that the most represented life forms of the poisonous plants were Therophytes having 20 species (40%) followed by Geophytes 9 species (18%) Phanerophytes 8 species (16%) Nano-phanerophytes 6 species (12%), Chamaephytes 5 species (10%), and Heleophytes 2 species (4%).

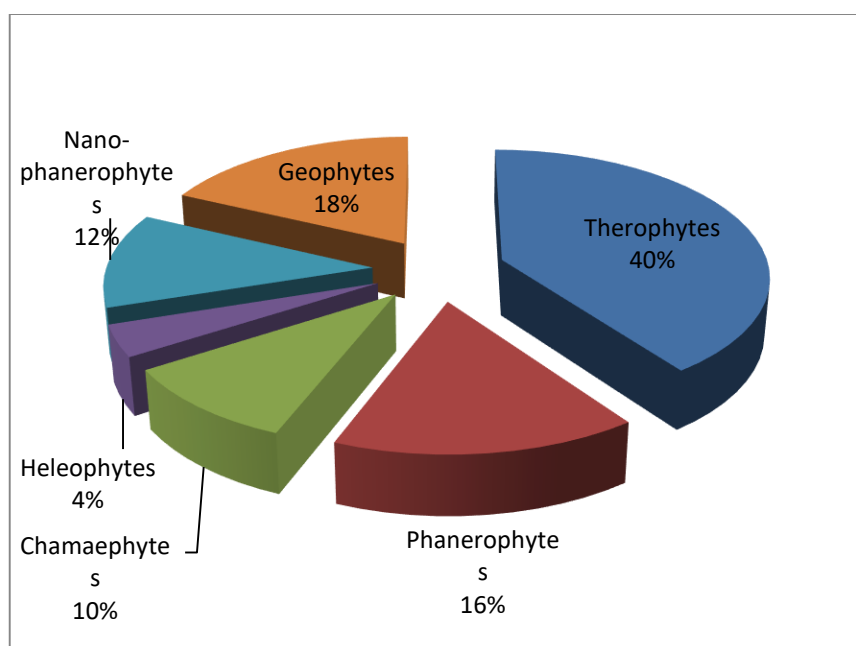
**Table 1. List of poisonous plant species, recorded in Shahat, Al-Jabal Al-Akhdar, their life form, and used part. for plant life-forms are: (Ch) Chamaephyte, (G) Geophyte, (H) Hemicryptophyte, Ph(Phanerophyte), Th (Therophyte)**

N o.	Family	Scientific name	Life form	Local name	Used part	References
1.	Alliaceae	<i>Allium roseum</i> L.	G	Ghazul	Leaves and Bulbs.	Flora of Libya
2.	Amoryllidaceae	<i>Narcissus elegans</i> (Haw.)Spach.	G	Nargis	Bulbs	Flora of Libya
3.	Apocynaceae	<i>Nerium oleander</i> L.	N.Ph	Defla	The entire plant	Kotb, 1985
4.	Apiaceae	<i>Ammi majus</i> L.	Th	Khalla	Fruits when consumed in large quantities.	Flora of Libya
5.		<i>Thapsia garganica</i> L.	Ch	Derias	The entire plant	Flora of Libya
6.	Araceae	<i>Arisarum vulgare</i> Targ. Tozz.	G	Weden Essaloqi	Tuber	Flora of Libya
7.	Asteraceae	<i>Senecio leucanthemifolius</i> Poiret.	Th	Aloghwan	Leaves	El-Gadi 1989
8.		<i>Sonchus oleraceus</i> L.	Th	Tefaf	Milky juice.	Flora of Libya
9.		<i>Xanthium spinosum</i> L.	Th	-----	Seedling.	
10.	Boraginaceae	<i>Borago officinalis</i> L.	Th	Lesan Althawr	Consume a plant continuously for a long time.	Kotb 1985
11.		<i>Echium angustifolium</i> Mill.	Ch	Henna alagrab	Its barbed hairs spread throughout most of the plant are an obstacle to grazing animals and contain alkaloids.	Flora of Libya
12.		<i>E. sabulicola</i> Pomel.	Th	\\\\	\\\\	Flora of Libya
13.		<i>Heliotropium europaeum</i> L.	Ch	Ramram	Seeds and young shoots.	Flora of Libya
14.	Brassicaceae	<i>Sinapis alba</i> L.	Th	Khardal,	The entire plant, especially seeds and fruits.	Flora of Libya
15.	Capparaceae	<i>Capparis spinosa</i> L	H	Kabbar	Seeds and fruits	Flora of Libya
16.	Clusiaceae	<i>Hypericum triquetrifolium</i> Turra	H	Bugrat	The entire plant	Flora of Libya
17.	Cupressaceae	<i>Cupressus sempervirens. ver.horizontalis</i> (Mill.)Gordon	Ph	Al-sarow	leaves.	Kotb 1985
18.		<i>C. sempervirens</i> L. ver. <i>Sempervirens</i>	Ph	\\	\\\\\\\\	Kotb 1985
19.	Euphorbiaceae	<i>Euphorbia retusa</i> L.	N.Ph	Halablab	Milky juice	Flora of Libya

20.		<i>E.dendroides</i> L	N.Ph	Halablab	\\	Flora of Libya
21.		<i>E. peplus</i> L.	Th	Lebbena	The entire plant, especially milky juice	Kotb, 1985
22.		<i>Mercurialis annua</i> L	Th	Halbob	Milky juice and volatile oils.	Kotb, 1985
23.		<i>Ricinus communis</i> L	N.Ph	Kharwa	The seed.	Kotb, 1985
24.	Fabaceae	<i>Anagyris foetida</i> L.	Ph	Kharroub El-Klab	Toxic to humans and animals because it contains alkaloids Cytisine Anagyrene	Kotb, 1985
25.		<i>Lathyrus aphaca</i> L.	Th	Bega	The entire plant, especially seeds.	Kotb, 1985
26.		<i>Robinia pseudoacaia</i> L.	Ph	Chagarat Algarad	The inner shell of the stem, branches, tender leaves and seeds.	Kotb, 1985
27.	Iridaceae	<i>Iris sisyrinchium</i> L.	G	Kaab teeb	Rhizomes.	Flora of Libya
28.	Lamiaceae	<i>Rosmarinus officinalis</i> L.	N.Ph	Kleel	Volatile oils.	Flora of Libya
29.	Lauraceae	<i>Laurus nobilis</i> L.	Ph	Ghar - Rand	Leaves when consumed in large quantities..	Flora of Libya
30.	Liliaceae	<i>Ornithogalum umbellatum</i> L.	G	-----	The entire plant, especially bulbs	Flora of Libya
31.		<i>Urginea maritima</i> (L.)Baker.	G	Faroon	The entire plant, especially bulbs	Flora of Libya
32.	Moraceae	<i>Ficus carica</i> L.	Ph	Karmus	Fruits and latex from the stems.	Kotb, 1985
33.	Oleaceae	<i>Olea europaea</i> L.	Ph	Zaitoon	Leaves.	Flora of Libya
34.	Oxalidaceae	<i>Oxalis pes-caprae</i> L.	G	Hommeida	The entire plant	Flora of Libya
35.	Papaveraceae	<i>Papaver rhoeas</i> L.	Th	Zeghalil	The entire plant	Kotb 1985
36.	Pinaceae	<i>Pinus halepensis</i> Mill.	Ph	Senouber	Leaves	Kotb 1985
37.	Polygonaceae	<i>Rumex pulcher</i> L.	Th	Hommadet Hmam	The entire plant	Kotb 1985
38.	Primulaceae	<i>Anagallis arvensis</i> L. ver <i>arvensis</i>	Th	Ain Algatuus	Roots and leaves.	Flora of Libya
39.		<i>Anagallis arvensis</i> L. <i>caerulea</i> (L.) Gouan	Th	\\	\\	\\
40.		<i>Cyclamen rohlfsianum</i> Aschers.	G	Rakaf	Tubers	Kotb 1985
41.	Urticaceae	<i>Urtica pilulifera</i> L.	Th	Horreiq	The bristles touched the body.	Flora of Libya
42.	Ranunculaceae	<i>Adonis microcarpa</i> DC.	Th	Ain el buma	Flowers, leaves and roots.	Flora of Libya
43.		<i>Ranunculus asiaticus</i> L.	G	Harir	Succulents.	Flora of Libya
44.		<i>R. bullatus</i> ssp. <i>cyrenaicus</i> (Pamp.)Maire.	Ch	\\	\\	\\
45.		<i>R. cyclocarpus</i> Pamp.	Th	\\	\\	\\
46.		<i>R. trilobus</i> Desf.	Th	\\	\\	\\
47.	Solanaceae	<i>Datura innoxia</i> Mill.	Ch	Datura	The entire plant	Flora of Libya
48.		<i>Nicotiana glauca</i> Graham.	N.Ph	akkuzemus a	The entire plant	Flora of Libya
49.		<i>Solanum nigrum</i> ver <i>nigrum</i> L.	Th	Enab –Al-deib	Unripe small fruits.	Flora of Libya
50.		<i>Solanum nigrum</i> ver <i>villosum</i> L.	Th	\\ \\ \\	\\ \\ \\	Flora of Libya

**Table 2. Life- form spectrum of poisonous plants in Cyrene (Shahat) Al-Jabal**

Life form	No. of species
Therophytes	20
Geophytes	9
Phanerophytes	8
Nano-phanerophytes	6
Chamaephytes	5
Heleophytes	2

**Figure 2. Life- form spectrum of poisonous plants in Cyrene (Shahat)Al-Jabal Al-Akhdar.**

## DISCUSSION

We note here that most of the existing plants are annual plants that have the ability to adapt to the high temperatures in the summer, and they represent the Mediterranean region, and this study is consistent with previous studies conducted in different regions of the AL-jabal AL-akhdar [17,18].

This ecological spectrum is strikingly similar to that of other Mediterranean basin regions. Therophytes, the main life form, is well adapted to the summer because annuals complete their life cycle in a single season.

In Shahat, Therophytes made up the largest portion of the spectrum of life- forms in poisonous plants, similarly, [19] indicated that Therophytes were dominant (36%).

The analysis of the distribution of the species shows that Asteraceae, Fabaceae and Boraginaceae attained the highest number of genera recorded in the study area with 3 genera and 3 species, followed by Apiaceae, Liliaceae and Primulaceae with 2 genera and 2 species. There is more than one family that was represented by one gender and one species. Similar results have been reported in previous studies investigating the vegetation of Al-Jabal Al-Akhdar's valleys; Asteraceae was the most dominant family in Wadi Al-Ager, with 46 species [20]. It was also the largest family in the Sedy Boras region, represented by 130 species [21].

Our results agreement with Alzerbi *et al.*, (2016, 2018) in their comprehensive analysis of Wadi Al-Kouf vegetation which they reveal that number of poisonous plant species were also recorded in this study such as; *Solanum nigrum* L. *Euphorbia charachias* L. *Thapsia garganica* L. *Neirium oleander* L. *Hypericum triquetrifolium* Turra. (Table 1).

Similarly, many studies have indicated the types of poisonous plants that were recorded in our current study [24,1].

Some of these poisonous plants are has medicinal uses known in Folk Medicine [22-24].

Poisonous plants can be classified on the basis of the chemicals they possess such as alkaloids, glycosides [25]. The toxicity of a plant depends on the presence of several chemical com pounds and their concentration, as well as on other factors, i.e., temperature, rain, age of plants, growth stage [24].

## CONCLUSION

AL-jaabal AL-akhdar is considered one of the important areas because of its vegetation cover rich in plants that are not found anywhere else, some of the poisonous plants harvested due to their high medicinal values and because of their over-exploitation they are categorized as threatened species. On the other hand, due to the toxicity of these plants to animals, these plants are wiped out by the local inhabitants, due to which the existence of these plants may be threatened in the future. Therefore, it is urgent need to develop conservation strategies for these plants as well as aware the people about their toxicity especially in children. Further studies are needed towards to a better understanding of the detailed mechanism of action of these poisonous plants, as well as their role in curing a variety of diseases.

*Conflict of interest.* Nil

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## قائمة مرجعية للنباتات السامة في القيرواني (حرم أبولو) شحات الجبل الأخضر ، ليبيا

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### المستخلص

**الأهداف.** الهدف من هذه الدراسة هو التعرف على النباتات السامة في القورينا (حرم أبولو) (الشحات- الجبل الأخضر ، ليبيا. **طرق الدراسة.** أجريت في الفترة من أكتوبر 2021 إلى مايو 2023. جمعت في حالة التزهير أو الاثمار ، وقد تم توثيق حصر البيانات في شكل العائلة ، والاسم النباتي ، والاسم العام ، وشكل الحياة ، والجزء المستعمل. **النتائج.** أظهرت الدراسة وجود 50 نوعاً من النباتات السامة موزعة على 41 جنساً و 27 عائلة. تنتمي عائلتان من عاريات البذور و 25 عائلة متبقية إلى كاسيات البذور. وتمثل ذوات الفلقتين 39 نوعاً و 2 نوع 33 sup جنس 20 عائلة. وتمثل أحادية الفلقة 6 أنواع 6 جنس 5 فصائل. أكثر أشكال الحياة انتشاراً للنباتات السامة كانت Therophytes بها 20 نوعاً (40%) تليها 9 Geophytes أنواع (18%) ، 8 Phanerophytes أنواع (16%) ، 6 Nano-phanerophytes أنواع (12%) ، 5 Chamaephytes أنواع (10%) ، و Heleophytes نوعان (4%). **الخاتمة.** وتعتبر هذه الدراسة الأولى من نوعها لتوثيق النباتات السامة في المنطقة ، وإعداد قائمة بها ، حيث لم يتم دراستها من قبل ، وجاءت لملء النقص في المعلومات. هناك حاجة إلى مزيد من الدراسات من أجل فهم أفضل للألية التفصيلية لعمل هذه النباتات السامة ، وكذلك دورها في علاج مجموعة متنوعة من الأمراض.

**الكلمات الدالة.** الجبل الاخضر القيرواني ، الشحات ، النباتات السامة.