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Checklist of Poisonous Plants in Al Mansora and Jarjar– oma regions of Al Jabal Al Akhdar- Libya

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A B S T R A C T

The total number of poisonous species in the two regions was 78 species. In Al Mansora region 36 species which belong to 32 genera and 22 families, 9 species belong to monocotyledons and 27 species belongs to dicotyledons were recoreded. The results showed that the percentage of poisonous plants was 20.5% in Al Mansora region. However, in Jarjar oma region 42 species which belong to 37 genera and 23 families, 10 species belong to monocotyledons and 32 species belong to dicotyledons were recorded. Also, the results showed that the percentage of poisonous plant was 23.4% in Jarjar oma region. The checklist included family, scientific name, local name, some toxic plant parts and some effects for some species.The results showed that the largest proportion of poisonous species in the Mansora site egion to Asteraceae, Poaceae, Ranunculaceae,Apiaceae and Euphorbiaceae respectively. In Jarjar oma region the largest families were Euphorbiaceae, , Fabaceae, Chenopodiaceae, Liliaceae and Poaceae respectively.

1. Introduction

Poisonous plant substances can be considered waste products or intermediate products in secondary metabolic processes and perform non-essential functions in plants but interfere with plant-environment interactions. Some are pigments give a color of flowers and fruits, play an essential role in reproduction by attracting insect pollinators or animals that contribute to the dispersal of seeds. Others protect plants from predators, and act as repellents because of their bitter taste or toxic properties or both. It also intervenes in mechanisms to defend plants against various pathogens, such as pesticides (Olsnes, 2004). The poisonous plant is known to contain any toxic compounds that are harmful if consumed by humans or animals (Iramain, et al., 2008). Plants may possess unique features (such as hairs, crystals, pollen, or spines) that can injure people

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mechanically or through contact without ingesting them; these interactions may induce systemic effects because of chemicals released after contact. (Pérez, et al.,2010). In order to avoid, endure, or defend themselves against predators, parasites, and rivals, plants have evolved a diverse array of defense systems. Plants can defend themselves in a variety of ways. Mechanical defenses, for example, can be caused by prickles, spines, thorns, or even sharp edges on specific parts of the plant that can pierce the skin and cause harm, itching, or irritation to the victim. Chemical defenses, on the other hand, are made of chemicals that are produced by plants as secondary metabolites or by-products of essential plant functions that are then stored in plant cells' vacuoles. (Patrick, et al.,1997). Accordingly, dangerous plants are divided into two major categories according to how they interact with organisms:(1) injuries by external contact (2) ingested (Cuadra, et al., 2012). Thus, the distinction between a poison and a remedy truly has no boundaries. The dosage administered determines whether a substance is a drug or a poison; a small dose is regarded a medicine, and a larger dose is considered a poison.If a high dosage is administered (Narayan, 2005Chemicals such as alkaloids, glycosides (including saponins), nitrates, bitter principles, oxalates, tannins, phenols, and volatile oils can be used to categorize plants as poisonous. (Frohne andPfander, 1984). Despite making up only 1% of Libya's total land area, Al-Jabal Al-Akhdar is distinguished by its extensive vegetation, which includes over 50% of all plant species found in the country. Of the approximately 2000 species of plants known to exist in Libya, about 1100 species are found in this region. (Al-Jabal Al-Akhdar south project, 2005). The goal of the current study is to list the dangerous plants found in the Al Mansora and Jarjar oma regions, as well as to illustrate the consequences and toxic components of these plants.

Table (1). Previous studies in the area of toxic plants, comprise toxin chemicals with examples, famous families containing the poison and most important effects

Toxin chemical	Examples	Famous families containing	Effects	References
Alkaloids	Nicotine, colchicine, morphine, ephedrine, and atropine	Amaryllidaceae, Apocynaceae, Buxaceae, Asteraceae, Euphorbiaceae, Fabacae, Liliaceae, Papaveraceae, Ranunculaceae and Solanaceae	Bitter taste often effects the gastrointestinal tract and the central nervous system	(Frohne & Pfander, 1984)
Glucosides	Releasing toxic chemicals on hydrolysis (e.g., cyanide or hydrocyanic acid)	Rosaceae, Fabaceae and Poaceae.	Anti-arrhythmic effects on the heart	(Dimitrios, 2006)
Oxalates	Oxalic acid and its salts	Oxalidaceae, Geraniaceae, Araceae and Polygonaceae	Causes toxic effects	(Tampion,1977) (Nasir & Ali,1970) (Dymock1890)
Nitrogenous compounds	Proteins, peptides and amino acids	Fabaceae and Euphorbiaceae	Agglutination of the red blood corpuscles	(Tampion ,1977) (Nasir &Ali,1970) (Dymock 1890)

Toxin chemical	Examples	Famous families containing	Effects	References
Essential or volatile oils		Lamiaceae, Asteraceae, Rutaceae, Apiaceae, Myrtaceae	Affecting the Digestive system and Central nervous system	(Tampion ,1977) (Nasir & Ali,1970) (Dymock 1890)
Resins	Heterogeneous group of complex and variable chemical substances	Cucurbitaceae, Convolvulaceae and Euphorbiaceae	Some of these cause poisoning due to their purgative or irritant properties	(Tampion ,1977) (Nasir & Ali,1970) (Dymock 1890)

Materials and Methods

2.1 Location

Information about Poisonous plants were collected from literature review in the area of poisonous plants (Dahkel, 2014) of poisonous plants. All species where checklist includes family, scientific name, local name, life duration, flowering period, some toxic part, toxic compound and some toxic effects of this species

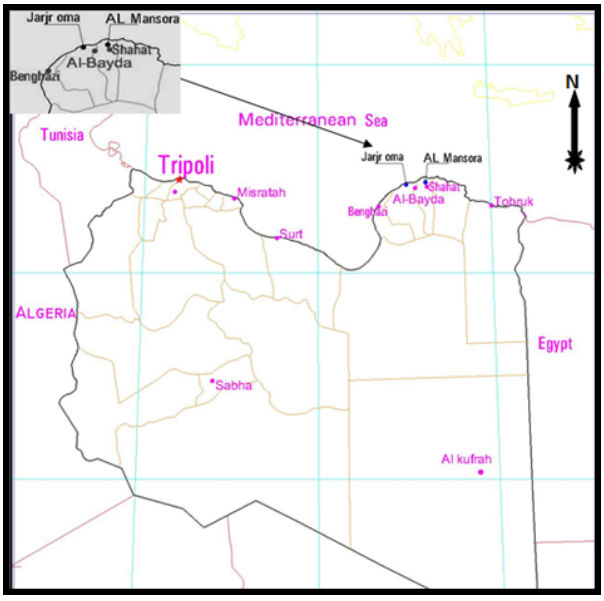

Figure (1) Map of the study regions

The studied regions are Al Mansora, which is located on Libya's Mediterranean coast between latitude "44.8 ,50ó ,32ỏ N and longitude "30.3 ,50ó ,21ỏ E 11 Km east Al Baida city, and Jarjar-oma between latitude "49.8 ,47ó 32ỏ N and longitude "40.6 ,26ó ,21ỏ E, 28 km west Al Baida city. Al Mansora 6.5 km of the sea at altitude of 309.4 m above sea level and Jarjr-oma 300 m of the sea at altitude of 1 m above sea level. (Fig 1).

2.2 Climate:

Table (2). Climate information about the study regions

Climate		Al Mansora	Jarjar oma
Rainfall	Maximum/month	111.4 mm-January	191.6 mm-January
	Minimum/month	0.39mm June	1.2mm June and July
	mm/ year	515.9	550.5
Temperature	Maximum/month	24 C˚/ August	24 C˚/ August
	Minimum/month	9 C˚/ January and February	9.7 C˚ / February
Relative humidity	The highest	80.2%/ January	75.4%/ January
	The lowest	61% - May	50%- June
Wind speed	The highest	7.9 Knots – February	5.8 Knots- February
	The lowest	5.8 Knots – October	4.5 June, September and October

3. Results and discussion

In Al Mansora there is 36 poisonous species belonging to 32 genera and 22 families. Dicotyledons represented by 27 species, and monocotyledons represented by 9 species. While in Jarjar oma there is 42 represented by 10 species Table (3). In addition, among the recorded species one endemic species *Allium negrianum* in Al mansora and one endemic species *Allium rumherianumin* Jarjar oma. According to (Dahkel, 2014). The flora of Al mansora region was represented by 175 species, while in Jarjar oma region was represented by 179 species. In the previous studies, the checklist showed that about 20.5 % and 23.4% of the species of the plants in the Al mansora and Jarjar oma respectively regions are poisonous.

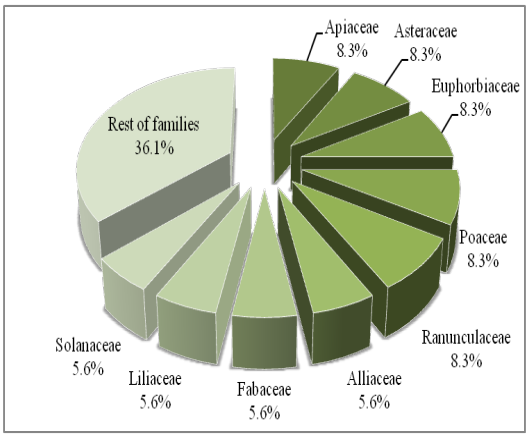

Figure (2) The percentage of poisonous plant in each family relative to total number of poisonous plant species in Al Mansora region.

In Al Mansora area the largest families were Asteraceae, Poaceae, Ranunculaceae, Apiaceae and Euphorbiaceae (8.3%) with 3 species for each family, Alliaceae, Fabaceae Liliaceae and Solanaceae (5.6%) with 2 species for each family, while the rest families were 36.1% with species belonging to 13 families (one species for each family) (Fig. 2)

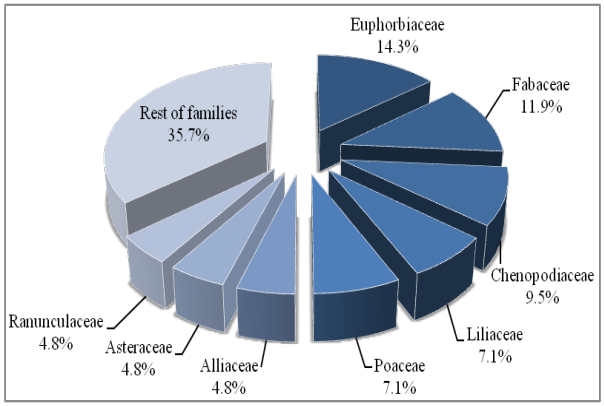

Figure (3) The percentage of poisonous plant in each family relative to total number of poisonous plant species in Jarjar oma region.

In Jarjar oma region the largest families were Euphorbiaceae (14.3%) with 6 species, Fabaceae (11.9%) with 5 species, then Chenopodiaceae (9.5%) with 4 species, Liliaceae and Poaceae (7.1%) with 3 species for each family, Alliaceae, Asteraceae and Ranunculaceae (4.8%) with 2 species for each family. The other family was 35.7% with 15 species belonging to 15 families (one species for each family) (fig. 3). The vernacular name, life duration and flowering period is according to (Jafri and El-Gadi,1977-1993). The poisonous constituents of the studied species and their major toxic effects are taken from previous literatures

(Table 1). Some species found in the region are well known at the general level to exhibit toxicity worldwide e.g. *Euphorbia* spp., *Heliotropium* spp., *Chrozophora* spp., *Oxalis* spp. (Frohne and Pfander, 2004; Cooper et al., 2003; Kingsburg, 1964)

The results of this study show that there are two species of the genus *Senecio*, which considered as highly toxic to cattle and humans. Both two species are *Senecio leucanthemifolius* Poiret in Al mansora and *Senecio gallicus* Chiax in Jarjar oma and belong to Asteraceae family. Toxic species contain pyrrolizidine alkaloids and carcinogenic compounds which have a toxic effect on

the liver, heart and uterine contractions (El- Gadi and Hossain, 1986

Table(3) Family, scientific name, vernacular name, toxic part, toxic effects for some poisonous plant species. (M= Al Mansora and J= Jarjar oma)

Family & Scientific name	M	J	Vernacular Name	Toxic part	Toxin	Effects
1. Aizoaceae *Mesembryanthemum nodiflorum* L.	-	+	Rhassoul	-	Oxalate	Oxalate toxicity& hypocalcemia & chronic ingestion can lead to renal failure
2. Alliaceae *Allium negrianum* Maire & Weiller	+	-	-	Bulbs, bulblets, flowers, and stems	Alkaloids	Intense gastroenteritis
Allium nigrum L.	+	-	-	Bulbs, bulblets, flowers, and stems	Alkaloids	Intense gastroenteritis
Allium roseum L.	-	+	Ghazul	Bulbs, bulblets, flowers, and stems	Alkaloids	Intense gastroenteritis
Allium rumherianum Asch.	-	+	-	Bulbs, bulblets, flowers, and stems	Alkaloids	Intense gastroenteritis
3. Amaryllidaceae *Narcissus elegans (*Haw*).* Spach.	+	-	Nargis	Bulbs	Alkaloids	Severe gastroenteritis, vomiting & trembling & convulsion
4. Anacardiaceae *Pistacia lentiscus* L.	+	+	Baattoom	Leaves Pollen	Tanin	Allergy Problems in digestion
5. Apiaceae *Ammi majus* L.	+	-	Sfinnari-hmeer	Fruit	-	-
Ammi visnaga (L.) Lam	+	+	Sfinnari-hmeer	Fruit	-	-
Thapsia garganica Lag.	+	-	Deryas	-	-	-
6. Araceae *Arisarum vulgare* Targ.	+	+	Weden Essaloqi	-	Aronin Saponine glycoside, Irritan juice	-
7. Asteraceae *Chrysanthemum segetum* L.	+	-	Oqhowan	Flower head	other & ,Arteglasin A sesquiterpene lactones	Sensitization & Dermatitis
Cichorium pumilum Jacq	+	+	-	-	-	-
Dittrichia viscosa (L.) W. Greuter	+	-	-	-	-	-
*Silybum marianum (*L.) Gaertner	-	+	Shobrum	Entire plant	Nitrates	Severe gastroenteritis, due to the reduction of nitrates to the more highly toxic nitrites
8. Brassicaceae *Sinapis alba* L.	+	+	Harra	Seed	Glycosides	Severe gastroenteritis and pain, fatal in some cases
9. Caesalpinaceae *Ceratonia siliqua* L.	-	+	Kharob	-	-	-
10. Chenopodiaceae *Beta vulgaris* L.	-	+	Selg	-	-	-
Chenopodium murale L.	-	+	Effena	Entire plant	-	Large quantities can cause interference with calcium metabolism in the body and possible phototoxicity

Family & Scientific name	M	J	Vernacular Name	Toxic part	Toxin	Effects
Salsola kali L.	-	+	-	-	-	-
Suaeda vera Forak.ex Gmel	-	+	Souida	-	-	Performs to death because of severe dirrohea
11. Cucurbitaceae *Bryonia cretica* L.	-	+	Ollag	Fruits – Root	Glycocidic, Bryonin and Bryonidin	Gastroenteritis, with vomiting & Abdominal pain & severe dirrhoea.
12. Cuscutaceae *Cuscuta epithymum* L.	+	-	-	Entire plant	-	If eaten in large quantities is caused general weakness and abdominal pains
13. Dioscoreaceae *Tamus communis* L.	-	+	-	Fruits	Unknown	Burning sensation in the mouth & blistering, together with abdominal pain & purging. deaths have been reported
14. Euphorbiaceae *Chrozophora tinctoria* (L.) Juss.	-	+	Effana	Fluffy hairs and milky juice	-	If eaten, plant parts cause burning sensations in throat, thirst, coughing and later stomach pain, nausea and vomiting. & Cause an inflammation or irritation when in contact with the skin
Euphorbia falcata L.	+	+	-	Entire plant	Resines & Resinoides	-
Euphorbia paralias L.	-	+	Lebbana	-	-	-
Euphorbia parvula Del.	+	-		-	-	-
Euphorbia peplis L.	-	+		Entire plant	Resines & Resinoides and Tanen	-
.L *Euphorbia peplus*	-	+	Libana	Entire plant especially Milky juice	Diterpene phoabol	Lesions of the mouth & digestive system producing severe gastroenteritis with purgation& death
Mercurialis annua L.	+	+	Marga	Pollen Leaves	Saponinler (Metliamin, Trimetilamin)	Severe gastroenteritis in human and livestoc& leaves eaten as vegetable can also cause poisoning
15. Fabaceae *Lathyrus aphaca* L.	-	+	-	Seed	Propionitrits derivatives	-
L *Medicago polymorpha*	+	+		-	-	-
Melilotus indicus (L.) All.	+	-	-	-	Fungi that grow on it can create dicoumarol, the principle toxin	Animal may be injuriedmarked swellings, mucous membranes are respiration & pale ; pulse rapid. Then death
Desf *Melilotus sulcatus*	-	+	-	-	Fungi that grow on it can create dicoumarol, the principal toxin	Animal may be injuriedmarked swellings, mucous membranes are pale ; pulse & respiration rapid. Then death
.L *Vicia sativa*	-	+	Jilban	Seed	Siyonogenetics glycoside	-
(L.) Schreb *Vicia tetrasperma*	-	+		-	-	-
16. Hypericaceae *Hypericum triquetrifolium* Turra	+	-	Bugrad	Leaves & Flowers	Hypericin	Swelling for livestock particularly goats and sensititety by touch
17. Lamiaceae *Marrubium vulgare* L.	+	-	Robia	-	-	-
18. Liliaceae	+	+	Onsail	-	-	-

Family & Scientific name	M	J	Vernacular Name	Toxic part	Toxin	Effects
Asphodelus microcarpus Salzm. & Viv.						
Scilla peruviana L.	-	+	Possaila	Entire plant	Cardioactive steroids resembling digitalis	Animals' ingestion lead to Poisoning to produce cardioactive steroid poisoning. Dysrhythmias are usually lead to as sinus bradycardia, premature ventricular contractions, atrioventricular conduction .defects
Urginea maritima (L.) Baker.	+	+	Faroon	Bulb	Scillarin, a cardioactive steroid resembling digitalis.	-Poisoning to produce cardioactive steroid poisoning. Dysrhythmias are usually lead to as sinus bradycardia, premature ventricular contractions, atrioventricular conduction defects.
19. Linaceae *Linum usitatissimum* L.	+	-	Kettan	Leaves & Seeds	cyanogenic glycoside (Linamarin) that releasing cyanide & Curbitacin	Convulsion, Increased respiratory rate, epilepsy and paralysis may lead to death.
20. Malvaceae *Malva parviflora* L.	+	+	Khobbaze	Entire plant	Nitrate	Intoxication are shevering or trembling , staggering and collapse. Respiratory troubles and convulsions
21. Oleaceae *Olea europaea* L.	+	-	Zaytun	Leaves	-	-
22. Orobanchaceae *Orobanche coelistis* (Reut.)	-	+	-	Entire plant	-	General weakness, abdominal, pain, salivation, abdominal inflammation
23. Oxalidaceae *Oxalis corniculata* L.	-	+	Hommeda	Entire plant	Oxalic acid & oxalate	Colic, depression, coma, even death
24. Papaveraceae *Papaver rhoeas* L.	+	-	Garoon	Entire plant especially during seed formation	Al kaloide (Morphine&Rheadine)	Drowsiness deep- sleep, slow respiration and weak pulse in animal with intestinal disturbances
25. Poaceae *Cynodon dactylon* (L.) Pers.	-	+	Nagil	The plant itself is probably not toxic and the toxins produced of the fungi that grow on plant	-	A variety of effects is produced depending upon type of fungus
Dactylis glomerata L.	+	+	Adem	-	-	-
Lolium rigidum Guad.	+	-	Bomanjor	-	-	-
Phalaris minor Retz.	+	+	Zewan	-	-	-
Polygonaceae .26 .L *Rumex crispus*	-	+	-	Entire plant	Anthraquinone, Flavonoid hydrocarbon, Saponin & Tanin, Rumisin,Hirizorobin (root)	-
27. Primulaceae *Anagallis arvensis* L.	+	+	Ain el-Gattous	Roots Leaves	Glycoside, tannins, cyclamin & Saponins	Dermatitis
Ranunculaceae .28 DC *Adonis microcarpa*	+	+	Ain El Buma		Glycoside adonidin & Adonitoxin	Severe gastro enteritis

Family & Scientific name	M	J	Vernacular Name	Toxic part	Toxin	Effects
Ranunculus asiaticus L.	+	+	Harir	Entire plant especially bulbous	Glucoside ranunculin	Severe gastro intestinal irritation, mouth inflamed , blister forming on skin
Ranunculus bullatus L.	+	-	-	Entire plant	Glucoside ranunculin	Severe gastro intestinal irritation, mouth inflamed , blister forming on skin
29. Scrophulariaceae *Scrophularia canina* L.	+	-	-	Entire plant	Iridoid & Saponin	-
30. Solanaceae *Datura innoxia* Mill.	+	-	Datura	Nectar of flower Leaves	Hyoscyamine, Atropine& andother Al kaloides(mexture of Hyoscyamine & meteloidine)	Leaves used as poison and sucking nectar from is flowers may cause poisoning in children
Nicotiana glauca R.C.Graham	+	-	Akukuzemo sa	All plant, especially flowers and leaves	Alkaloid anabasine And Nicotine	Weak pulse, staring eyes, unsteadiness, trembling, salivation, frequent urination in some animals
Urticaceae .31 .L *Urtica urens*	-	+	Horrag	Arial parts espicially leaves	Acetocoline and Histamine	Reddening accompaniend by the marked itching swelling and an intense burning sensation
Zygophyllaceae .32 .L *Zygophyllum album*	-	+	Belbal	Parts of fresh	Unknown	-

Some the references that used in checklist prepare (Jacob & Peet, 1989), (Ginty & Machen, 1914), (El-Gadi & Hossain, 1986), (Silanikove et al., 1996), (Wagstaff, 2008), (Kadri et al. 2013), (Lewis, et al. 2007), (Ahmed, 2012), (Sharawy & Alshammari, 2009), (Hilal & Youngken, 1984), (Hardin et al., 1974), (Frohne & Pfander, 2004), (Cooper et al, 2003), (Kingsburg, 1964), (Ozturk et al., 2008), (Gildersleeve et al 2013), (Al-Jabal Al-Akhdar south project. ,2005) and (Stary & Berger, 1995).

The number of Annuals poisonous species recorded was 24 and 19 in Jarjar oma and Al Mansora respectively, while perennials poisonous species was 18 and 17 in Jarjar oma and Al Mansora respectively (Table 4).

Table (4) Comparison between the poisonous plant species groups in two study regions.

Regions	Poisonous species	Family	Genera	Species
	Annual	-	-	24
	Perennial	-	-	18
	Monocot	5	9	10
Jarjar oma	Dicot	18	28	32
	Total	23	37	42
	Annual	-	-	19
	Perennial	-	-	17
	Monocot	5	8	9
Al Mansora	Dicot	17	24	27
	Total	22	32	36

Conflict of interest: The authors declare that there are no conflicts of interest

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