

## **THE DIVERSITY OF WILD ANIMALS IN THE NORTHEASTERN MARJ REGION (LIBYA)**

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### **ABSTRACT**

The Libyan Marj Province, part of the Libyan coastal plain, is known for its diverse habitats and a source for food for a variety of wildlife species. Given the nature of the vital environment in Libya, it was found that the most obvious aspect is that most of the country's area falls within a desert climate. The most important feature of the Libyan desert is the oases in which the water level is close to the surface. The most important element in particular is the presence and abundance of bird species in the wild fauna. In this research, many species of mammals, birds and reptiles were observed. The objectives of the article were to explain the soil resources available in Libya in relation to the environmental and social assessment framework; provide examples of how Libyan soil databases can be used for environmental and social applications (for example, providing a healthy eating plate). It described some typical services in the country. The most important challenges (handicaps) facing agriculture and future growth in Libya are desertification, salinization, and limited freshwater resources. The most important types of soil and plants spread in these areas under study were monitored, as well as the wild animals that live in these areas. We have attached some pictures of these plants and animals.

An amazing plant diversity appeared in the study area from one season to another and from one region to another within the study area, which negatively affected this diversity. It was directly affected by the surrounding environment and began to disappear in parts of the study area, as this study showed. There were many reasons for this disappearance, including natural and human causes, the main reason of which was the lack of environmental awareness among citizens and the absence of the role of the state and judicial legislation in limiting these dangerous violations.

**Key Words:** animal biodiversity, Libyan fauna, Tekins , Jira and Zaza .

### **INTRODUCTION**

Tripoli, which is located in the northwest of the country, Cyrenaica was in the east of the country, and Fezzan in the southwest, which are the

three historical regions that make up Libya. In the eyes of the Ottoman Empire, these areas were privileged. They were combined into a single colony under Italian control, eventually becoming the state of Libya. In most parts of early Libya, Except for the countries narrow coastal strip and the northern hills to the east and west, the rest of Libya lies in desert.

It has an important physical asset because of its strategic location at the midpoint of Africa's northern rim. The total area of Libya is about 1.76 million km<sup>2</sup>; it ranks fourth in the area among all countries of Africa and 15th among all countries on earth (**McMorris, 1979**). More than 95% of Libya is desert, which is a part of Sahara, that is the most extensive area of severe aridity. The aridity of the central and eastern Sahara is due to its domination by continental tropical air all-year, which is continually descending from the upper levels of the atmosphere where, in these latitudes, anticyclone conditions are permanent. The cultivable areas are estimated slightly over 2% of the total area (**Frynta, et al., 2000**). Amphibians and reptiles recently recorded in Libya, **Frynta, et al., (2000)**. The fertile lands of Jifara Plain in the northwest, Jebal Al-Akhdar in the northeast and the coastal plain east of Sirt receive sufficient precipitation to support agriculture

The aridity of the central and eastern Sahara is due to its domination by continental tropical air all-year, which is continually descending from the upper levels of the atmosphere where, in these latitudes, anticyclone conditions are permanent.

Its conditions are semi-desert due to its latitude. Because of these differences in elevation, plants and animals have evolved to adapt to a wide range of climates and climatic conditions (**Hufnagel, 1972**).

In Libya, you can find a wide range of ecosystems, from the coastal environment with its salt marshes scattered along the coast, to the green plains of the north-eastern region and the north-western highlands (which include the Nafusa Mountains), to desert and semi-desert. The desert was ecosystem with its oases and valleys (**Toski, 1969**). The desert is environmentally sensitive and ecologically important in terms of the plants and animals that have managed to survive in this habitat despite severe environmental challenges, such as high temperatures (particularly in summer) and water shortages. However, these ecosystems are home to an impressive diversity and richness of species, especially endemic species and those adapted to their specific conditions.

Since the Fezzan region is a true desert region, it is home to a wide variety of desert animals (**Bundy, 1976**). In this region, which is located in the south-western part of Libya, there are desert valleys, oases, palm plantations, and irrigated agricultural lands. Few studies and reports since the Italian occupation have addressed the alarming decline in individual wildlife species and populations in the region.

Proceedings of the Second International Conference on Species and Taxonomy, 16-18 May 2014, species received Cefalù-Castelbuono (Italy) which was on the verge of extinction or had already disappeared from its former range on 25 June 2014; Accepted August 30, 2014; It was printed on March 30, 2015. Among the reasons are: (1) urbanization in some areas at the expense of natural resources and natural vegetation; (2) Construction of roads leading to open areas where wildlife refuges and habitats are located; (3) Modern vehicles that facilitate access to rugged areas; (4) poaching; (5) petroleum exploration, investments and activities related to this industry; and (6) the establishment of some sites for the purpose of various agricultural activities (**Spetta et al., 2006**).

There are still many species living in arid valleys and oases despite the numerous threats they face due to natural (high temperatures, lack of water bodies, rainfall) and human (starting in the 1960s) causes.

In present research, we showed a sample of animal species that have been documented in the study area. It is desirable to continue documenting in some parts of the region despite the possibility of a decrease in their densities vitality. But in order to save (for future generations) what can be saved of the wildlife that still inhabits some of these sites, wildlife studies in Al Marj Governorate need to focus on areas that may be vulnerable to urbanization and industrial sprawl. The authors of present research based their findings on a combination of previous publications and reports covering the past few decades, as well as their own observations during their trips to specific sites in the region to learn more about the reptiles, birds and mammals that live there.

Climate change, population growth, decreasing resource availability, and global development had a significant impact on many countries around the world. The Sustainable Development Goals (SDGs) seekThe SDGs of the United Nations (UN) seek to balance the use of natural resources for social and economic development and the maintenance of ecosystem services (ESs), which are essential for human livelihoods and well-being.

Libya is mostly characterized by arid climatic conditions, except the coastal strip and the northern hills toward the east and the west. While the rest of the country is located under the conditions of desert and semidesert because of its geographical location in terms of latitude (**Essghaier et al., 2015**).This resulted in the presence of environments with distinct characteristics in terms of temperature, humidity, and rainfall that reflected on the biological components of the plants and the animals that are able to coexist in various ways with those difficult environmental conditions (**Hufnagel, 1972**).

Maintaining sustainable use of terrestrial environments while stopping their degradation and desertification is the basis of sustainable

development. Worldwide, terrestrial ecosystems are frequently degraded by land degradation, soil erosion, and loss of soil organic matter. As guidelines for promoting the sustainability of human societies around the world, the United Nations has agreed on 17 Sustainable Development Goals. The UN Sustainable Development Goals centre around soil, which has a crucial role to play (**Kestra et al., 2016**).

Consumption of natural resources is increasing around the world, including in Africa. Many African countries are working to find solutions to their food production and water shortage problems. In 2005, South Africa hosted the first MS research in Africa. Most environmental enhancement studies in Africa have been conducted in sub-Saharan Africa (e.g. South Africa, Kenya, Tanzania), focusing primarily on service provision and regulation. Monetary and non-monetary values were used for ES in Economic Analysis of the African Continent. Libya is a North African country with an area of 1,759,540 square kilometres, making it one of the largest countries in the world and the fourth largest country in Africa (**Ahlbrandt, 2001**).

There are four municipal regions in Libya, according to the Ministry of Planning: Tripoli (the capital is Tripoli), Benghazi (the capital is Benghazi), Al Khaleej (the capital is Sirte), and Fezzan. (The capital is Sebha). The largest resident population is located in my municipality Tripoli and Benghazi. Only a small portion of the northern Mediterranean coast, a few mountainous areas, and a few scattered oases in the desert are home to the majority of agricultural operations. Nearly 5% of Libya's labour force is employed in agricultural activities, which also contribute nearly 9% of the country's GDP (**Yigini and Panagos, 2016**). Agriculture depends on the private sector, with the majority of agricultural production coming from private farms. To produce grains and fodder in the desert, some government irrigation projects were established.

The primary objectives of this review article are to describe Libyan soil resources within an environmental and social assessment framework, provide examples of how Libyan soil databases can be used for environmental and social assessment applications (e.g., provisioning, healthy eating plate), and identify some typical challenges faced by the country. Many of the ES in or derived from soil, either directly or indirectly. Researchers and managers can use spatial soil databases to combine soil information with other, often spatial, data (e.g., hydrology, vegetation, demography, etc.) to better understand and identify major ES within a country. Identifying soil spatial databases that can be used within the current ES framework will also allow others to explore related studies.

Jabal Akhdar is located in the northeastern part of the country

bordered by the sea from the north and west, the Marmarica Plateau at the east, and the desert at the south (320–330 N and 200–230 E). Al Jabal Al Akhdar IPA (The Biodiversity in Libya 123 Green Mountain) in the Cyrenaica region of northeast Libya is the largest and most significant IPA in Libya. It is characterized by distinct ecological features since it is the only evergreen forest area of unique type along the coastal belt from Atlas Mountains in the west to Palestine-Syria-Lebanon in the east. Jabal Akhdar is similar in its biodiversity to the areas south and east of the Mediterranean. The ancient civilizations established on Jabal Akhdar area were correlated with its unique natural vegetation. Although the area of Jabal Akhdar is not more than 1% of the total area of the country, it is distinguished by its high percentage of the country's biodiversity. It contains about 1,300 plant species, which encompasses 70–80% of the Libyan flora. The general topography of the area consists of three levels of escarpments differs little bit climatically. The first level adjacent to the seashore up to altitude 200 m represents a plain with Mediterranean climate, the second level is from 200 m to 600 m, and the third level is from 600 to 800 (the highest is 882 m (A.S.L.) is characterized by cool winter and hot summer. Temperature means ranges from about 7°C during the winter months to about 27.6°C during the summer period in Shahat area on top of mountain range. The Figure 1 shows the important plant areas in Libya (IPAS) [1 – Jabal Alakhdar, 2 – Tawuorgha, 3 – Jabal Nafusah, 4 – Messak, 5 – Alaweinat].

Also, the difference in the geographical locations of the subareas of the Jabal Akhdar led to notable variation in average annual rainfall. The maximum annual rainfall reaches 600 mm at Shahat (Cyrene) and this annual average drops as we move to the east, west, or south to reach the lowest 200 mm south of the limits of the forest range. These climatic and topographical differences are reflected on the types and characters of the plant cover in these areas and types of soils (mostly red alluvial terra rosa) spreading within which produced ecological variation allowed agricultural activities along the year in different locations.

### **MATERIALS AND METHODS**

The research was conducted in M Portfolio Libyan Marj. Which falls on the Mediterranean coast in north eastern Libya. Its area is about 10,000 square kilometres. Al-Marj is located at 32°29'12"N and 20°50'02"E, and is located on the level of Cyrenaica on the western side of Jebel Akhdar. Its population is estimated at 85,315 people at the beginning of 2012. Jebel Akhdar, and agricultural activities such as irrigated agriculture non-irrigated livestock, livestock, and economic activities all contribute to...Y

The status was of the study area as one of the most valuable sites in Libya. Using GARMIN GPSMAP 67CSx (Mobile, Lenexa, MD, USA),

we determined the exact locations of groundwater well sample points in the field. The Mediterranean climate, with its hot, dry summer and warm, rainy winter, is a major factor in the study area. The climate of the research area is characterized by minimal precipitation, large evaporation rates, and a generally dry appearance, resembling a semi-desert climate. The nearest weather station to the research area, Al-Marj, provided data on the local climate. It rains at a rate of 380 mm every year. The wettest and coldest months are December, January, February and March, with an average annual temperature of 18.8°C. The average relative humidity is 71% in January and February, and 50% in May and June. The average annual wind speed is 8.6 km/h, and the maximum wind speed is in December, January and February when it can reach 10 km/h. Figure 1 shows the results of a water quality survey conducted on 11 groundwater wells in the research area.



Figure (1): Important plant areas in Libya (IPAS) [1 – Jabal Alakhdar, 2 – Tawuorgha, 3 – Jabal Nafusah, 4 – Messak, 5 – Alaweinat].

### Data collection

#### 1- Animals

Herb dominates Asphodel, an herb of the lily family, is found on herbaceous plants and annual herbs in the coastal plains during years of

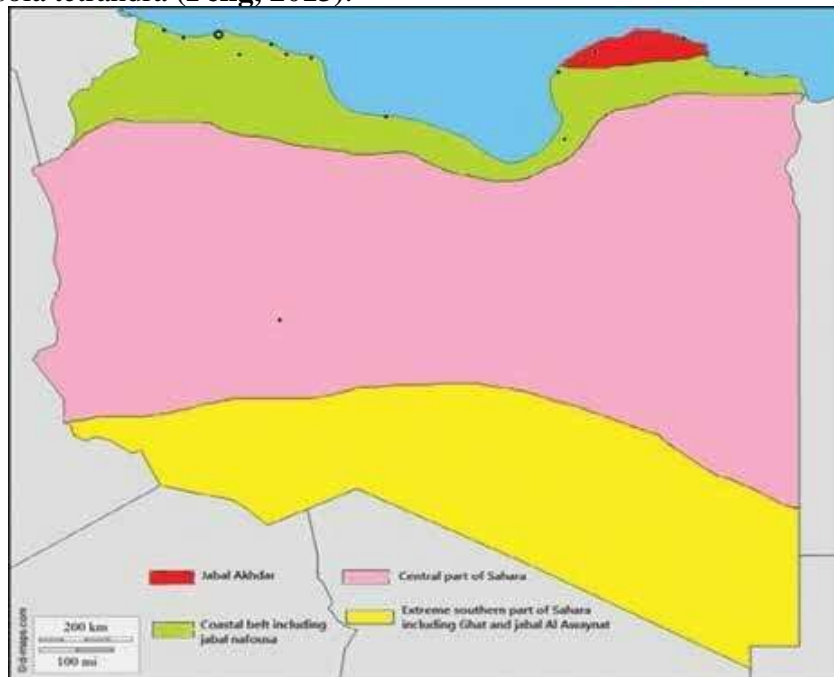
heavy rainfall. It characterized by region the Brother Mountain Z. The northern Mediterranean-influenced region has dense juniper and lenticel trees. Brome, canary, bluegrass and rye are common annuals. South of the mountaintop, forests are sparse and annual plants are rare. The Nafusa Plateau, whose pastures are nestled among the barren hills to the west, contains little plant life. The semi-arid steppes also have sparse vegetation with drought-tolerant areas. Salt, absinthe, avodel, and linen are the most common types. In wet years, annual grasses flourish and leguminous plants appear. The true desert region has little rainfall and little vegetation, but semi-arid plants thrive in the valleys of the valley and the palm trees of the southern oases. Desert hare, gerbil, hyena, fennec, red fox, jackal, skunk, deer and wild cat are considered wild creatures. . Reptiles common in oases and water holes include the deadly viper and the krait. Wild doves, partridges, larks, and prairie chickens are native to it. Eagles, hawks and vultures are common. From the Mediterranean to the Sahara, Libya has outstanding biodiversity. Mammals, including cattle, sheep, goats and chickens are 87. There are 338 species of birds, numerous rodents, insects and marine animals, and 95 reptiles including snakes, lizards and turtles. In addition, Libya contains many parks, reserves & other protected areas for endangered and unusual animals. Globally, Libya is a poor country in term of living species space that occupies its area. From a total of 1.7 million described, Libya has about 2,135 plants and 4,590 animals (EGA, 2010).

## **2- Plants**

Identifying the plant species took nine months. Plant species in the study area were surveyed during the flowering and fruiting periods of plants.

Squares are measured by floral composition. The most representative square was evaluated to minimize pasture heterogeneity. The examined forest pastures have three transect lines (Lt). Visual variation and vegetation composition define the latitudinal lines. Twenty quadrats were fitted between 250-550 m a.s.l. along each transect line: Lt 1 (35,080 N; 5,180 W), Lt 2 (35,150 N; 5,230 W), and Lt 3. Quadrates were fitted every 50 m elevation drop along the cross-section lines. All woody plant species, including trees and shrubs, were recorded in 20 m by 20 m quadrats, while herbaceous species were recorded in twenty sub-quadrants (5 m by 5 m) systematically covering the main quadrat. The Catalog of the Flora of Morocco, the Flora of North Africa. The Practical Flora of Morocco, & the Flora and Environment of Morocco has been used to classify and identify cross-sectional species in the field. To create a digital herbarium, high-resolution images of the leaves, stem, flower and fruit of each plant species were taken. The botanical identifications obtained were checked against this herbarium. Given the recent changes,

we identified samples at the laboratory of the Regional Centre for Agricultural Research in Tangier (INRA-Morocco). Due to human activity, the Eco-environment is severely degraded. Pioneer species formed a unique form of adverse environment, with strong resistance to drought and barren stress. Such forms are *Haloxylon schweinfurthii*, *Acacia flava*, *Aristida acutiflora*, *uphorbia abyssinica*, *Calligonum comosum*, *Acacia senegali*, *Cordia africana*, *Tamarix mannifera*, and *Salsola tetrandra* (Feng, 2013).



**Figure (2):** Centers of endemism in Libya.

## RESULTS

The life form distribution among Libyan plants was characterized by a high proportion of herbs (annual to perennial). The low number of woody (tree and shrub) species in our dataset reflects the defensive capabilities of the vegetation in bad conditions (such as drought), i.e., the lack of moisture in Libya. It seems that the herb life form is the preferable strategy in the temperate deserts of the studied area. This is not only a reflection of the growth strategy, but also of the presence of highly adapted, drought-resistant species. These xerophytes are widely distributed in the subhumid and semiarid tropics and play major economic and ecological role. Therefore, these are very successful



species, capable of stabilizing mobile sands by their rapid growth and long roots (**Higgins et al., 1997**).

All results are analysed using the Shannon index which is a statistical indicator of information, which means that it is assumed that all species were represented in a sample and that they were sampled randomly:

Plants are an important part of natural ecosystems because they show how the environment affects the whole. Changes in climate have a major impact on flower diversity in terrestrial areas. Rainfall is believed to be the primary element in determining floral diversity and composition. Exposed the north-eastern and north-western Libyan coast the rest of the southern coast of the Mediterranean basin receives precipitation mainly in winter. Precipitation patterns and totals have changed over the past decade. Floristic elements have been considered as useful tools in phytogeographical analysis (**Preston and Hill, 1997**). This is an important method in floristic research to divide the distribution into different area types according to the Chinese botanist Wu's documentation (**Wu et al., 2003**).

Figure 3 shows that spring receives 72% of the year's precipitation while winter receives only 6%. This rainfall variability may affect plant species diversity, phenology, and life cycles, as noted by several authors. Figure 2 displays the diversity and habitats of the plant families examined in the current study. Based on the results obtained, the floristic diversity of forest grasslands includes 358 species, which are taxonomically distributed into 228 genera in 66 families (Supplementary). Table of materials S1). Thus, the taxonomic diversity in the study area reaches 1.57 species for each genus. Herbaceous plants contribute 86.1% of the species while shrubs and trees contain 11.7 and 2.2%, respectively. The dominant herbaceous species are *Anthemis cotula* L., *Brachypodium distachyon* (L.) P.Beauv., *Bromus* spp. (including *B. hordeaceus* L., *B. mollis* L., *B. rubens* L., and *B. tectorum* L.), *Clinopodium nepeta* (L.) Kuntze, *Cynodon dactylon* (L.) Pers., *Medicago* spp. (Including *M. ciliaris* (L.) Krock., *M. minima* L., *M. orbicularis* (L.) Bartal.,

*M. polymorpha* L., *M. sativa* L., and *M. truncatula* Gaertn.), *Ranunculus* spp. (including *R. bullatus* L., *R. ficaria* L., *R. macrophyllus* Desf., *R. muricatus* L., *R. paludosus* Poiret., and *R. parviflorus* L.), *Rumex* spp. (including *R. bucephalophorus* L., *R. conglomeratus* Murr., *R. intermedius* DC., and *R. spinosus* L.), *Trifolium* spp. (Including *T. arvense* L., *T. Campestre* Schrb., *T. isthmocarpum* Brot., *T. scabrum* L., *T. stellatum* L., *T. subterraneum* L., and *T. tomentosum* L.), and *Vicia* spp. (including *V. faba* L., *V. hirsuta* (L.) Gray, *V. lathyroides* L., *V. lutea* L., *V. peregrina* L. and *V. sativa* L.). In the study area, *Arbutus unedo* L., *Calicotome villosa* (Poir.) Link, *Cistus* spp. (including *C.*

crispus L., *C. monspeliensis* L., and *C. salviifolius* L.), *Erica arborea* L., *Lavandula stoechas* L., *Myrtus communis* L., *Phillyrea latifolia* L., and *Pistacia lentiscus* L. Dominant shrub species . *Quercus* spp. (Including *Q. coccifera* L., *Q. faginea* L., and *Q. suber* L.).

Data in Table 1 indicates a visibility rate of 100%. However, in Zaza, only 13% (2 individuals) were seen, while the majority of 87% (27 individuals) remained unseen.

For *Streptopella turtur*, 60% (14 individuals) were observed in Takens, while 40% (6 individuals) were not seen. In Jira, 28% (6 individuals) were seen, and 72% (13 individuals) were not observed. Zaza had a similar pattern, with 34% (9 individuals) seen and 66% (20 individuals) not seen.

Distributed *Corvus corax* is 60% (12 individuals) in Takens, while 40% (8 individuals) have not been seen. In Jira, 53% (10 individuals) were observed, and 47% (9 individuals) were not seen. In Zaza, only 3% (1 individual) were seen, and the majority of 97% (28 individuals) were not observed.

Vision rate reached *Galerride cristata* 75% (15 individuals) in Takens and 25% (5 people) not seen. In Jira, the percentage of sighted people was 25% (4 individuals), while 75% (15 individuals) were not observed. Likewise, in Zaza, 38% (11 individuals) were seen, and 62% (18 individuals) were not seen.

Regarding *Ardea Purpurea*, 55% (11 individuals) seen in Takens, 45% (9 individuals) not seen. In Jira, the percentage of sightings reached 28% (6 individuals), while 72% (13 individuals) were not observed. In Zaza, only 7% (2 individuals) were seen, and 93% (27 individuals) were not seen.

Moving on to mammals, *Spalax ehrinbergi* 85% (17 individuals) were seen in Takens, and the remaining 15% (3 individuals) were not observed. In Jira, the percentage of sightings reached 58% (8 individuals), while 42% (11 individuals) were not seen. Zaza had 24% (7 subjects) sighted and 76% (22 subjects) non-sighted.

*Attactaga tertradactyla* the sighting rate was 70% (14 individuals) at Takens, and 30% (6 individuals) were not seen. In Jira, 28% (6 individuals) were observed, and 72% (13 individuals) were not seen. In Zaza, 31% (9 individuals) were observed, while the majority of 69% (20 individuals) were not observed.

Likewise, the vision rate reached *Lepus capensis barceus* 70% (14 individuals) in Takens, 30% (6 individuals) not seen. In Jira, 28% (6 individuals) were observed, and 72% (13 individuals) were not seen. In Zaza, 31% (9 individuals) were observed, while the majority of 69% (20 individuals) were not observed.

The number of animals in Libya according to preliminary estimates 4,590 species. The most important of these taxa in terms of number is the insects (81%), followed by birds (7%). However, animals diversity in Libya still needs further taxonomic studies to be well documented.

Estimates of marine animal and plant species are about 1,500 species, for instance, 560 species of marine algae, and three species of endangered seagrasses in the Mediterranean Sea, and about 100 species of fish and three species of marine reptiles (turtles). No available information on the Protista.

- A total of 139 species of Molluscs.
- The number of Arachnids is about 170 species.
- Insects are the majority of Libyan animal diversity. The approximate number is 3,763 species.
- The number of fish species is 98 includes one endangered species.
- The smallest number of Libyan animals is three of amphibian species.
- The Libyan reptiles are 25 (Frynta *et al.*, 2000).

The recent documentary publication has confirmed that the total number of birds in Libya is 350 species (100 are currently breeding in Libya) (Isenmann *et al.*, 2016).

- Libyan mammals are 76 species, including 4 endemics and 12 threatened (EGA, 2010).

There are three endemic genera represented by one species each: *Pachyctenium mirabile* (Umbelliferae), *Oudneya africana* (Cruciferae), and *Libyella cyrenaica* (Gramineae).

Examples of endemic plants in Libya are *Cyclamen rholfianum* (Primulaceae). Its picture on the series of the Flora of Libya's cover, *Arum cyrenaicum* (Araceae), *Teucrium cyrenaicum* (Labiatae), *Linaria tarhunensis* (Scrophulariaceae), and *Tourneuxia varrifolia* (Compositae).

**Table (1): Number of individual plant of regions (Tekins, Jira, and Zaza)**

to request	Number of individuals(n)	n/n	Bye
Bromus spp.	6	6/27	0.222
<i>Polymorphic</i> L	5	5/27	0.185
<i>T. Subterranean</i> L	1	1/27	0.037
<i>T. stellatum</i> L.,	3	3/37	0.111
<i>R. parviflorus</i> to	12	12/27	0.4444

Table (2): Association between mammals and regions (Tekins, Jira, and Zaza)

Regions Avis	Statistics	Tekins N(17)		Jira Inn(22)		Zaza N(20)		$\chi^2(sig)$	total	
		NO	%	NO	%	NO	%		NO	%
Alicatoris Barbara	did not see	3	15	8	42.1	7	24.1	6.235	18	26.47
	Visible	17	85	11	57.89	22	75.86	(0.1 05)	50	73.529
Streptococcus tourtur	did not see	6	30	6	31.58	9	31.03	16.5	21	30.88
	Visible	14	70	13	68.42	20	68.97	(0.00)	47	69.12
Corvus Corax	did not see	8	40	10	52.63	1	3.45	0.218	19	27.94
	Visible	12	60	9	47.37	28	96.55	(0.900)	49	72.06
Gallerid cristata	did not see	5	25	4	21.05	11	37.93	4.488	20	29.41
	Visible	15	75	15	78.95	18	62.07	(0.105)	48	70.59
Ardea purpurea	did not see	9	45	6	31.58	2	6.90	4.23	17	25
	Visible	11	55	13	68.42	27	93.10	(0.038)	51	75

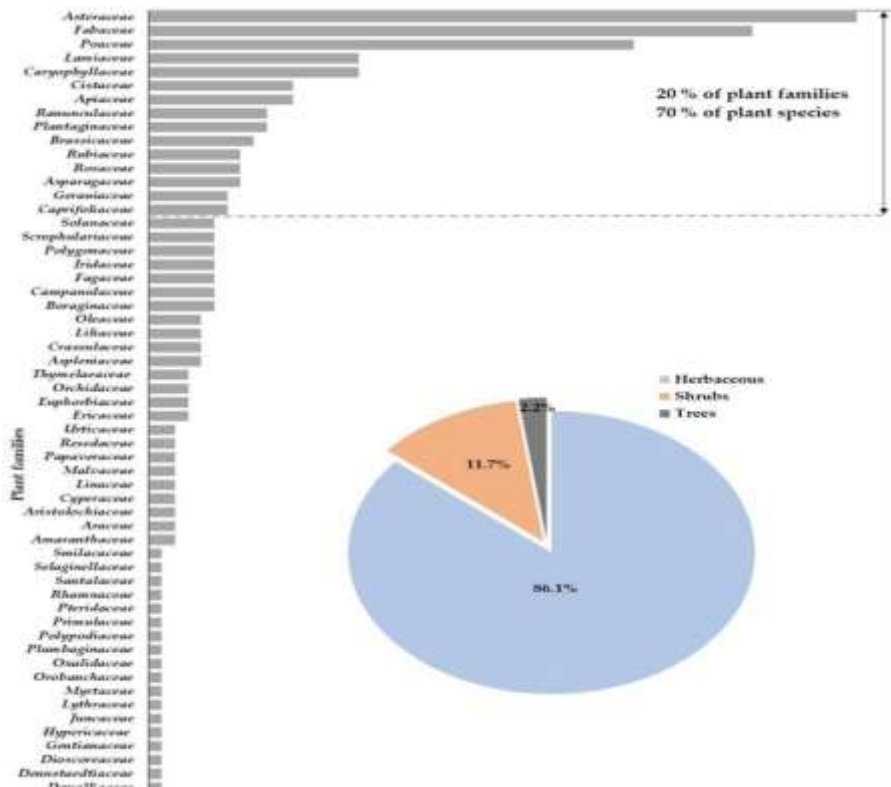


Figure (3). Plant diversity in northeastern Libya (Al-Marj).

**Table (3): Number of Like animal, paítfdge, President and Doves on regions (Tekins, Jira, and Zaza)**

A point	To rise	An offer	Length	Like animal			paítfdge			President			Doves		
				Notice	Not obsessed rved	Anesthetic any	Notice	Not obsessed rved	Number Bear	Notice	United Nations observer vid	Number Bear	Notice	Not noticed	number
B 1	300	3018.520	2028.520		0	0	1		3	1		1	1		2
B2	301	3014.300	2024.300		0	0	1		1		0	0		0	0
B3	302	3015.20	2025.20	1		1		0	0		0	0	1		2
B4	303	3013.77	2023.77		0	0		0	0	1		2		0	0
B5	304	3018.200	2028.200	1		1		0	0		0	0	1		3
B6	305	3014.15	2024.15		0	0	1		2		0	0	1		2
B7	306	3010.00	2030.00		0	0	1		1		0	0		0	0
B8	307	3016	2026	1		2	1		2	1		1	1		3
B9	308	3014.354	2024.354		0	0		0	0	1		2	1		2
B10	309	3012.541	2022.541		0	0		0	0		0	0		0	0
B11	310	3013.702	2023.702		0	0		0	0		0	0	1		2
B12	311	3011.256	2021.256	1		3	1		1		0	0		0	0
B13	312	3013.782	2023.782		0	0		0	0	1		1		0	0
B14	313	3015.931	2025.931	1		1		0	0		0	0	1		1
B15	314	3012.645	2022.645		0	0	1		1		0	0	1		3

**Table (4a): Number of animals of Notice and United Nations observer vid on regions (Tekins, Jira, and Zaza)**

A point	To rise	An offer	Length	the wolf			Porcupine			Hyena			Fox		
				Notice	Not obsessed rved	anesthetic any	Notice	Not obsessed rved	Number Bear	Notice	United Nations observer vid	Number Bear	Notice	Not noticed	Number
B 1	300	3018.520	2028.520		0	0	1		2	1		2	1		3
B2	301	3014.300	2024.300		0	0	1		1		0	0		0	0
B3	302	3015.20	2025.20	1		1		0	0		0	0	1		1
B4	303	3013.77	2023.77		0	0		0	0	1		1		0	0
B5	304	3018.200	2028.200	1		1		0	0		0	0	1		1
B6	305	3014.15	2024.15		0	0	1		3		0	0	1		1
B7	306	3010.00	2030.00		0	0	1		3		0	0		0	0
B8	307	3016	2026	1		2	1		5	1		1	1		1
B9	308	3014.354	2024.354		0	0		0	0	1		1	1		2
B10	309	3012.541	2022.541		0	0		0	0		0	0		0	0
B11	310	3013.702	2023.702		0	0		0	0		0	0	1		1
B12	311	3011.256	2021.256	1		3	1		2		0	0		0	0
B13	312	3013.782	2023.782		0	0		0	0	1		3		0	0
B14	313	3015.931	2025.931	1		1		0	0		0	0	1		1
B15	314	3012.645	2022.645		0	0	1		1		0	0	1		3

**Table (4b): Number of animals of Notice and United Nations observer vid on regions (Tekins, Jira, and Zaza)**

A point	To rise	An offer	Length	Rabbit			Gerbil			Immortal			Jackal		
				Notice	Not obsessed rved	anesthetic any	Notice	Not obsessed rved	Number Bear	Notice	United Nations observer vid	Number Bear	Notice	Not noticed	Number
B 1	300	3018.520	2028.520		0	0	1		5	1		2	1		1
B2	301	3014.300	2024.300		0	0	1		1		0	0		0	0
B3	302	3015.20	2025.20	1		2		0	0		0	0		0	0
B4	303	3013.77	2023.77		0	0		0	0	1		3	1		1
B5	304	3018.200	2028.200	1		1		0	0		0	0	1		1
B6	305	3014.15	2024.15		0	0	1		2		0	0	1		1
B7	306	3010.00	2030.00		0	0	1		3		0	0		0	0
B8	307	3016	2026	1		3	1		3	1		2		0	0
B9	308	3014.354	2024.354		0	0		0	0	1		1	1		1
B10	309	3012.541	2022.541		0	0		0	0		0	0		0	0
B11	310	3013.702	2023.702		0	0		0	0		0	0	1		1
B12	311	3011.256	2021.256	1		1	1		1		0	0		0	0
B13	312	3013.782	2023.782		0	0		0	0	1		2		0	0
B14	313	3015.931	2025.931	1		2		0	0		0	0	1		1
B15	314	3012.645	2022.645		0	0	1		2		0	0	1		1

## DISCUSSION

Libya consists of three main local botanical habitats: the coastal, the mountainous, and the desert habitats with their crossing valleys from south to north and from west to east. More than 1800 plant species are flourishing in these habitats. These plant species form a vegetation type with variable features (**Boulos, 1972**)

Through theaves, we found that there are a number of *Alectoris Barbara* that are present in three different regions such as Takens, three of which are unseen, which represents 15%, and 17 of which are seen, which represents 85%. According to the second one known as Gera, 8 of them have been seen and 11 of them have not been seen. Finally, according to Zaza, there are two of them who have been seen and 27 of whom have not been seen.

According to the classes, it was found that there are a number of classes namely *Streptopella turtur*, which was found in three different areas such as the Takens, 6 of which were not visible and 14 of which have been seen. According to the second one, known as Gera, 6 of them have been seen and 13 of them have not been seen. Finally, according to Zaza, there are 9 of them that have been seen and 20 of them that have not been seen.

According to the values, it was found that there were a number of birds that are *Corvus corax*, which was found in three different regions such as Takens, 8 of which were unseen and 12 of which were seen. According to the second it is known as Gera, There are 10 of them seen and 9 of them not seen. Finally, according to Zaza, there was one of them who has been seen and 28 of whom had not been seen.

According to the classes, it was found that there were a number of classes namely *Galerride cristata*, which is found in three different regions such as Takens, 5 of which had not been seen and 15 of which had been seen. According to the second known as Gera, there were 4 of them seen and 15 of them not seen. Finally, according to Zaza, there were 11 of them that have been seen and 18 that have not been seen.

According to the layers, it was found that there were a number of layers which were *Ardea Purpurea* was found in three different regions such as Takens, 9 of which were unseen and 11 of which were seen. According to the second one, known as Gera, 6 of them have been seen and 13 of them have not been seen. Finally, according to Zaza, there were two of them who have been seen and 27 of whom have not been seen.



As for mammals, it was found that there were a number of mammals, namely: *Spalax ehrinbergi*, which was found in three different areas such as the Takens, 3 of which were not visible and 17 of which have been seen. According to the second one known as Gera, 8 of them have been seen and 11 of them have not been seen. Finally, according to Zaza, there were 7 of them that have been seen and 22 of them that have not been seen.

According to mammals, it was found that there were a number of mammals, namely: *Attactaga tertradactyla*, which was found in three different areas such as the Takens, 6 of which were unseen and 14 of which have been seen. According to the second that Known as the Gera, there were 6 of them seen and 13 of them not seen. Finally, according to Zaza, there were 9 of them that have been seen and 20 of them that have not been seen.

According to mammals, it was found that there were a number of mammals which were *Lepus capensis barceus*, which was found in three different areas such as the Takens, 6 of which were unseen and 14 of which have been seen. According to the second one known as Gear, 6 of them have been seen and 13 of them have not been seen. Finally, according to Zaza, there were 9 of them that have been seen and 20 of them that have not been seen.

According to mammals, it was found that there were a number of mammals, namely: *Canis aureus*, which was found in three different areas such as the Takens, 5 of which were unseen and 15 of which have been seen. According to the second known as Gera, There are 4 of them seen and 15 of them not seen. Finally, according to Zaza, there were 11 of them that have been seen and 18 that have not been seen.

## **CONCLUSIONS**

Based on the data provided, we can observe the distribution of birds and mammals across three different regions: Takens, Gera and Zaza. Among the bird species, it is found *Alectoris Barbara* in Takens, where 85% (17 individuals) have been seen, while the remaining 15% (3 individuals) have not been seen. In Gera, all eight individuals of *Alectoris barbara* were observed.

In summary, the data presented present the sighting rates of different mammals and mammals in different regions. These observations provide valuable insights into the occurrence and distribution of these species across the Takens, Jira and Zaza.

		
<p>Mephitidae</p>	<p>Canis aureus</p>	<p>Gazella arabica</p>
		
<p>Allactaga tetradactyla</p>	<p>Vulpes vulp</p>	<p>Hyaena hyaena</p>
		
<p>Fox Sand</p>		<p>Fennec</p>

Pictures of some wild plants and animals that live in the study areas in Al-Marj, Libya.

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### تنوع الحيوانات البرية في منطقة المرج الشمالية الشرقية (ليبيا) عقيلة بن حمد علي<sup>1</sup>، حسين أمجاور<sup>2</sup>، محسن شميم<sup>3</sup>.

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تشتهر محافظة المرج الليبية، وهي جزء من السهل الساحلي الليبي، ببيئاتها المتنوعة، ومصدراً للغذاء لمجموعة متنوعة من أنواع الحياة البرية. وبالنظر إلى طبيعة البيئة الحيوية في ليبيا نجد أن الجانب الأكثر وضوحاً هو أن معظم مساحة البلاد تقع ضمن مناخ صحراوي، وأهم ما يميز الصحراء الليبية هو الواحات التي يقترّب فيها منسوب المياه من السطح. وأهم عنصر على وجه الخصوص هو وجود وفرة أنواع الطيور في الحياة البرية. وقد لوحظ في هذا البحث العديد من أنواع الثدييات والطيور والزواحف.

**أهداف البحث:** هي شرح موارد التربة المتاحة في ليبيا فيما يتعلق بإطار التقييم البيئي والاجتماعي؛ كذلك تقديم أمثلة على كيفية استخدام قواعد بيانات التربة الليبية للتطبيقات البيئية والاجتماعية (على سبيل المثال، توفير طبق أكل صحي)؛ ووصف بعض الخدمات النموذجية في البلاد. أهم التحديات (المعوقات) التي تواجه الزراعة والنمو المستقبلي في ليبيا هي التصحر والملوحة ومحدودية موارد المياه العذبة. تم في هذه الدراسة رصد أهم أنواع التربة والنباتات المنتشرة في هذه المناطق محل الدراسة، وكذلك الحيوانات البرية التي تعيش في هذه المناطق. وقد أرفقنا بعض الصور لهذه النباتات والحيوانات.

ظهر تنوع نباتي مذهل في منطقة الدراسة من موسم إلى آخر ومن منطقة إلى أخرى ضمن منطقة الدراسة مما أثر سلباً على هذا التنوع. وتأثرت بشكل مباشر بالبيئة المحيطة وبدأت تختفي في أجزاء من منطقة الدراسة، كما أظهرت هذه الدراسة. وتعددت الأسباب وراء هذا الاختفاء، منها أسباب طبيعية وبشرية، كان السبب الرئيسي فيها هو قلة الوعي البيئي لدى المواطنين وغياب دور الدولة والتشريعات القضائية في الحد من هذه الانتهاكات الخطيرة.