Mammals of Jabal Moussa Nature Reserve: Survey, Status and Conservation

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SUMMARY

Mammals constitute a major component of the Lebanese biodiversity. However, they are probably the least studied faunal group in Lebanon. Like most of Lebanon's fauna, mammals are threatened by habitat destruction, urbanization, over-hunting and persecution. This accentuates the importance of documenting the species present for an effective conservation strategy. Jabal Moussa Nature Reserve (JMNR) is a typical Lebanese Mountainous Mediterranean Scrubland Biome with different topography and elevations ranging from 700m to 1500m. Knowledge on the presence of mammals in JMNR was initially assessed through information from focal group discussions and individual interviews, followed by camera trapping, rodent trapping, and transect surveys that were conducted from March 2008 to July 2009. The field survey revealed the richness of JMNR in mammal diversity. Nineteen species of mammals belonging to 6 orders, 14 families and 1 subfamily were identified among which one rodent species new to Lebanon and 3/4 classified as threatened on the national level. This richness could be referred to its ecosystem, location, elevation differences, and closeness to urban areas. Besides, the harshness of the ecosystem makes the reserve unpopular for human activities, hence less disturbance to biodiversity. Nevertheless, threats from hunting and habitat loss still persist. Populations of most mammals were found to be healthy and large proposing the reserve as an in-situ breeding place for mammals to augment other Lebanese reserves. A series of conservation recommendations are presented on the basis of this survey.

INTRODUCTION

Jabal Moussa Nature Reserve (JMNR) in Lebanon was created under Law No. 398/A on July 07, 2008. It was nominated as a Biosphere Reserve in September 2008. The reserve is currently managed by the Association for the Protection of Jabal Moussa. Covering 1250ha, JMNR is typical of a Mountainous Mediterranean Scrubland Biome with oak trees (*Quercus spp*) being the dominant plant cover.

Even though mammals constitute a major part of the Lebanese biodiversity, they were not well surveyed or studied. Increasing human population, chaotic urbanization, absence of national monitoring programs and the economic situation, have all had an impact on natural habitats in general and biodiversity in particular. Moreover, the high rate of biodiversity loss, through recurring forest fires, hunting and persecution, quarries, and real estate businesses are destroying many natural areas and their biodiversity. This calls for urgent action to conserve what is left. One good approach is protecting as much of the Lebanese natural areas as possible to help in securing a small refuge for wildlife (flora and fauna). For that purpose, there is a great need for information related to the distribution, abundance and status of each species. This will facilitate effective legislation, sound conservation and management policies related to Lebanese mammals. Accordingly, a national mammal-monitoring scheme must be followed. Due to their secretive behaviour augmented by human persecution, monitoring mammals is costly, requiring skilful personnel, time, and hi-tech equipment. Limited with funding, starting with nature reserves probably is a good strategy to assess mammals in Lebanon which will lead to a wider national mammal monitoring programme.

Aims of the Mammal Survey

1. **To create a species inventory of JMNR's mammals**
2. **To gather information regarding the extant mammal species**
3. **To evaluate the conservation importance of JMNR**
4. **To identify necessary conservation interventions in JMNR**

MATERIAL AND METHODS

I. RRA/PRA Methods

- **A pre-appraisal dialogue was conducted among site officials (mayors) and elders in villages surrounding JMNR**
- **Focal group discussions were conducted to establish facts on Mammal species that were and are present, their population trends, attitudes of local people towards them, and their conservation needs**

II. Field Surveys:

The field survey was conducted from March 2008 to July 2009 using the following methods:

a. **Transect surveys: Transects of unequal length were selected randomly. The location of secondary signs such as footprints and scats detected were recorded using the GPS.**

Red squirrel footprint

Striped Hyaena footprint

Rock Hyrax Scat

b. **Camera traps: Twelve pre-baited active and passive remote camera traps, triggered by both heat and motion, were tied to trees 40-60cm above ground. The cameras were programmed to take photographs 24hours/day with a 2-minute interval between photos, recording date and time on each photograph. The bait consisted of butchery leftovers, apples, carrots corn seeds, and domestic refuse placed on the ground, 3 m away from the camera trap. Camera traps were distributed randomly and visited on weekly bases, for checking and adding bait whenever needed and down loading the photos.**

d. Rodent trapping Two methods were followed:

1- Indirect Methods: Seeking paths used by rodents, mole-rat hills, signs of discarded food remains, rodents' scat, nests, owl pellets, and scats of carnivores.

2- Direct methods: Using camera traps, and Sherman Live Rodent Traps. Thirteen sites were selected randomly; five traps, 5m apart, were triggered at each site; traps were baited with peanut butter or broiler feed mix.

RESULTS AND DISCUSSION

I. Local Knowledge

During focal group discussions, elderly residents reported that mammals were more abundant than nowadays. However, due to logging, quarries, urbanization and hunting, the number of species and their population decreased. On the other hand, striped hyaenas appeared newly in the area after the civil war.

II. Field Survey

A total of 19 species of mammals were observed, some of which are common in the reserve and elsewhere in Lebanon. However, 75% of the mammals species reported are considered threatened at the national level.

II.a. Common and Abundant Species

1- Red fox, *Vulpes vulpes* LC.,
2- Common Jackal, *Canis aures* LC.
3- Stone marten *Martes foina syriaca* LC.
The large population of the above three species may affect other animal species such as birds and reptiles.

4- Wild boar *Sus scrofa lybicus* LR/lc.
In JMNR, their population seems to be under control, which reflects the undisturbed natural balance of the reserve

5- Porcupine *Hysterix indica indica* LR/lc.
6- The Mole Rat, *Spalax leucodon ehrenbergi*.
7- The Broad Toothed Field Mouse, *Apodemus mystacinus mystacinus* LC
The above three species are widely spread and their population is healthy and reproductive.

II.b. Mammal Species of Special Conservation Importance

1- Hedgehog, *Erinaceus concolor* LR/lc were found in the deciduous forest as well as in a mixed conifer-deciduous forest.

2- Mediterranean horse shoe bat, *Rihnolophus euryale judaicus* nT
3- European Free-Tailed bat; *Tadarida teniotis* LC
4- Kuhl's Pipistrelle; *Pipistrelle kuhli ikhawanius* LC

5- Gray wolf *Canis lupus pallipus* LC. Since the last decade, this is the first record of a breeding wolf in-country and especially in Mount Lebanon.
Photos from camera traps showed that JMNR is a territory for a small pack.

6- Badger, *Meles meles* NT/lc. Photo trapped only twice

7- Striped hyaena *Hyaena hyaena syriaca* LR/nt. is fairly abundant in Lebanon and in JMNR. However, it was not reported before in this region.

8- Weasel *Mustela nivalis* (S) LC is a new record for this species in Lebanon.

9- Wild cat *Felis silvestris* LC. is reported for the first time in Jabal Mousa region.

10- The Rock Hyrax *Procavia capenis syriaca* nt: They are widely distributed and found in large population

11- The Persian Squirrel, *Sciurus anomalus syriacus* LC population is very healthy, large, reproductive and widely spread in JMNR.

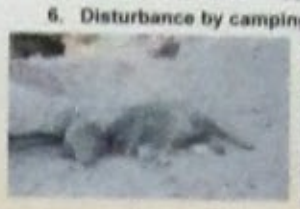
12- The Wagner's Gerbil, *Gerbillus dasyurus gallagheri* LC is a new record for this species in Lebanon and eventually in JMNR. Only one specimen was trapped in rocky habitat with sparse vegetation.

III. Significance of the present survey and the importance of the JMNR.

Compared to other reserves of Lebanon, JMNR is considered to be one of the richest in mammal diversity. Mammal populations present in JMNR are very healthy and large relative to its area. Hence, the reserve could act as an in-situ breeding place for mammals to augment other Lebanese reserves. The variety of species present, some of which (e.g. wolves are critically endangered), highlights the importance of the reserve on the national and international levels placing it along other reserves with rich biodiversity and endangered species.

IV. Threats to Mammals in the JMNR

1. **Hunting by far the largest threat**
2. **Poisoning and extensive use of pesticides**
3. **Cross-breeding with domestic animals (e.g. wolves-dogs and wild cats-domestic cats).**
4. **Lack of environmental education and awareness programmes**
5. **Habitat loss due to logging, quarries, and forest fires**
6. **Disturbance by camping activities.**



V. Conservation Recommendations

1. **Local species-specific decrees should be issued and monitored through existing local administrative structures.**
2. **Increased law enforcement by the Ministries of Environment and Agriculture.**
3. **Controlled, licensed, sustainable and monitored logging could help reduce forest fires and benefit the local human societies.**
4. **Sustainable grazing within the reserve according to a grazing schedule that would reduce conflicts between shepherd and reserve interests.**
5. **Immediate cessation of quarries.**
6. **Awareness campaign targeting hunters, shepherds, and public at large.**
7. **Monitoring the effect of protection, ecotourism, and other activities on the biodiversity of the reserve.**

V.a. Community-Based Conservation Activities

1. **Creating a forest stewardship committee in each village neighboring the reserve that will be responsible for developing local regulation, monitoring and implementing projects**
2. **In-depth Participatory Rural Appraisal studies to identify community needs and priorities for the development and conservation of resources.**
3. **Use of the buffer zone as a means to link conservation, economic incentives and forest protection.**
4. **Identification of development priorities and linking them to the establishment of stewardship agreements and conservation initiatives.**

V.b. Protected Area Establishment

1. **Local community participation in the decision-making process and identifying priorities. Co-management of any protected or managed forest is vital for its sustainability.**
2. **The forest and marginal lands should be protected, enriched and enlarged, for the long-term sustainability of biodiversity in general and survival of mammals in particular, especially when taking expected climatic changes into consideration.**

V.c. Increase Awareness

1. **The initiation of awareness programs in all the neighboring villages on the importance of the reserve and its biodiversity on the local, national and global levels.**
2. **Establishment of long-term environmental education programs, where training of trainers is crucial, for its sustainability.**
3. **Environmental awareness components should also be integrated into adult literacy programs.**

V.d. Research Activities

1. **Further surveys and monitoring of mammals should be conducted to identify all species present, population number, status, and their current range, so that focus communes for targeted conservation can be identified.**
2. **A thorough analysis of the biodiversity should be conducted.**
3. **Thorough ecological studies for endangered species will enrich the scientific knowledge and could be incorporated in eco-touristic activities.**
4. **Research on habitat requirement for critical species.**
5. **Research on the integration of JMNR with other Lebanese reserves through corridors.**

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