A Walk Through Jabal Moussa

MAB Med

[2015]

Location

Jabal Moussa Biosphere Reserve (JMBR) is located in Kesrouan District, Lebanon, on the shoulders of the western slopes of Mount Lebanon Chain (34° 03' 43.93" N, 35° 46' 09.84" E), overlooking the Mediterranean Sea to the West. It covers an area of 6500 hectares, at an altitude ranging between 350 meters in the North-West and 1,700 meters to the South-East. Its main villages are: Yahchouch, Qehmez, Jouret el Thermos, Nahr ed Dahab, Ghbale, Ebreh, and Chouwan. Jabal Moussa and surrounding villages became part of the UNESCO Network of Biosphere Reserves under the Man and Biosphere (MAB) program in 2009. As part of the MAB program, JMBR addresses human livelihood improvement and nature conservation through combining natural sciences with social sciences, economics and education.

Jabal Moussa mountain presents an exceptionally rich biodiversity, with at least 728 flora species, 25 mammal species, and more than 137 migratory and soaring birds species. Equally rich with cultural heritage, it portrays the interdependence of Man and Nature throughout history through various spiritual and historical sites dating back from the Phoenician, Roman, and Ottoman Periods.

Figure 1: The Northern side of Jabal Moussa Biosphere Reserve

A walk through the forest of Jabal Moussa

Jabal Moussa is a unique mountainous forest ecosystem, presenting remarkable biological and geological features, which, together with the cultural heritage, allowed its designation as a "UNESCO Man and Biosphere Reserve" in 2009.

Figure 2 - A view on Jabal Moussa mountain ridge

Jabal Moussa is a stretched mountain ridge carved out of the pale limestone that makes up the fundament of the Lebanon mountain range. Time and water have shaped this foothill's steep slopes to the north, west and south, and heavy rainfalls have sharpened the karstic rocks covering the ridge. From the lowest bottom in Nahr Ibrahim valley to the highest summit, *Qornet El-Mzar*, the range in altitudes spans from around 350 to up to approximately 1,550 meters. From this diversity in altitude, slopes, and aspect comes the richness in plant species that gave Jabal Moussa's nature its many faces: more than 700 plant species distinguish and add up to several vegetation types.

Tall specimens of Oriental Plane (*Platanus orientalis*) together with smaller tree and shrub species (*Salix orientalis*, *Alnus orientalis*) make up the riparian forest along the two rivers Nahr Ibrahim and Nahr El-Dahab down in the valleys around the mountain.

Figure 3 - Historic Adonis River

Pure stands of evergreen Kermes Oak (*Quercus calliprinos*), a typical representative for the Mediterranean sclerophyll (hard-leaved) woodland, cling to the steep and rocky slopes to the south and west, where few plant species survive in the extreme summer draught. Individuals of other species thrive on parts of these slopes where milder microclimate allows it. Storax (*Styrax officinalis*), Terebinth (*Pistacia palaestina*), Hawthorn (*Crataegus monogyna*, *Crataegus azarolus*), Prickly Juniper (*Juniperus oxycedrus*) appear wherever their fibrous roots break through to depths that support their survival when the topsoil has dried out over the hot summer months. Among the well-presented rosaceous species (like the well-known *Rosa canina*), the rare and endemic Three-lobed Apple (*Malus trilobata*) and the Chequer Tree (*Sorbus torminalis*) may be found sporadically.

Figure 4 - A variety of trees in Autumn

Figure 5 - Flowers of *Malus trilobata*, endemic to Lebanon

On the western part of the ridge where deeper soil layers have accumulated over time, a dense forest of the three oak species (*Quercus calliprinos*, *Quercus infectoria*, *Quercus cerris*) expands up to the edges of the rocky summit. This karstic area is habitat to the magnificent Syrian Juniper (*Juniperus drupacea*) that is said to be the world's tallest juniper species. Large individuals form an open forest with mixed-in individuals of Manna Ash (*Fraxinus ornus*), Taurus Maple (*Acer*

tauricolum), Hop-horn beam (*Ostrya carpinifolia*), and small shrubs like wild almond (Amygdalus orientalis) and the Mahlab (Prunus mahaleb).

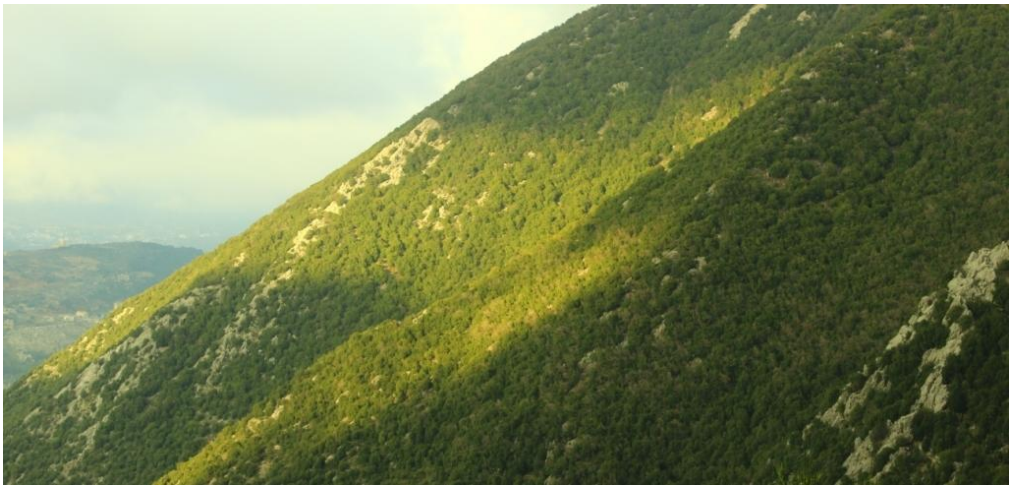

Figure 6 - Western slope of Jabal Moussa

The mountain's nature changes completely the further one follows the northern slopes towards the east, with the deep gorge of the Valley of Nahr Ibrahim (also known as Adonis Valley), that allowed the development of "geological windows" to the past, revealing the oldest outcrops reported in Lebanon dating back to more than 200 Million years. Up to a few hundred meters above the river, a dense pine forest (Pinus brutia) stretches up the valley. At first glance a pure coniferous forest, this area is worth a closer look that shows an understory rich in broadleaved species (*Arbutus andrachne*, *Ceratonia siliqua*, *Quercus infectoria*, *Laurus nobilis*, *Phillyrea latifolia, Styrax officinalis*, *Cercis siliquastrum, Acer syriacum*). On the higher part of the slope, massive rocky outcrops cut out the sunlight and humid conditions have allowed the development of a mosaic of species (*Arbutus andrachne*, *Ostrya carpinifolia*, *Laurus nobilis*, *Juniperus drupacea*, *Hedera helix*) rooting between the rocks.

Figure 7 - Riparian habitat

As clearly distinguishable these forest types may seem, as blurry it gets on lands that have formerly been used by the human population. Open woodland composed of trees and shrubs (*Pyrus syriaca*, Amygdalus *orientalis*, *Quercus* spp., *Crataegus monogyna*, *Crataegus azarolus*, *Juniperus oxycedrus*, *Styrax officinalis*) are predominant. It is not only a sequence of natural incidents that brought forth the natural wealth of the mountain. The observant eye will notice the human touch all around – only that here the decreasing human interference has allowed natural processes to let the woods reclaim lands that were formerly subject to constant grazing and agriculture, or to land use on rotational basis when forests were coppiced for their dense wood to provide firewood and charcoal. Abandoned agricultural terraces gave roots the deep soils and moisture they need to grow tall (*Quercus cerris, Quercus infectoria*). Continuous cutting and grazing created gaps and edges in the canopy letting sunlight reach the understory where populations of a multitude of herbaceous plants could be established.

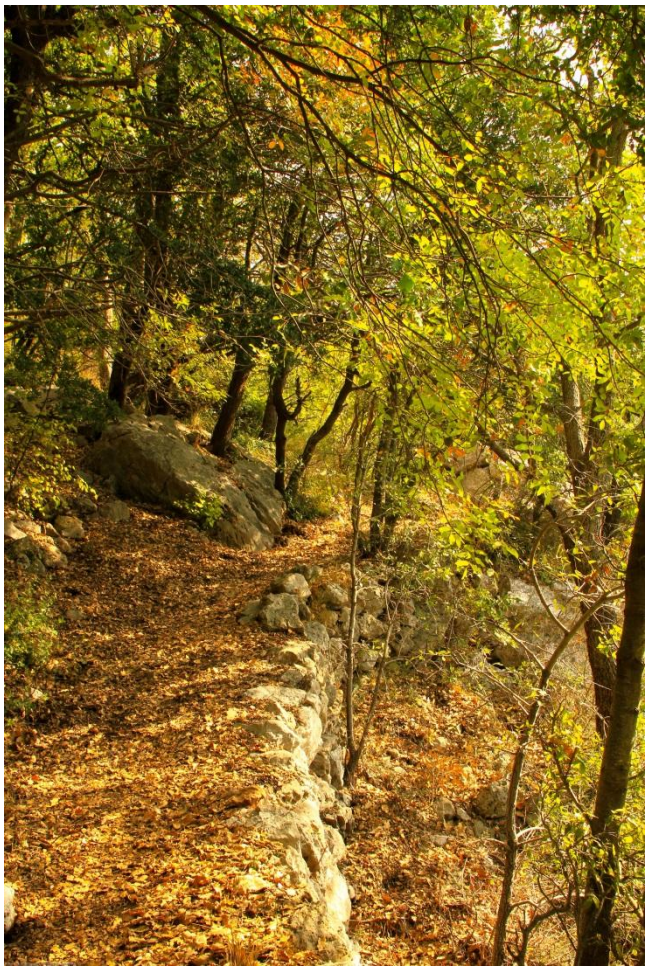

Figure 8 - Old terraces reclaimed by nature

On a relatively small surface, plant endemism in Jabal Moussa is pronounced; it hosts several species that are endemic to the Levant, restricted to Lebanon or even limited to Jabal Moussa BR. Among those the exquisite *Cyclamen libanoticum* can be found growing in small populations in the

shady microclimate below trees and rocks. This is only one of 26 plant species with populations in Jabal Moussa Biosphere Reserve that are endemic to Lebanon among which *Pentapera sicula*, *Salvia peyronii* (believed to be extinct until rediscovered in Jabal Moussa in 2011), *Salvia fruticosa*, *Origanum libanoticum*, *Origanum ehrenbergii*.

Figure 9 - Endemic *Cyclamen libanoticum* described as "semi-legendary" by the botanist Mouterde

Jabal Moussa's structured woodlands offer habitats to various fauna species: Being a bottle neck for migratory soaring birds, Jabal Moussa was declared an IBA (*Important Bird Area* as per definition of *BirdLife International*). In total, over 130 species of migratory, seasonal and resident breeding birds have been observed in the area.

Figure 10 - *Buteo Rufinus*

More than 20 wild mammal species among which common and well-known ones like the fox, squirrel, wild boar, but also species limited to the region of the Middle East or North Africa, e.g. the rock hyrax (*Procavia capensis syriaca*), or the striped hyena (*Hyaena hyaena*), inhabit the mountain.

Figure 11 - Rock hyrax

Figure 12 - Hyena

Of high interest in a country where human impact on nature is omnipresent are the sightings of the wolf (*Canis lupus pallipes*) for which Jabal Moussa is a confirmed breeding site. Around 30 species of amphibians and reptiles find their respective habitats from the moist valley bottoms to the warm and dry rocks on slopes and summit. A first study on insects (*Lepidoptera* = moths and butterflies) has recorded a wide range of species and led even to the discovery of an unknown species of fungus gnats (*Neuratelia jabalmoussae*). Further studies on invertebrate fauna species are desirable in order to fill the knowledge gaps and pave the way for ecological studies. The biodiversity of Jabal Moussa has a lot to offer for the scientific world as well as the nature lovers.

A walk through the History of Jabal Moussa

Jabal Moussa and Adonis valley are two adjacent sites that fall within the boundaries of Jabal Moussa Biosphere Reserve. These two sites share a common history and represent concrete illustrations of a chain of events that has brought together humans and nature since the Phoenician times.

Adonis Valley:

Historically known as Adonis River, Nahr Ibrahim is a perennial river that runs along the Valley of Adonis, on a surface area of 341 km2. The Valley that is part of the cazas of Kesrouan and Jbeil, provides the region with unique cultural, archeological and natural values.

Figure 13 - Adonis Valley

The Valley has always been a site of cult from prehistoric times. It is most notably renowned for being the birth site of the Phoenician myth of Adonis and Astarte which originated a variety of ritual beliefs at the time of the Phoenicians and afterwards, both in Lebanon and internationally. The myth of Adonis is linked to natural phenomena, as the annual red coloring of the river embodies the blood of the god Adonis, and the blooming of the red anemones represents his rebirth.
In commemoration of this event, the Phoenicians walked along some of the oldest pilgrimage roads in the region that traverse the flanks of the Valley, and traces of these ways are still well preserved, along with ruins of ancient temples and cult sites, some of which were turned in modern times into churches. It is probably here, that Man has prayed in the same sites for the longest of time throughout the history.

Consequently, the stream runs along rich archeological remains from different times and cultures, from prehistoric times till today: Mar Giorgis el Azrak temple, Mashnaka temple and steles, Yanouh temple, an Ottoman bridge, rock carvings by the Roman Emperor Hadrian, Roman temples, prehistoric grottos, Ottoman settlements...

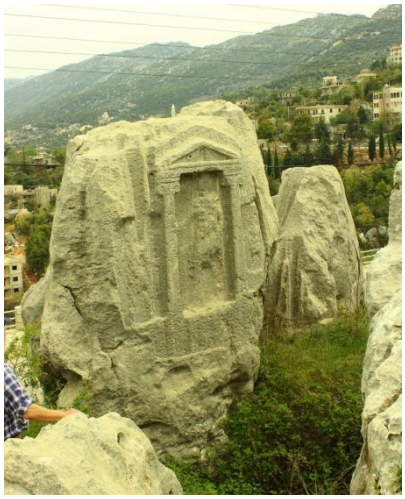

Figure 14 - Stele depicting Phoenician god Adonis

The Roman Road:

A network of roads was built by the Roman Empire between the 1st and 3rd century AC, linking the coast of Lebanon to the hinterland. The roads were used for several purposes, such as military and economic, but also for religious pilgrimage, resulting in the presence of many religious and spiritual constructions along the sides the road. Jabal Moussa harbours the most conserved part of this thousands years old way.

Figure 15 - The Roman Stairs

Emperior Hadrian's Inscriptions:

The Hadrian's Inscriptions are a series of stone inscriptions engraved under the order of the Roman Emperor Hadrian (reigned between 117 and 138 AD), limited to the forest of Mount Lebanon. They are intended to be seen and read by the general public, the aim being to protect certain species of trees such as cedar, cypress, juniper and oak. They are considered one of the first instances of nature conservation, even if the real intent was to halt their overharvesting and ensure the supply in wood for the construction of Roman vessels.

The text on the inscription can either be the entire following message or simply one part of it:
IMP HAD AVG DFS
AGIV CP
This is read as such: **IMP**eratoris **HAD**riani **AUG**usti **D**e**F**initio **S**iluarum
Arborum **G**enera Quatuor **C**etera **P**riuata
Which means: *From the Emperor Hadrian Augustus, delimitation of the forest, four types of trees (are reserved only for him) the others for private use.*

Figure 16 - Hadrian Inscription

El-Byut " Houses":

Secluded on the mountain summit, at a one-hour hike from the nearest village, three traditional Lebanese houses were built more than 300 years ago. Around them terraces are cultivated with white mulberry trees, the only traces left from sericulture, a popular activity in the 18th century. While water at the summit is scarce, water for farming was provided by an ancestral vaulted cistern built with stones.


Figure 17 - El Byut

Roman cult sites:

On the steep slopes of the core area of JMBR, several cult sites, mostly of Roman influence, can be visited:

- Monastery built in the nineteenth century on top of a Roman temple, today dedicated to St. George
- Qornet el Deir - cult site: at the top of a hill lies a site in ruins, revealing traces of different periods: a Roman tombstone, a medieval convent, an Ottoman kiln
- Qornet el Mzaar - cult site: located at the highest peak of Jabal Moussa (around 1,550 meters), this site is another site with interesting remains: cistern dug into the rock and ancient stairs, along with frequent potsherds dating back to the Roman period.

Figure 18 - Roman Tomb

Ottoman settlement:

In the secluded village of Chouwan, remains of an Ottoman settlement depict the traditional rural lifestyle dedicated to agriculture activities. Some of the remains include: an olive press, two abandoned farms, a hydraulic mill, and a stone bridge.

Figure 19 - Ottoman watermill

Figure 20 - Ottoman bridge

A walk in the villages of Jabal Moussa

JMBR is divided into three main management zones: *core area*, *buffer zone*, and *transition zone* (see map below). Only small villages with a limited number of inhabitants are entirely inside the core area (Al ebreh and Chouwan). Other larger villages are partly in the buffer zone (Yahchouch, Nahr el Dahab, Qahmez), and the remaining villages are in the transition zone (Ghbaleh and Jouret el Thermos). Land ownership in these zones is very diverse, with a majority of private and endowment lands. The largest landowner is the Lebanese Maronite Patriarchate, with which APJM has signed a medium-term lease agreement for the purpose of nature conservation and sustainable ecotourism.

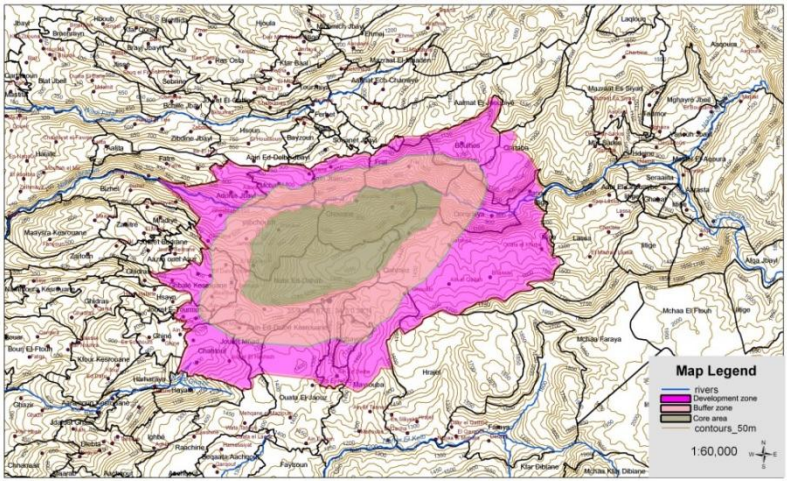

Figure 21: Zonation map of JMBR

Seven villages are part of the Jabal Moussa Biosphere Reserve. Most of their inhabitants live in the transition zone of the reserve, where 11% of the surface area is dedicated to agriculture, 5.5% to urbanization and human agglomeration, 8% are abandoned lands, and 75.5% are forests.

Agriculture, farming, and related activities, represent the most important socio-economic sector. Most of the permanent residents are farmers growing vegetables, cereals, harvesting olive groves and raising goats, cows and poultry. Unfortunately, the agriculture sector has become unprofitable. As a result, many of these farmers are now mechanics, builders and storekeepers - or are unemployed.

The level of education and literacy is good. On a total of 1,432 surveyed adults, only 6.1% of men and 8% of women declare being illiterate, whereas 17% of men and 17.1% of women are university graduates.

Local communities are highly influenced by religious and cultural traditions. Festivities and pilgrimage are carried out annually all over the villages, to celebrate various religious events.

Figure 22: Mass celebrated at the mountain summit for the Cross feast

Their bond to Jabal Moussa has many aspects: one aspect is a relationship of taming and defiance, with an attempt to conquer the mountain summit and overcome nature's challenges. Another facet concerns viewing and using the natural resources as a source of income generation.

The adoption of the concept of the Man and Biosphere Program in 2009 has allowed the Association for the Protection of Jabal Moussa to move forward from a purely conservation stance to one that integrates the socio-economic development and meets the needs of the local communities.

The reserve's major program, ecotourism, is completely community-based: APJM has recruited, trained, and engaged local guards and guides, who soon became the stewards of Jabal Moussa. Visitors can complement their hike with a lunch at a local guesthouse, or with an overnight stay at local Bed & Breakfast inns.

Figure 23: Local guide briefing a group of visitors

Conservation also meets development, in the Forestry Program, where native tree nurseries are established in lands owned by locals and maintained by them. The tree nurseries are not only a source of income but also of pride, visible when land owners showcase the seedlings to visitors.

Figure 24: Native tree nursery in Mchati village

APJM has also its own line of food and handicraft products, manufactured by 50 motivated local women. The products are currently being marketed under the growing registered brand name of "Jabal Moussa". Through specialized marketing channels and targeted outlets, products are being increasingly demanded.

Figure 25: Products of Jabal Moussa on a stand

Figure 26: Jabal Moussa products are handmade and heartmade

A program is also dedicated to encouraging the drivers of the food products value chain: the local farmers. Development might take many forms, such as purchase of yield, training sessions, and in-kind assistance. Particular types of farming are encouraged, such as beekeeping and planting of wild plants (such as thyme), both serving a dual vision of conservation and income generation.

Figure 27: On-field training provided for a beekeeper in Yahchouch village