Plant collection in Ehden Nature Reserve – north Lebanon
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SCAT RAIDERS UNRAVEL ANIMAL-PLANT INTERACTIONS IN LEBANON USING DNA BARCODING TOOLS

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Using DNA dietary analysis on Eastern Mediterranean wildlife to explore the role of animals in ecological restoration processes.

Lebanon is considered a hotspot for biodiversity in the Mediterranean basin likely due to its geographic position at the transition of two major landmasses (that is Eurasia and Africa). The Lebanese territory is divided between mountainous slopes with fertile valleys separating the two mountain chains that run parallel with the sea and the steppe areas in the north-east. Deep canyons and numerous rivers characterize this mountainous landscape.

These geomorphological regions give rise to many bio-climatic zones and several habitat types that are home to more than 9,116 described species (4,486 for fauna and 4,630 for flora from which 91 are endemic). However, major taxonomic groups like insects and fungi are understudied and taxa are underrepresented within public data platforms. For example, according to the Barcode of Life Data System (BOLD), only 345 Lebanese specimens with sequences are published, forming 151 BINs and, of these records, only 108 have species names.

In September 2018, the Faculty of Science at Saint Joseph University of Beirut joined the iBOL Consortium providing us with the opportunity to unravel Lebanese biodiversity by DNA barcoding both small and

large mammals as well as the main trees and shrubs used in reforestation programs. We will also target endemic plant species.

Animals are a crucial component for the resilience of forest ecosystems and an important factor in forest restoration projects as they promote the sustainability of reintroduced plants, as well as seed dispersal. However, we still need to identify the animals present in restored areas.

In addition, knowing what each animal eats and which plant seeds are being dispersed is crucial for reforestation schemes that promote wildlife and ensure ecosystem sustainability. The information needed to study the diets of animals can be found hidden in their scat which contains not only the animal's DNA, but also what that animal has eaten. With the powerful technique of DNA metabarcoding, we now have

Animal scat collection.
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the necessary tool to efficiently unravel the genetic information hidden in animal scat. The DNA sequences obtained from such material are identified by comparison to a reference library of animals and plants of the Eastern Mediterranean countries.

This reference library was prepared from leaves collected in the wild and from DNA isolated from dead animals found along roads or from private museums. Thus, we have generated sequences for 51 plants and 18 mammals.

Constructing the reference library – DNA isolation.
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This study conducted in collaboration with the Smithsonian Conservation Biology Institute and the University of Otago is the first to employ a DNA dietary analysis on wildlife in the Eastern Mediterranean Region and explicitly considering the role of wildlife in ecological restoration processes. Our results will inform management strategies to help with the conservation efforts of these imperiled species.

Online:

https://ibol.org/barcodebulletin/research/scat-raiders-unravel-animal-plant-interactions-in-lebanon-using-dna-barcoding-tools/