

# Important Plant Areas of the south and east Mediterranean region

## Priority sites for conservation

Editors: E.A. Radford, G. Catullo and B. de Montmollin



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**Plantlife**



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For improved readability the Occupied Palestinian Territories will be referred to in the text as Palestine.

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## Message of support

### Important Plant Areas of the south and east Mediterranean region

The past decade has seen the growing international awareness about the vital role of biodiversity, supported by the scientific community, NGOs and policy makers in both North and South. France has participated in raising awareness in this matter through international commitments, particularly since the Rio Summit in 1992.

L'Agence Française de Développement (AFD) has since engaged actively in sustainable development, especially regarding the careful use of ecosystem and the conservation of biodiversity at large. Therefore since 1996, AFD has pledged nearly 600 millions Euros for biodiversity related projects. As one of the six funders of the Critical Ecosystem Partnership Fund worldwide, and as a long standing supporter of development in the Mediterranean-Middle East region, AFD was very happy to contribute to the preparatory scientific and strategic work for the protection of the Mediterranean biodiversity hotspot.

Being aware of the lack of unified data relevant to the distribution and status of plants in the Mediterranean, essential for the definition of conservation priorities, AFD funded the "Identification of the important sites and habitats for plants in North Africa, the Middle East and Albania and their integration, along with Red Lists of the Mediterranean species, in the Ecosystem Profile of the CEPF", developed by IUCN in 2009, in collaboration with Plantlife International and WWF.

The results presented in this publication contributed to the "Ecosystem Profile for the Mediterranean region" – a strategic document used to prioritize the allocation of CEPF funds to conservation NGOs in the region for the period 2011-2015. Furthermore, AFD wishes that this publication be used to raise the profile of the conservation of the extraordinary flora of the Mediterranean region and to encourage further development of botanical knowledge.

**Gilles KLEITZ**

Biodiversity Programme Office. AFD





# EXECUTIVE SUMMARY

**Important Plant Areas (IPA) are internationally important sites for wild plants and fungi, identified at national level using standard criteria.** Initially developed to address the lack of focus on conserving plant diversity, IPAs provide a framework to assess the effectiveness of conservation activities for plants, and target sites for future action. They support existing conservation programmes such as protected area networks and the CBD Global Strategy for Plant Conservation.

**The Mediterranean is an undisputed global biodiversity hotspot solely because of her huge plant diversity.** Around 10% of the world's vascular plants (25,000) are found in the Mediterranean Basin on less than 2% of the Earth's surface and half of these species are found nowhere else on earth. Despite this, precise data on the distribution and status of plants are frequently insufficient, out of date or absent, particularly in the south and east of the region. This potentially results in the haphazard application of conservation action.

**This report describes a rapid assessment of Important Plant Areas in the south and east Mediterranean;** a project designed to provide the 'wild plant perspective' for the regional investment strategy of the Critical Ecosystem Partnership Fund. The project partnership of IUCN, Plantlife International and WWF with botanical teams from Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Tunisia, Syria and Albania, was supported by the French Development Agency.

**207 IPAs have been identified in the project countries bringing the total IPAs in the region to 888.** Threatened and restricted species and habitats present on these sites have been recorded along with the threats affecting them. All Mediterranean habitats are represented: forest, maquis, garrigue, pasture, wetland, coast and the transition to the desert zone. 40% of IPAs identified coincide with key biodiversity areas in the region; sites important for other taxa (mammals, birds, freshwater fish and amphibians).



▲ Middle atlas wheat crop and *Consolida* spp.  
© P. Regato



◀ [Left page]  
**Holm oaks (*Quercus ilex*), and Atlantic cedar (*Cedrus atlantica*) forest in the Middle Atlas, Morocco**  
© Michel Gunther / WWF-Canon



▲  
Lebanese endemic, *Cousinia libnotica*  
on Makmel IPA

© N. Machaka-Houri



▲  
*Orchis tridentata*  
Abu Quies IPA, Syria  
© F. Al- Mahmoud

**75% of IPAs contain locally endemic species found only within one country; 60% contain very restricted species.** ‘Mega endemic sites’ containing over 20 very restricted species can be found in Algeria, Morocco, Lebanon, Syria and Libya.

**Overgrazing of pastoral lands is the most significant threat to the IPAs affecting 67% of sites.** Deforestation (largely due to collecting firewood), tourism development, intensification of arable farming and unsustainable collection of plants affect over one third of the IPAs analysed.

**The level of official protection for IPAs varies across the project countries from 0 – 80%.** Though official protection of sites can be a helpful measure of conservation, evidence of management plans leading to biodiversity friendly land management is a better measure. Evidence of management plans for IPAs in the region is minimal.

**A unique product of this project is the first preliminary list of restricted range plant species for North Africa and the Middle East,** which found that 1195 species occur within less than 5,000km<sup>2</sup> and around 50% of these occur over less 100km<sup>2</sup>. Understanding the level of threat to these species will help target action against biodiversity loss.

**IPAs are not an optional extra and neither is their conservation.** They support the livelihoods of many people and provide undervalued services such as water and flood control, carbon capture, the prevention of desertification and a reservoir of genetic species and diversity; all critically important for the Mediterranean region.

**10 recommendations have been developed to help direct the conservation of wild plants in the Mediterranean.** Successful implementation of these will secure a sustainable future for the environment and inhabitants of this unique region; failure will condemn both to a poverty of natural resources and little or no resilience in the face of profound changes in climate.

# RECOMMENDATIONS

Conservation-focused investment in the south and east Mediterranean should seek to improve capacity across the whole ‘plant conservation skill set’. This is needed to: secure the *basic botanical skills* needed to identify plant species; enable *mapping of the distribution and status* (quality and integrity) of the flora and vegetation; undertake *appropriate and targeted actions* to ensure the conservation and sustainable use of plant species and habitats; and effectively advocate *positive change to environmental policy and its implementation*.

## IPA conservation

**RECOGNISE** Important Plant Areas as internationally significant priority sites for conservation in local, national and regional environmental policies and plans.

**TARGET** Important Plant Areas as priority sites for conservation action in the Mediterranean region. This will ensure that direct conservation action on priority plant sites can begin now, alongside the continued efforts to improve data.

**INCORPORATE** IPAs (where appropriate) into protected area networks.

**UPDATE** management plans for protected areas that contain IPAs to take account of new plant data presented and ensure effective implementation. Develop and implement management plans for IPAs where they do not exist (starting with top priority sites).

**ENSURE** that Environment Impact Assessments are undertaken on development projects that affect IPAs and ensure their recommendations are enforced and monitored.

**TARGET** IPAs for the implementation of sustainable forest management and agri-environment scheme and projects.

**ENCOURAGE** communities whose livelihoods depend on plant resources to participate in IPA conservation planning activities (e.g. medicinal plant collectors, promoters of nature tourism, hunters, mountain guides).


## IPA data

**‘GROUND-TRUTH’** the plant species and habitat data associated with IPAs through fieldwork (starting with priority IPAs named in this report) and ensure that IPA plant features are properly mapped.

**INVEST** in the provision of comprehensive and up to date information on plant and habitats species in the south and east Mediterranean, building on the work carried out in this project. This should include:

- A definitive list of restricted range, endemic plant taxa for the Mediterranean with accurate data on their distribution, abundance and importance to the local community.
- A regional IUCN Red List is for the Mediterranean (begin by focusing on restricted range species that are endemic to the region).
- National IUCN Red Lists for vascular plants for all south and east Mediterranean countries.
- A list of Mediterranean habitats and threatened habitats.

**ENABLE** the data associated with IPAs to be stored electronically (such as on the IPA database) so it can be updated easily via the web.



# 01

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## section

# SCENE SETTING

- .Context for the project
- .Important Plant Areas, government responsibility and key conservation initiatives
- .Methodology summary
- .Criteria used for IPA selection in North Africa and Middle East countries using a rapid assessment of existing data

## Context for the project

Important Plant Areas (IPAs) are internationally significant sites for plant diversity – or more simply the best sites for plants. Identified at national level, using internationally standardised criteria, they provide a framework for implementing target 5 of the Global Strategy for Plant Conservation of the Convention on Biological Diversity (CBD). IPAs are a vital tool for conserving wild plants and their habitats *in situ*, and the plant resources they contain support the livelihoods of many people. In addition IPAs provide essential ecosystem services: water sources, flood control, carbon capture, prevention of desertification and a reservoir of genetic diversity.

The Mediterranean basin is one of the world's major centres of plant diversity, where 10% of the world's higher plants can be found in an area representing 1.6% of the Earth's surface (Médail and Quézel 1997). The huge flora of around 25,000 species has exceptionally high endemism; approximately 13,000 species are found only within the Mediterranean region, hence its status as a global biodiversity hotspot. In 1999 Médail and Quézel identified 10 'mini hotspots' within the Mediterranean basin based on plant endemism and richness.<sup>1</sup> These sites contain between 10 and 20% endemism. The majority of these are too large scale for focused site based action, but they represent areas/sub regions of immense importance for conservation.

Despite widespread acknowledgement of the region as a global plant hotspot, precise data on the distribution and status of plants and habitats within many Mediterranean countries are frequently insufficient, out of date or absent. This is particularly true of countries in the south and east of the Mediterranean basin (North Africa and the Middle East sub regions). Without baseline data on the patterns of plant diversity it is difficult to



▲  
*Campanula heirosolythana*  
A typical Levantine annual  
© O. Golan

◀  
[Left page]  
Typical forest and grassland mosaic  
Mbas Deja Leva, Albania  
© REC Albania

1 Madeira and Canary islands; High Atlas and Middle Atlas (Morocco); Baetic –Rifan complex (Spain, Morocco, Algeria); Tyrrhenian Islands (Sicily, Sardinia and Corsica); Maritime and Ligurian alps, south and central Greece; Crete; south Anatolia and Cyprus; Syria, Lebanon and Israel, Mediterranean Cyrenaic (Libya).



▲  
Middle Atlas mountains  
© L. Soderstrom

monitor the condition of this diversity or to target limited resources in the areas most in need of conservation with any certainty. An illustration of this is the poor representation of plants species from the project countries assessed for the IUCN Global Red List (176 species assessed by 2010), and few countries have an up-to-date national vascular plant red list or list of threatened plants. Plants and their habitats are under threat in the region, as are the livelihoods and ecosystem services that these plant resources support, but exactly where and by what?

This report begins to answer those questions. It is the result of a 6 month project, which aimed to bring together existing data on internationally important sites for plant diversity (Important Plant Areas) in the south and east Mediterranean. The project was conceived to support the creation of an Ecosystem Profile for the Mediterranean region by the Critical Ecosystem Partnership Fund (CEPF). It was important to ensure plant priorities were included in the Profile document, which outlines biodiversity priorities in the region and informs a five year investment strategy for CEPF. This work on Important Plant Areas therefore provides a basis for conservation work and future research and on plants in the Mediterranean region.

The project was funded by the French Development Agency (AFD) a major partner in the CEPF, and carried out in partnership by IUCN, Plantlife International and WWF with IPA country teams from Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Tunisia, Syria and Albania. IPA teams within the other Mediterranean Balkan countries, Slovenia, Croatia, Macedonia FYR and Montenegro have already identified IPAs (Radford and Odé, 2009; Anderson *et al*, 2005), as have teams in Turkey (Özhatay *et al*, 2003) and Italy (Blasi *et al* 2010 in press). Important Forest Areas have also been identified by WWF and partners in some of the project countries with a strategy for their conservation (Regato, 2001).



Once IPAs are identified the next phase is to undertake conservation of these sites, for example by:

- promoting the biological importance of the sites;
- using the information collated to inform site management ensuring IPAs remain diverse and intact;
- building capacity by strengthening links between individuals and groups interested in and knowledgeable about these sites;
- advocating policy change at national, regional and global level for the benefit of plants and their habitats on IPAs (and for the health of the wider landscape).
- undertaking conservation action at local level with relevant stakeholders.

### Important Plant Areas, government responsibility and key conservation initiatives

Important Plant Areas are designed to inform existing programmes and legislation and not to compete with them (IPA is not a legal designation). IPAs can add value to existing programmes by providing information on plants that is often lacking when valuable natural sites are prioritised for attention.

The conservation of important areas for plant diversity has been embedded within target 5 of the Convention on Biological Diversity (CBD) **Global Strategy for Plant Conservation (GSPC)**, 2002. Target 5 was updated at the CBD Conference of the Parties in 2010 to: *At least 75 per cent of the most important areas for plant diversity of each ecological region protected, with effective management in place for conserving plants and their genetic diversity.*

This Global Strategy recognises the importance of conserving plant diversity and contains sixteen targets in total. The Strategy has been endorsed by the 182 Parties which are signatories to the Convention, including the governments of all the countries represented in this project. The Strategy has galvanised botanical and conservation communities at global, regional and national levels, drawing together plant conservation projects and contacts to improve plant conservation. Plantlife International, with IUCN, is recognised as a facilitating organisation for target 5, and the methodology associated with this project is a useful tool in helping its implementation.

Important Plant Areas may provide a useful tool for identifying gaps in existing **national protected area programmes** due to their international significance for biodiversity. In many countries protected area networks have grown on an *ad hoc* basis, often based on large charismatic animals, without a thorough scientific investigation of all biodiversity. Inclusion of IPAs can help improve coverage of important biodiversity within these networks. IPA criteria in Europe include those required to designate important sites for biodiversity conservation that make up the Emerald network and Natura 2000 required actions under the **Bern Convention** and the **EC Habitats Directive** respectively. The criteria for designating IPAs also overlap with those for the designation of internationally important wetlands, known as Ramsar sites.



▲  
*Tulipa agensis*  
© F. Al- Mahmoud

“IPAs can add value to existing programmes by providing information on plants that is often lacking when valuable natural sites are prioritised for attention”



▲  
Al-Quornet es-Sawda peak  
Makmel IPA, Lebanon  
© N. Machaka-Hour



▲  
*Ranunculus coronaria*  
Palestine  
© B. Al-Sheik

It is not necessarily appropriate or possible to include all IPAs in protected area networks. Proper management, not simply the designation of protection status, is the key to their survival. IPAs can also provide a focus for **agri-environment** and **sustainable forestry programmes**, such as government support schemes for High Nature Value farmland currently being developed in some Balkan countries. IPAs are sites that are critically in need of biodiversity friendly management, ensuring the vital plant resources they contain are used in a sustainable way.

### Methodology summary

In order to find a workable methodology to identify preliminary important areas for plant diversity, existing methods that have been used to select priority sites for conservation in the region were discussed by project participants. These methodologies were:

- Important Plant Areas (IPAs) used by Plantlife International and partners
- Important Forest Areas used by WWF and partners and
- Areas defined using the threatened species data of IUCN.
- 

Details of Important Plant Area and Important Forest Area criteria governing these methods are included in appendix 1 on page 82, they overlap significantly.

Country coordinators involved in the project consolidated the criteria into one set of IPA criteria focusing on those data that they knew were readily available, to provide the framework for justifying the sites selected. In doing so they acknowledged that the list of IPAs identified would be *preliminary* but would be the very best sites for plant diversity botanical experts within their countries were aware of. Coordinators also agreed that efforts should be made within the project to build regionally focused datasets of threatened species and habitats. In some cases further work would be necessary to refine the data to ensure the 'internationally important' standard of the sites could be upheld. In Albania an adaptation of the European IPA criteria was used (Anderson, 2002) as it was more appropriate to the country situation and the quality of data available.

The process of developing criteria and bringing together results took place during two workshops at the IUCN Centre for Mediterranean Cooperation in Malaga separated by a five month period of data collation and analysis. A summary of the criteria used to identify IPAs are included overleaf in box 01. Vascular plants, bryophytes, lichens, algae and also fungi could all be considered when selecting IPAs and where data were available. Fungi are not part of the plant kingdom but have traditionally been included in IPA selection. Ultimately for sites to be internationally significant, the presence of species and habitats that are threatened or restricted in distribution (on regional and global scale) or sites that are exceptionally species rich (by habitat) should be prioritised when selecting sites. Comprehensive data on all these criteria are not yet available, though there is enough to begin working with and progress will be made as a result of this project.

## Box 01

### Criteria used for IPA selection in North Africa and Middle East countries using a rapid assessment of existing data

Sites can be selected on the basis of ONE OR MORE of the criteria below.

#### A. SPECIES: THREATENED AND/OR ENDEMIC (RESTRICTED RANGE)

For immediate consideration<sup>1</sup>:

- i) *Sites containing threatened species*
  - Presence of nationally threatened species, on existing national Red Lists or based on threatened species known by experts<sup>2</sup>
  - Presence of threatened national endemic species, i.e. restricted to one country
- ii) *Sites containing endemic species (not threatened)*
  - Presence of national endemics (limited to one country)
  - Presence of sub national endemics (steno-endemics), i.e. restricted to a very limited area
- iii) *Sites containing species at the edge of their geographical range which contain important genetic variability from core populations*

For consideration following further regional discussion<sup>1</sup> i.e. 'regional endemics'.

- iv) *Species with restricted range occurring in more than one country* - for example Levant or Morocco/Algeria. Defined as <5,000km<sup>2</sup> for restricted range species and <100km<sup>2</sup> for site restricted species<sup>3</sup>
- v) *Species occurring in small isolated populations*, even though their range may be large but the area of occupancy is small.

#### B. RICHNESS

- i) *Sites rich in endemic species (possible in some countries)*
- ii) *Sites rich in species that provide 'the best example of a habitat' that is not degraded.*

#### C. HABITATS

For immediate consideration

- i) *Sites containing nationally threatened habitats*
  - Presence of nationally threatened habitats (defined by experts)
  -

For consideration following further regional discussion

- ii) *Sites containing regionally threatened habitats developed through combining and discussing nationally threatened habitats lists.*

1 The criteria 'for immediate consideration' are those where it is relatively easy to bring together the data from existing sources or with a group of experts. The criteria needing 'further regional discussion' will be based on species and habitat lists that require further discussion and validation (at a second regional workshop) to justify their use in IPA selection.

2 Nationally threatened species have been included in the analysis for the time being because this data is available for some countries. Alone the presence of nationally threatened species or habitat will not be significant enough to give a site 'internationally important status' but where they exist on a site with high levels of locally endemic (restricted range) species and regionally threatened habitats, which are internationally significant, the inclusion of such sites in the IPA inventory is justifiable.

3 As part of this project each country expert team proposed species that fit this category and included them in the country reports. These were brought together in a regional list of restricted range species. See section 04 on endemism and restricted range species.

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# 02

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## section

# IPAs IN THE SOUTH AND EAST MEDITERRANEAN REGION

- .Important Plant Areas identified to date in Mediterranean countries
- .Plant species endemism on IPAs
- .Threats
- .Protection



Country	N° of IPAs
<b>Morocco</b>	19
<b>Algeria</b>	21
<b>Tunisia</b>	13
<b>Libya</b>	5
<b>Egypt</b>	20
<b>Israel</b>	15
<b>Palestine</b>	4
<b>Lebanon</b>	20
<b>Jordan</b>	12

Country	N° of IPAs
<b>Syria</b>	33
<b>Turkey</b>	144
<b>Albania</b>	45
<b>Macedonia FYR</b>	42
<b>Montenegro</b>	21
<b>Croatia</b>	97
<b>Slovenia</b>	57
<b>Italy</b>	320
<b>TOTAL</b>	<b>888</b>

▲ [Fig. 1] Important Plant Areas identified to date in Mediterranean countries

Green dots indicate the 207 IPAs identified in current project

◀ [Table. 1] No. of IPAs identified in Mediterranean countries to date

Countries in bold were part of the current project



▲  
Collecting thornbush for fire wood,  
Morocco  
© M.S. Taleb

Two hundred and seven priority sites for plants (Important Plant Areas) have been identified within the eleven countries in this project, (Morocco, Algeria, Tunisia, Egypt, Libya, Jordan, Israel, Palestine, Lebanon, Syria and Albania) and a further twenty six sites have been identified as potential sites in need of further research before they can be confirmed as IPAs.

The site inventories developed represent the first attempt to draw together detailed country-wide site-based data on Important Plant Areas. Much of the data available is old, and expert opinion within the countries concerned has played an important role in site selection. Undoubtedly more work is needed to provide comprehensive IPA inventories in these project countries – particularly fieldwork to update the data on distributions and status of species and habitats. More sites may be identified in future but these provide a good basis from which to work, and are justifiable priorities for conservation action. A full list of all these sites can be found in appendix 2 and in the country section from page 20. Further detailed descriptions of many of these sites can be found in country reports at [www.plantlife.org.uk](http://www.plantlife.org.uk).

Across the whole Mediterranean a further 681 IPAs have been identified (in Slovenia, Croatia, Montenegro, Macedonia FYR, Turkey and Italy (references at the end of the section) through previous IPA projects which brings the total number of Important Plant Areas in the region to 888. The table below shows the number of sites identified across the Mediterranean to date.

All Mediterranean habitats are represented within the IPAs identified through this project: forest, maquis, garrigue, pasture, wetland, coast and the transition to the desert zone. The coverage and the type of sites selected vary between countries. In Algeria IPAs have been selected within all the major vegetation zones from sea level to 2300m and they are highly floristically diverse. In Morocco the majority of sites chosen are 2500m above sea level with associated alpine and sub alpine vegetation, these sites are also exceptionally rich in endemic species for example Toubkhal National Park in

“This work represents the first attempt to draw together detailed country-wide data on IPA’s. More fieldwork is needed to update the data on distribution and status of species and habitats”

the High Atlas mountains. The focus in Tunisia and Egypt has largely been on wetland and coastal IPAs, and in Libya IPAs have been selected that represent the coastal belt, mountains and desert region, with a focus on Al Jabal Al Akhdar, the largest IPA on the Cyrenaican Peninsula which contains 80% of the Libyan flora and is a region of exceptional plant endemism.

In Lebanon and Syria a very comprehensive assessment of current data has resulted in the selection of IPAs located throughout the territories of these countries; in humid, sub humid, semi arid and arid habitats. Many of the Syrian sites are mountainous and typically have high local species endemism. In Israel the IPAs include the best plant sites across the major Israeli vegetation zones: Mediterranean maquis, the transition zone and the desert region. The focus in Palestine has been to identify the best sites within the predominant maquis vegetation, which are most in need of conservation attention.

Finally in Albania a greater number of smaller sites containing mosaics of habitats have been selected, notably containing high alpine forests and grasslands. This is similar to the pattern of IPA selection in other small highly biodiverse European countries in the Balkans such as Macedonia FYR and Croatia (Radford and Odé 2009).

### Plant species endemism on IPAs

As expected, high levels of plant species endemism is a recurring feature on IPAs in this region (table 2). 75% of IPAs contain single country endemic species, found only within one country, for example *Cicer atlanticum* in Morocco or *Euphorbia postii* in Syria; and just over 60% contain a very restricted species such as *Onosma cyrenaica* restricted to Al Jabal Al Akdar in Libya. ‘Mega endemic sites’ containing over 20 steno-endemic (very restricted range) species can be found in Algeria, Morocco, Lebanon Syria and Libya. Jabal Al Arab in Syria is one such site.

“All Mediterranean habitats are represented within the IPAs identified through this project: forest, maquis, garrigue, pasture, wetland, coast and the transition to the desert zone”

	TOTAL (&%) of 147 IPAs analysed <sup>1</sup>	Morocco	Algeria	Tunisia	Libya	Egypt	Israel	Palestine	Lebanon	Syria	Albania
No. of IPAs containing single country endemic species	110 (75%)	19	20	6	1	8	4	3	16	25	8
No. of IPAs containing very local steno-endemic species	104 (71%)	15	21	6	1	3	7	4	12	27	8
No of IPAs containing greater than 20 single country endemic species or very local steno-endemic species	33 (22%)	16	4	0	1	1	0	0	6	5	0

<sup>1</sup> IPAs analysed: eight of the 45 IPAs in Albania, 1 of the 5 IPAs in Libya, 7 of the 15 IPAs in Israel and all IPAs in remaining countries. Figures for Jordan unavailable.

[Table. 2] Plant endemism on IPAs in the Mediterranean project countries



▲  
Grazing in the cork forest surrounding  
Majen Choucha IPA  
© Z. Ghrabi- Gammar

“Agricultural intensification through overgrazing of pastoral lands is the most significant threat to the IPAs identified in this project, affecting 67% of the sites analysed”

The next step of analysing species endemism on these IPAs should include an assessment of the numbers of restricted range species (less than 5000km<sup>2</sup> in range) present on each site. This will be possible using the list of restricted range species created during this project (see section 04) and will help will further prioritise sites by focusing on those containing species with limited distributions regardless of whether they are present in one or more countries. Restricted range species are potentially in greater need of conservation attention and multi-country restricted range species can be overlooked in national prioritisation exercises. These restricted range species could also become priorities for Red List assessment.

### Threats

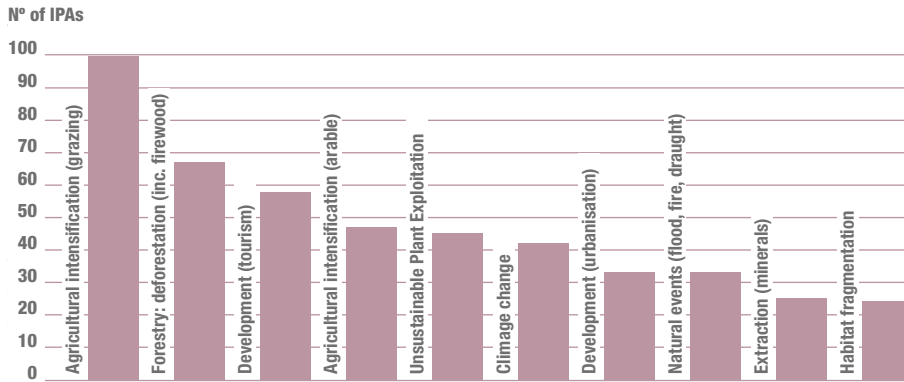
Agricultural intensification through overgrazing of pastoral lands is the most significant threat to the IPAs identified in this project, affecting 67% of the sites analysed. Deforestation (largely due to collecting firewood), tourism development, intensification of arable farming and unsustainable collection of plants, affects over one third of the IPAs analysed. Unsustainable collection of medicinal and aromatic plants (supporting livelihoods) is of great concern in Syria (affecting 91% of Syrian IPAs) and Palestine.

The threat of over collection may provide a conservation opportunity in terms of using plant conservation to secure livelihoods and assist development. Threats posed by climate change are notable for IPAs in Morocco, Lebanon and Tunisia, Morocco and Lebanon have a high number of high altitude sites and Tunisia's sites are predominately isolated wetlands in all cases increased temperatures resulting from climate warming leave the plants with nowhere to retreat. No IPAs have no threats recorded.



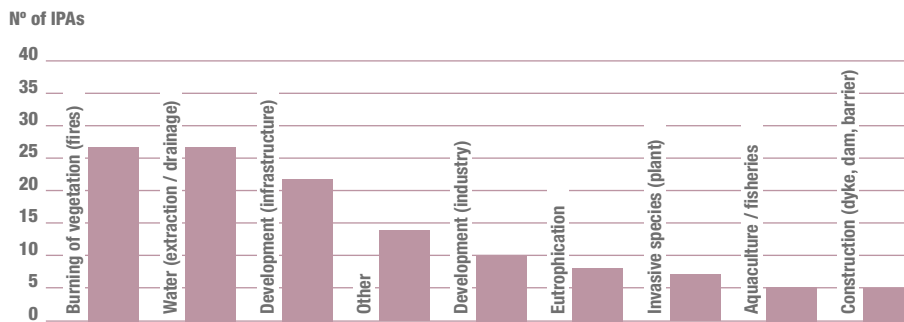


▲  
*Diplotaxis siettiana*  
© C. Moreno



[Fig. 2] Top ten threats affecting 147 IPAs in the project countries

IPAs analysed: Eight of the 45 IPAs in Albania, 7 of the 15 IPAs in Israel and all IPAs in remaining countries. Figures for Libya and Jordan unavailable.



[Fig. 3] Other threats affecting 147 IPAs in the project countries

IPAs analysed: Eight of the 45 IPAs in Albania, 7 of the 15 IPAs in Israel and all IPAs in remaining countries. Figures for Libya and Jordan unavailable.

Threat	TOTAL (and %) of 147 IPAs analysed <sup>1</sup>	Morocco	Algeria	Tunisia	Egypt (Med)	Egypt (other)	Israel	Palestine	Lebanon	Syria	Albania
Agricultural intensification (grazing)	99 (67%)	16	14	11	7	4	5	2	7	28	5
Forestry: deforestation (inc. firewood)	68 (46%)	13	5	3	3	3	0	4	7	26	4
Development (tourism)	60 (41%)	8	9	7	2	5	1	0	9	16	3
Agricultural intensification (arable)	50 (34%)	10	3	3	4	2	5	0	1	22	0
Unsustainable Plant Exploitation	49 (33%)	9	2	1	0	1	0	3	2	30	1
Climate change	42 (29%)	15	4	10	1	1	0	0	10	1	0
Development (urbanisation)	35 (24%)	2	1	1	5	1	6	2	13	4	0
Natural Events (/flood/fire/drought)	35 (24%)	2	18	5	2	5	0	0	0	0	3
Extraction (minerals)	28 (19%)	0	7	1	0	0	0	1	3	15	1
Habitat fragmentation	27 (18%)	10	1	1	1	0	6	4	2	2	0
Burning of vegetation (fires)	26 (18%)	4	0	1	0	0	1	0	3	14	3
Water (extraction/drainage)	26 (18%)	0	2	5	5	1	4	1	3	5	0
Development (infrastructure)	22 (15%)	1	2	1	4	2	0	3	1	8	0
Other	14 (10%)	4	6	0	0	3	0	0	1	0	0
Development (industry)	11 (7%)	1	0	0	4	2	1	0	1	2	0
Eutrophication	9 (6%)	0	2	3	0	2	0	0	0	0	2
Invasive species - plant	8 (5%)	1	2	1	2	1	0	0	1	0	0
Aquaculture/Fisheries	6 (4%)	0	0	0	3	0	0	0	0	3	0
Construction: dyke/dam/barrier	6 (4%)	0	0	0	3	0	0	0	0	3	0
Threats Unknown	3 (2%)	3	0	0	0	0	0	0	0	0	0
Abandonment/reduction of land management	2 (1%)	0	2	0	0	0	0	0	0	0	0
Agricultural intensification (hort.)	2 (1%)	0	0	0	0	1	0	1	0	0	0
Extraction (peat)	2 (1%)	0	0	0	2	0	0	0	0	0	0
Invasive species - animal	2 (1%)	0	0	0	1	0	0	0	1	0	0
Security/Military	2 (1%)	0	0	0	0	0	1	0	1	0	0
Intrinsic Species Factors(slow growth, density etc.)	1 (<1%)	0	0	0	1	0	0	0	0	0	0

<sup>(1)</sup> IPAs analysed: eight of the 45 IPAs in Albania, 7 of the 15 IPAs in Israel and all IPAs in remaining countries. Figures for Libya and Jordan unavailable.

[Table. 3] Threats affecting 147 IPAs in the Mediterranean project countries



**Protection**

The level of official protection for the IPAs identified varies across the project countries from 0 – 80%. Protection can be in the form of protected areas such as National Parks or internationally important wetland (Ramsar) sites or as natural monuments. In Albania over 80% of the IPAs are protected or recognised as important sites for nature in some way. Many IPAs in Morocco, Tunisia and Algeria are also National Parks, in the Middle East countries the situation is less clear but official protection of IPAs is not as comprehensive.

Official protection of sites can be helpful but a truer measure of whether a site is properly managed or not can be measured through evidence of site based conservation activity, often linked to a recognised management plan. Evidence of management plans for IPAs is minimal, 6 sites in Egypt, 3 in Syria and 2 in Lebanon do have active management plans.

▲  
Rural landscape and wetland in a Ramsar zone of El Kala National Park  
Algeria  
© Michel Gunther / WWF-Canon

“The level of official protection for the IPAs identified varies across the project countries from 0 – 80%. Protection can be in the form of protected areas such as National Parks or internationally important wetland (Ramsar) sites or as natural monuments”

	TOTAL	Morocco	Algeria	Tunisia	Libya	Egypt	Israel	Palestine	Lebanon	Syria	Albania
<b>IPAs are fully or partially within national parks / protected areas</b>	97	6	8	13	2	12	-	0	11	7	38
<b>Management plans available</b>	11	?	?	?	?	6	?	?	2	3	?

Figures for Jordan unavailable.

[Table. 4] Protection of IPAs in the Mediterranean project countries



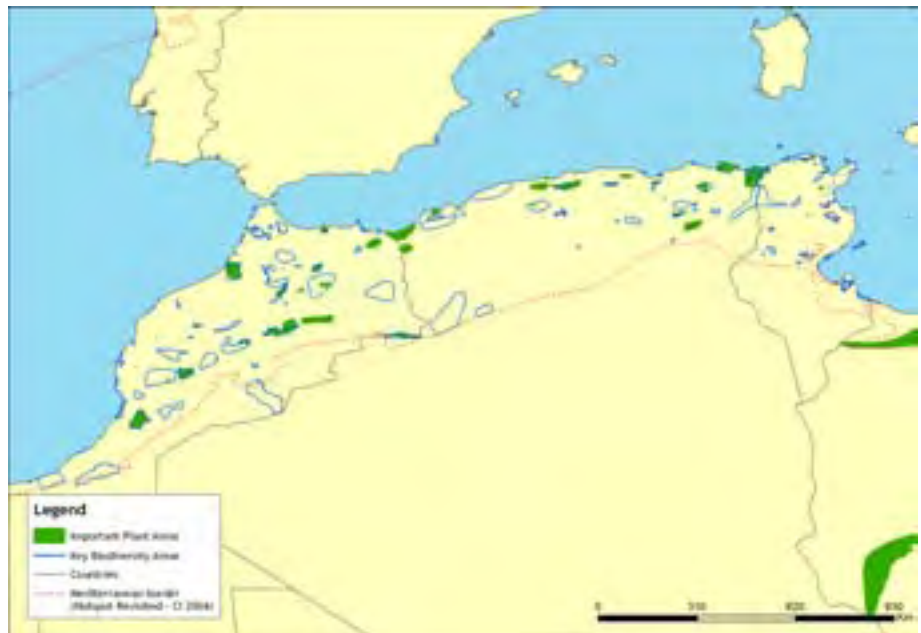
▲  
Landscape of the Middle Atlas  
Morocco  
© Michel Gunther / WWF-Canon

“IPA country teams made their own selection and prioritised up to five IPAs in terms of their importance for conservation investment”

### IPAs and Key Biodiversity Areas

Eighty two IPAs (40% of the total number IPAs identified) overlap with the 327 key biodiversity areas identified for the same countries within the Ecosystem Profile for the Mediterranean basin (Critical Ecosystem Partnerships Fund, 2010) (See figs. 4 and 5). The key biodiversity area analysis was made largely using taxa other than plants (birds, mammals, fish, reptiles and amphibians), due to the lack of plant species data available on the IUCN Global Red List. A further 29 IPAs show partial overlap with key biodiversity areas. Our IPA analysis employs a slightly different approach to assessing the importance of sites for plant diversity by drawing on a wider selection of data and expertise, to compensate for the lack of data available in a format recognised for key biodiversity area selection.

The CEPF profile identified 36 priority key biodiversity areas, 19 of which overlap with IPAs, but these are not necessarily those IPAs in greatest need of conservation action from a wild plant perspective. IPA country teams made their own selection and prioritised up to five IPAs in terms of their importance for conservation investment. They made a subjective assessment of the importance of these sites based on biological importance, threats affecting the site and the need for action. ‘Priority’ IPAs selected in this way are shown in table 5, nine overlap with priority Key biodiversity areas and of these seven are prioritised for investment by CEPF.



[Fig. 4] IPAs and key biodiversity areas in the western Mediterranean



[Fig. 5] IPAs and key biodiversity areas in the eastern Mediterranean

Morocco	Talassemtane National Park. Bou-Naceur and Bou Iblane. Ifrane National Park*, High Eastern Atlas National Park*, Toubkal National Park*.
Algeria	El Kala 1*, El Kala 2*, Djurdjura*, Babor*, Gouraya.
Tunisia	Garaa Sejenane, Kroumirie (a suite of 11 small IPAs), Majen Choucha, Oued Ziatine, Toujane.
Libya	Al Jabel Al Akhdar (the whole peninsula – larger than the key biodiversity area currently selected).*
Egypt	Western Mediterranean Coastal Dunes, Sallum Area, Saint Katherine, Nabq, Halayeb Triangle.
Israel	Meron, Hula, Hebron Gradient.
Palestine	Faqoua`-Jalaboun Safa, W Elbalat - W Armyah Ein Samya, Wad Qana-Wad Eshai`r, Yaseed-Ibzeik.
Lebanon	Makmel, Qammouaa-Dinneyh, Jabal Moussa- Nahr Ibrahim.
Syria	Kurd Dag, Salma-Haffeh, Ghab; Anti-Lebanon*, Jabal al Arab.
Albania	Gramozi Mt, Korabi Mt, Tomorri Mt.

(\*) Indicates site is also a priority KBA by CEPF.

[Table. 5] Priority Important Plant Areas for conservation selected by country IPA teams

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\*Available to download from the Plantlife International website: <http://www.plantlife.org.uk/international/plantlife-data->

An aerial photograph showing a vast, dense forest of Cedar of Lebanon (Cedrus libani) covering a mountain slope. The trees are a mix of green and brownish-yellow, suggesting some dryness or seasonal change. The terrain is rugged with rocky outcrops. In the foreground, there are some smaller, more scattered trees and a dirt path. The sky is clear and blue.

# 03

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## section



[This page]  
Cedar of Lebanon (*Cedrus libani*), in Maaser forest. Although protection measures such as the creation of the Al-Shouf Cedar Nature Reserve have been undertaken, the Cedar woodlands of Central Mount-Lebanon are threatened by overgrazing, unregulated tourism, and a high occurrence of forest fires in forests below the slope. Lebanon

© Michel Gunther / WWF-Canon



# COUNTRY REPORTS & CASE STUDIES\*

.Morocco  
.Algeria  
.Tunisia  
.Libya

.Egypt  
.Occupied Palestinian  
Territories  
.Israel

.Lebanon  
.Jordan  
.Syria  
.Albania

\* The order of the countries in the publication follows a West to East geographical structure





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**Mohamed Ribí**  
(High Commission for Water, Forests  
and Desertification Control).

# Morocco

M. S. Taleb and M. Fennane



[Fig. 6] IPAs of Morocco

- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| 01 Jbel Bouhachem                   | 11 Jbel Ayachi                    |
| 02 Talassemtane National Park       | 12 Jbel Maâsker                   |
| 03 Al Hoceima National Park         | 13 Jbel Krouz                     |
| 04 Beni Snassene                    | 14 Jbel Mgoun                     |
| 05 Jbel Bou-Naceur                  | 15 Tamga and Aqqa Wabzaza         |
| 06 Jbel Bou Iblane                  | 16 Toubkal National Park          |
| 07 Tazekka National Park            | 17 Aghbar                         |
| 08 Jbel Tichoukt                    | 18 Jbel Kest, Anezi and Jbel Imzi |
| 09 Ifrane National Park             | 19 Maamora                        |
| 10 Eastern High Atlas National Park |                                   |

### Overview of Moroccan IPAs

Nineteen Important Plant Areas (IPAs) have been identified from a preliminary list of 57 potentially eligible sites (15 classed as priority, 27 highly remarkable and 15 important) drawn from Sites of Biological and Ecological Interest. Most of the IPAs are located in mountain areas (High, Middle and Saharan Atlas); more than half of them are at elevations above 2,500m and some, like Toubkal and Jbel Mgoun, reach 4,000m. There are two coastal IPAs: Al Hoceima National Park and Maamora.





The predominant vegetation in most of the mountain IPAs is forest, sometimes degraded, with stands of Algerian oak, cork oak, holm oak, pine, cedar, fir, *Tetraclinis* and juniper. Above 3,000m, woody vegetation gives way to formations of thorny cushion-like xerophytes and meadows very rich in endemics. The rate of endemism is over 80 percent in the summit region of Toubkal. In the lowlands, Maamora boasts a potentially very extensive cork oak forest (130,000ha), whereas Al Hoceima National Park is mainly characterized by a wild, rocky coastline with cliffs rising out of the sea.

Morocco's IPAs are characterized by particularly high numbers of national endemics and stenoendemics: there are 16 areas with more than 20 such species. The richest sites for locally endemic species are Ifrane National Park (196), Toubkal National Park (164), Jbel Ayachi (75), and Jbel Bou-Naceur and Jbel Bou Iblane (92). Many of these species are stenoendemics found only at a single site.

Six IPAs are included within national parks. The others have not yet been awarded any special protection.

- Number of IPAs: 19
- Number of IPAs containing national endemics: 19
- Number of IPAs containing stenoendemics: 15
- Number of IPAs containing more than 20 national endemics or stenoendemics: 16

▲  
High mountain cushion shrubs  
in Middle atlas  
Morocco  
© P. Regato

“Morocco's IPA are characterized by high numbers of locally endemic species - some found only at a single site”

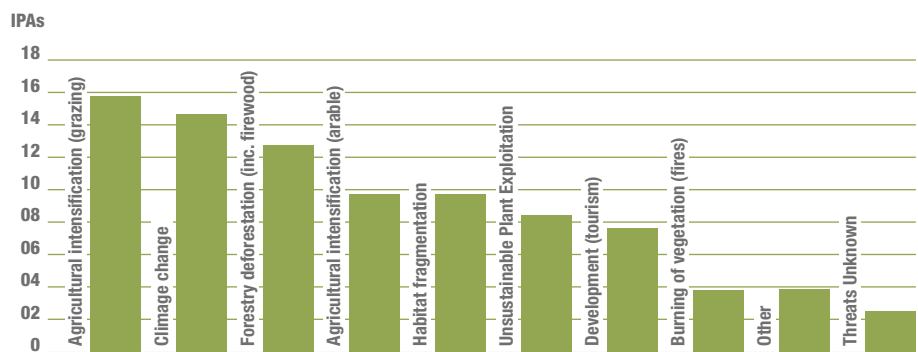


Transhumance in the Eastern High Atlas.  
Morocco

© M.S. Taleb

### Threats to the IPAs

The main threats to Morocco's IPAs are water stress, exacerbated by drought; overgrazing, climate change, deforestation and habitat fragmentation and isolation.



[Fig. 7] Top 10 threats to Morocco's IPAs

### Flora, vegetation and conservation

Morocco covers a total area of 710,850km<sup>2</sup> in North-West Africa. It lies in a position between Africa and Europe, which has resulted in considerable genetic exchange between these regions, these with the great diversity of biotopes in the country has resulted in high species diversity.

The four major mountain ranges - the Rif, the Middle Atlas, the High Atlas and the Anti-Atlas - form an important part of the relief of Morocco, occupying 15 percent of its land area. The Moroccan climate is classed as Mediterranean and is influenced by both the Atlantic and the Sahara. Precipitation decreases from north to south and from west to east. It is high in the mountain massifs, reaching 2,000mm in the Rif, but less than 150 mm in the pre-Saharan and Saharan regions.

The main vegetation units consist essentially of forest and preforest ecosystems (with stands of argan, kermes oak, cypress, cedar, holm oak, cork oak, deciduous oak, *Tetraclinis*, Spanish juniper, fir, Phoenician juniper, carob, wild olive, prickly juniper, pine, mastic, *Retama* and *Adenocarpus*), steppes (esparto, wormwood and thorny xerophyte steppes) and Saharan ecosystems (with acacias and chamaephytes).

The Moroccan flora is particularly rich, with approximately 7,000 species in 920 genera and 130 families, these include an estimated 4,500 species and subspecies of vascular plants. There are 951 national endemics (over 20 percent of the vascular plants). Some 500 local endemics (of restricted range) are shared with Algeria, the Iberian Peninsula and even Mauritania and the Canary Islands. The rate of endemism is particularly high in the High Atlas and, to a lesser extent, in the Middle Atlas, the Rif and the Anti-Atlas. This is because these mountains played an important role during the Quaternary ice ages in providing refuges for Holarctic taxa that either survived or evolved after being isolated there.

Morocco has identified 160 sites of biological and ecological interest. All of them should soon be classed within the five categories of legally protected areas: national park, natural park, natural reserve, biological reserve and natural site. There are currently 10 national parks.



▲ Atlantic cedar (*Cedrus atlantica*) forest. Atlantic cedar is native to the Atlas Mountains of Morocco and Algeria in northern Africa. Middle Atlas, Morocco  
© Michel Gunther / WWF-Canon



▲  
Ifrane National Park  
The threatened *Juniperus thurifera*  
ecosystem  
© M.S. Taleb

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## Priority IPAs for conservation measures

Of the nineteen IPAs described in detail for this project the Moroccan IPA Team has selected the following as priorities for conservation measures: Talassemtane National Park, Bou-Naceur and Bou-Iblane, Ifrane National Park, Eastern High Atlas National Park and Toubkal National Park. Three of them are described below.

### Talassemtane National Park

Located in the eastern part of the limestone ridge of the Rif, Talassemtane National Park covers an area of 58,950 ha and is remarkable for its biodiversity. The natural heritage of the park, with its rugged scenery typical of the Rif mountains, is outstanding at Mediterranean level. The bioclimatic zones are semi-arid, subhumid and humid. The vegetation stages present are thermo-Mediterranean, meso-Mediterranean, supra-Mediterranean and mountain-Mediterranean. The principal forest species are *Abies pinsapo*, *Cedrus atlantica*, *Quercus ilex*, *Quercus suber*, *Pinus halepensis*, *Pinus nigra*, *Pinus pinaster* and *Tetraclinis articulata*. The park's flora comprises approximately 747 taxa, including 47 that are endemic to Morocco alone, 27 restricted to the Iberian Peninsula and Morocco, and 9 to Algeria and Morocco. The local people are engaged in arable and livestock farming and forestry.

### Ifrane National Park

Covering an area of 125,000ha, Ifrane National Park is located in the Middle Atlas. Three vegetation stages succeed one another: meso-Mediterranean (1,200–1,600m), supra-Mediterranean (1,600–2,000m) and mountain-Mediterranean (1,600–2,000m). The park is approximately 60 percent forested, with cedars, oaks, pines and junipers and is home to 1025 species of vascular plants, 25 percent of which have restricted ranges. Sixty-four species are endemic to the park itself, and 90 are endemic to northern Morocco, making this IPA especially important. The park is inhabited by many communities who use its resources. The flora and vegetation suffer from pressures of overgrazing and firewood collection.

### Eastern High Atlas National Park

The Eastern High Atlas National Park comprises very rugged mountain massifs covering an area of 49,000ha at elevations ranging from 1,600m to over 3,000m. The bioclimatic zones are arid, semi-arid and subhumid, with cold winters. The north-facing slopes of the park are covered with fine, tall cedar forest, following on from stands of holm oak, Phoenician juniper and Aleppo pine. At higher elevations, the cedar forest is replaced by stands of Spanish juniper. Above 3,000m, trees give way to thorny cushion-like xerophytes. On the southern slopes cedars are absent and the forested area is small. The vascular flora of the park comprises 300 taxa, 54 of which are endemic to Morocco. Sheep and goat herding is the predominant occupation of the local communities, arable farming (in the valleys) and timber extraction is secondary. These activities are putting the flora and vegetation under increasing pressure. Repeated droughts are a cause for concern.

# Algeria

N. Yahy and S. Benhouhou



[Fig. 8] IPAs of Algeria

- |                                   |                        |
|-----------------------------------|------------------------|
| 01 El Kala 1                      | 12 Theniet El Had      |
| 02 El Kala 2                      | 13 Chréa National Park |
| 03 Edough Peninsula               | 14 Sahel d'Oran        |
| 04 Guerbes                        | 15 Mount Chenoua       |
| 05 Djebel Ouahch                  | 16 Ghar Rouban         |
| 06 Belezma National Park          | 17 Cape Ténès          |
| 07 Babor Mountains                | 18 Traras Mountains    |
| 08 Taza National Park             | 19 Habibas Islands     |
| 09 Gouraya National Park          | 20 Aures-Chelia        |
| 10 Akfadou Forest                 | 21 Mount Zaccar        |
| 11 Massif Djurdjura National Park |                        |



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▲  
Forest and riverine vegetation of Oued El Maboun in the Guerbes-Sanhadja plain (the site was designated as a Ramsar Site in 2001 and has been proposed as a Regional Nature Park). Algeria.

© Michel Gunther / WWF-Canon

### Overview of Algerian IPAs

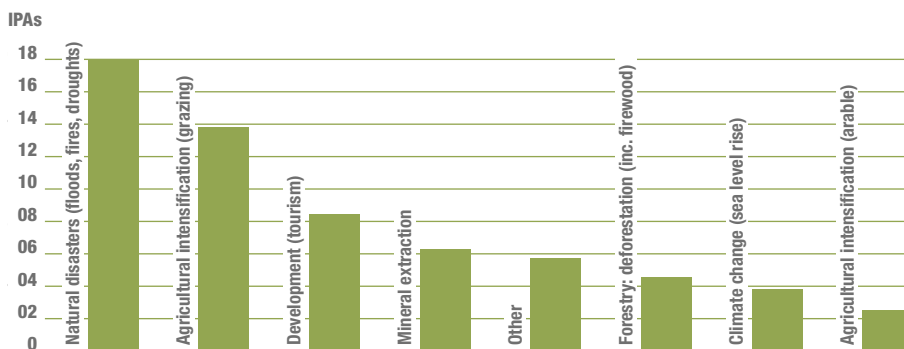
Algerian IPAs cover all vegetation stages present in the Mediterranean part of country and are often marked by a large elevational range, as in the Aurès Massif (100–2,300m) and Djurdjura (600–2,300m). Several coastal IPAs (El Kala 1, Edough Peninsula, Taza and Gouraya National Parks, Sahel d'Oran, Mount Chenoua, Cape Ténès, Trara Mountains et Habibas Islands) have high plant diversity and are rich in restricted range species, which are often highly localised (stenoendemic). Forested habitats are well represented, particularly with cedars (in Belezma, Djurdjura, Theniet El Had and Chréa National Parks, the Babor Mountains and Aurès Massif) or oaks (*Quercus canariensis*, *Q. suber* and *Q. ilex*). Several IPAs are rich in wetland habitats (El Kala 1 & 2, Edough Peninsula, Guerbes/Senhadja Plain, Djebel Ouahch, and Taza and Chréa National Parks).

The number of restricted range or locally endemic taxa in northern Algeria is 407. These include 224 endemic to Algeria alone, 124 shared with Morocco, 58 with Tunisia and one with Sicily. Some IPAs have a flora with a particularly high proportion of national endemics or stenoendemics, such as Djurdjura National Park with over 25 sub-national and stenoendemics, and El Kala 1 & 2 and the Babor Mountains, each with 20.

Twenty-one IPAs have initially been identified for northern Algeria. Many other sites may also deserve to be included but require further study, particularly in the Collo Peninsula, the Tlemcen Mountains, the Arzew Peninsula, Cape Falcon, Ouarsenis, Sersou, the Aflou region and Djebel Aissa. Sites in the steppe and Saharan zones of the country have not been described, since they are located beyond the Mediterranean part of Algeria. Eight IPAs are entirely or partly located inside national parks, while 13

others enjoy no management or protection measures. The Babor Massif is in the process of being listed as a natural reserve.

- Number of IPAs: 21
- Number of IPAs containing national endemics: 20
- Number of IPAs containing stenoendemics: 21
- Number of IPAs containing more than 20 national endemics or stenoendemics: 4



[Fig. 9] The main threats to Algeria's IPAs

## Flora, vegetation and conservation

With an area of 2,381,741km<sup>2</sup>, Algeria is the largest country with a Mediterranean coastline. It is bordered by Tunisia, Libya, Niger, Mali, Mauritania and Morocco. In the north of the country, the relief consists of the Tellian and Saharan Atlas, the Aurès Massif, the Tell coastal strip and the Nememcha Plateau.

Since Algeria is influenced by the sea, relief and elevation, its climate is classed as 'temperate extra-tropical Mediterranean', characterized by a long period of summer drought that varies from 3–4 months on the coast to 5–6 months on the high plains and more than 6 months in the Saharan Atlas. All Mediterranean bioclimates are represented in the north, from perhumid (Babor Mountains) to semi-arid (Sahel d'Oran).

The main vegetation units found in northern Algeria are:

- Sclerophyllous forests (holm oak, cork oak, etc.), deciduous forests (Algerian oak, afares oak, maples) and conifer forests (Aleppo pine, black pine, maritime pine, thuja, cedar, fir);
- Matorral, which includes evergreen vegetation dominated by mastic, *Cistus*, brooms, *Calicotome*, diss grass, rosemary and *Globularia*;
- Therophytic, orophytic and chasmophilic meadows, and asphodel grassland;
- Hygrophilous vegetation represented by riparian forests with *Populus alba*, *Alnus glutinosa* and *Fraxinus angustifolia*, as well as the vegetation of marshes, lakes, ponds and lagoons;



El Kala IPA - rich in local endemic species and Mediterranean threatened habitats  
© S. Benhouhou

Several coastal IPAs (El Kala 1, Edough Peninsula, Taza and Gouraya National Parks, Sahel d'Oran, Mount Chenoua, Cape Ténès, Trara Mountains et Habibas Islands) have high plant diversity and are rich in restricted range species, which are often highly localised (stenoendemic).



▲  
*Viola munbunya* var. *rifane* on El Kala 2, a restricted range species  
© S. Benhouhou



▲  
*Serapia stenopetala* a site restricted species (<100km<sup>2</sup>) in Algeria and Tunisia  
© M.S. Taleb

- Halophilous and littoral vegetation, including the vegetation of coastal dunes, cliffs and coastal scrub.

The Algerian flora comprises approximately 4,000 taxa in 131 families and 917 genera. There are 464 national endemics (387 species, 53 subspecies and 24 varieties).

### Priority IPAs for conservation measures

The Algerian IPA Team has prioritised the following IPAs for conservation measures: El Kala 1, El Kala 2, Djurdjura National Park, Babor Mountains and Gouraya National Park. Three of them are described below.

#### El Kala 2

The Medjedra mountain forests, which cover the El Kala 2 IPA, are located in the far north-east of Algeria and continue into Tunisia, where they are included in the Jbel Ghorra IPA. They range in elevation from 200m to 1,200m. Sandstones and clays are predominant, with a large number of rocky outcrops and cliffs. Small *oueds* (rivers) springs and temporary pools are common in the forested areas. The diversity of exposed surfaces and elevations gives rise to a very rich flora. Forests are mainly represented by cork oak and Algerian oak. This IPA is home to 20 national endemics and stenoendemics. The main threats are fire, overgrazing, deforestation and over-exploitation of certain species (*Quercus canariensis*, *Quercus suber*, *Laurus nobilis*).

#### Gouraya National Park

Djebel Yemma Gouraya lies in Gouraya National Park in north-eastern Algeria. This dolomitic limestone massif occupies approximately half the park's area. It stretches from the coast beyond the Oued Tazeboudjt in the west to the tip of the Cape Bouak peninsula in the east. This IPA is characterised by a humid climate with mild winters. It is an exceptional site for the stenoendemic flora of the vertical limestone rock faces overlooking the sea. The same is true for the southward-facing dolomitic boulder fields, which contain numerous rare locally endemic species. Djebel Yemma Gouraya has about ten national and stenoendemics. The main threats are fire, excessive visitor numbers and quarrying.

#### Djurdjura National Park

Djurdjura National Park comprises a limestone mountain range stretching 50km east–west. It is one of the wettest regions in Algeria, with an average rainfall of 1,200–1,500mm. The main forest stands are pure cedar (40 percent), cedar–holm oak (30 percent) and pure holm oak (13 percent). The highest elevations in the area are covered with chasmophilic meadows. Its flora is rich and diverse, with approximately 1,100 species, including 27 national endemics and stenoendemics, which makes it the richest Algerian IPA for endemics. The main threats are fire, overgrazing, illegal logging, quarrying and uncontrolled tourism.

#### Further reading

Yahi, N., Benhouhou, S., de Belair, G., Gharzouli, R. and Vela, E. 2010. *Proposition de Zones Importantes pour les Plantes en Algérie*. [www.plantlife.org.uk].



# Tunisia

Z. Ghrabi Gammar



[Fig. 10] IPAs of Tunisia

- |   |                                       |
|---|---------------------------------------|
| 01 Garâa Sejenane Majen Chitane Lake          | 06 <sup>h</sup> Majen El Mouajène (K) |
| 02 Dar El Orbi Peat Bog                       | 06 <sup>i</sup> Sraï el Majen (K)     |
| 03 Oued Ziatine 1 +2                          | 06 <sup>j</sup> Majen El Ma (K)       |
| 04 Aïn Zana Natural Reserve                   | 06 <sup>k</sup> Majen Sghaïer (K)     |
| 05 Sidi Ali El Mekki                          | 06 <sup>l</sup> Majen El Ouez 2 (K)   |
| 06 <sup>a</sup> Dat Fatma Natural Reserve (K) | 07 Majen Choucha                      |
| 06 <sup>b</sup> Sources du 18ème (K)          | 08 La Galité Archipelago              |
| 06 <sup>c</sup> Camp du 18ème (K)             | 09 Zembra and Zembretta National Park |
| 06 <sup>d</sup> Piste de Legba (K)            | 10 Toujane                            |
| 06 <sup>e</sup> Le Merij (K)                  | 11 El Feija Jbel Ghorra               |
| 06 <sup>f</sup> Majen Barbit (K)              | 12 Ichkeul                            |
| 06 <sup>g</sup> Majen El Ouez 1 (K)           | 13 Jbel Zaghouan                      |

(K): 'Kroumirie', a combination of these sites comprising peat bogs, small semi-permanent lakes and temporary pools



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A. Khaldi, A. Smaoui, A. Khouja, A. Sfaihi, A. Ferchichi, F. Maamouri, M. Boussaid, M. E. Khouk, M. L. Khouja, M. Ridha, N. Boussaidi, R. N'cibi and M. Selmi.



Collecting wood on Garâa Sejenane, IPA  
© Z. Ghrabi- Gammar

### Overview of Tunisian IPAs

Thirteen Important Plant Areas (IPAs) have been identified in Tunisia, while eight other sites are known for their rich flora but require further investigation. One of these IPAs, No 6, Kroumirie, is made up of a dozen small independent sites that have been combined because they are all small-scale wetland habitats; peat bogs, ponds or temporary pools. The thirteen IPAs are essentially located in the north of the country and most are characterized by a subhumid to humid Mediterranean climate. Ten of them have an average elevation below or around 500m, whereas three (Jbel Zaghouan, Jbel Ghorra, Aïn Zana) are more clearly mountainous.

Wetland environments are well represented as they make up more than half the IPAs, in the form of permanent lakes (Ichkeul), semi-permanent lakes (Majen Chitane, Majen Choucha, etc.), temporary pools (Garâa Sejenane, Majen el Ma, Sraï el Majen, etc.), marshes (Ichkeul), and peat bogs based on *Sphagnum* or *Osmunda* (Kroumirie) or bracken (Dar el Orbi). Although these sites are not particularly rich in national endemic or stenoendemic species—a large proportion of the species that occur in them are shared with neighbouring countries—they do contain most of the nationally or regionally threatened or rare habitats.

The Tunisian IPAs are also representative of the main forest and coastal habitat types of Tunisia. The most outstanding forest types are more or less protected; Algerian oak (*Quercus canariensis*) and cork oak (*Quercus suber*)

at Ain Zana and Jbel Ghorra, olive-mastic with carob on Jbel Ichkeul, juniper (*Juniperus phoenicea*) at Toujane, and alder (*Alnus glutinosa*) in the Oued Ziatine riparian forest. Coastal flora is represented on three IPAs; the La Galite Archipelago and the Zembra and Zembretta National Park, both rich in rare species and species endemic to Tunisia or North Africa, and Sidi Ali el Mekki. All three are particularly rich in endemics (*Linaria cossonii*, *Malcolmia doumetiana*, *Limonium gougetianum* and *L. zembrae*, and *Silene barrattei*).

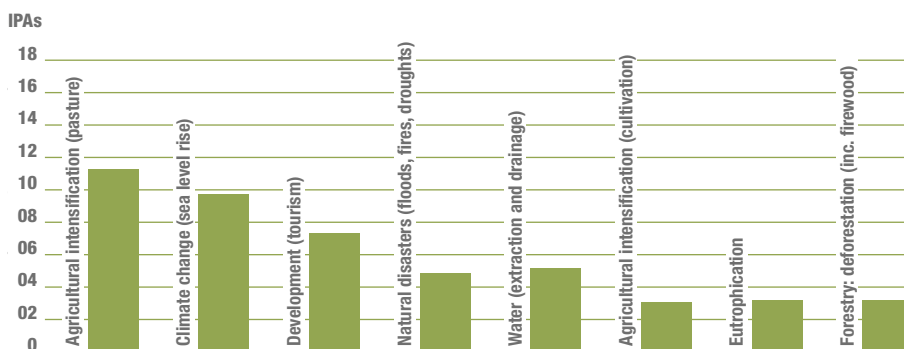
Six Tunisian IPAs contain national endemic or stenoendemic plant species.

Half of Tunisia's IPAs lie fully or partly inside protected areas, namely the three national parks, three Ramsar sites, two biosphere reserves and four natural reserves.

Of the thirteen IPAs, six contain national endemics and six have species with restricted ranges, none contain more than twenty national endemics or stenoendemics.

### Threats to the IPAs

The main threat to Tunisia's IPAs is overgrazing, which affects wet and marshy areas as much as sites with xerothermophilic vegetation. That is followed by climate change (causing wetlands to dry out), the pressure of tourism and leisure activities and fire. Drainage and water extraction are a specific threat to wetland IPAs.

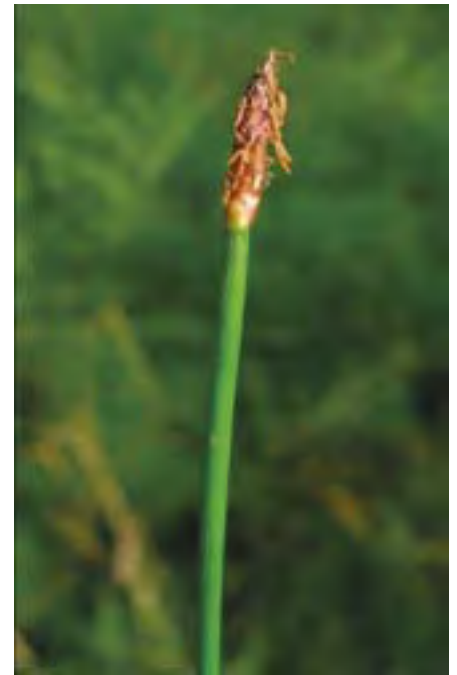


[Fig. 11] The main threats to Tunisia's IPAs

### Flora, vegetation and conservation

Tunisia is located in North Africa at the junction of the two basins that make up the Mediterranean, between the Mashreq (the Arab East) and the Maghreb (the Arab West).

The mountain ranges in the north and east of the country are well watered and form the eastern ends of the Tellian and Saharan Atlas. The arid high steppes are drained by *oueds* (wadis), and the semi-arid low steppes end at a flat coastal strip. The bioclimatic zones follow a rising gradient from south



▲  
*Eleocharis uniglumis* in threatened wetland habitat, Tunisia  
© S. D. Muller

Half of Tunisia's IPAs lie fully or partly inside protected areas, namely the three national parks, three Ramsar sites, two biosphere reserves and four natural reserves.



▲  
Majen Chitane IPA  
Tunisia  
© Z. Ghrabi- Gammar

to north, from hyper-arid in the Saharan area to humid Mediterranean in the northern mountains. Forests and matorral cover five percent of the land (reduced from twenty percent at the beginning of the 19th century), mainly in upland areas. They comprise stands of oaks (*Quercus canariensis*, *Q. ilex*, *Q. suber*, *Q. coccifera*), olive–mastic (*Olea europaea*, *Pistacia lentiscus*), pines (*Pinus halepensis*) and *Tetraclinis articulata*. Steppes of esparto (*Stipa tenacissima*), white wormwood (*Seriphidium herba-album* = *Artemisia herba-alba*), *Rhanterium suaveolens*, or *Haloxylon* (*Haloxylon scoparium*, *H. schmittianum*) cover approximately 20 percent of the country.

The Tunisian flora contains 2162 species. Of these, 2103 species in 115 families and 742 genera are included in the three-volume *Flore de Tunisie* (Cuénod *et al.*, 1954; Pottier-Alapetite, 1979, 1981). The remaining 59 species not mentioned in these volumes are additions by other authors. The most recent work on the nomenclature of Tunisian flora (Le Floc'h and Boulos, 2008) has the advantage of mentioning all taxa correctly or incorrectly attributed to Tunisia. According to the Ministry of the Environment and Sustainable Development (Ministère de l'Environnement et du Développement Durable, 2010), the Tunisian flora contains 1798 taxa.

The number of national endemics is relatively low (71 taxa, comprising 53 species, 12 subspecies, 5 varieties and 1 form). There are 99 North African endemics shared with Algeria and 13 with Libya.

## Priority IPAs for conservation measures

The Tunisian IPA Team has prioritized the following IPAs for conservation measures: Garâa Sejenane, the Kroumirie wetland sites (*Sphagnum* peat bogs, small semi-permanent lakes and temporary pools), Majen Choucha, the Oued Ziatine alder forest and Toujane. Three of them are described below.

### Garâa Sejenane

Garâa Sejenane is within the Mogods region of northern Tunisia, at an average elevation of 100m. The region is characterized by a humid Mediterranean bioclimate with mild winters and a mean annual precipitation of 750mm. As recently as the 1950s, Garâa Sejenane was a 15km<sup>2</sup> lake surrounded by a wide belt of quillwort (*Isoetes velata*), with a club-rush (*Schoenoplectus lacustris*) marsh in the middle. Much of the site is now dry and grazed or cultivated. It consists of a mosaic of marsh, temporary pools and temporarily flooded fields, with a small peat bog habitat at the edge. It is home to about 25 species that are rare and threatened in Tunisia, as well as one stenoendemic species found only at this site: *Rumex tunetanus*. The main threats to this IPA are drainage, the spread of croplands and pastures, eutrophication and infrastructure development. The site is not yet covered by any conservation measures.

### Oued Ziatine

Oued Ziatine is a permanent watercourse that runs 36km to the Mediterranean Sea at Cap Serrat, in northern Tunisia. Its drainage basin covers 95km<sup>2</sup> and receives a mean annual precipitation of 850mm. The region belongs to the humid Mediterranean bioclimate with warm winters. The IPA is characterized by an alder (*Alnus glutinosa*) riparian forest covering some 10ha, and is rich in species that are rare and protected in Tunisia and/or endemic to Tunisia and Algeria (*Fuirena pubescens*, *Solenopsis bicolor*) or North Africa (*Bellis prostrata*). This alder forest is threatened by the spread of agriculture and grazing, changes in the water regime and climate change. This site is not subject to any conservation measures.

### Toujane

The IPA of Toujane is located in the Matmata massif at an elevation of approximately 600m, not far from the east coast of Tunisia in the Governorate of Gabès. Its bioclimate is arid Mediterranean and it receives an average of 200mm of rainfall a year. The vegetation is garrigue with Phoenician juniper (*Juniperus phoenicea*). The site boasts two stenoendemic species (*Rosmarinus eriocalyx* and *Dianthus cintranus* subsp. *byzacenus*), endemics shared with Algeria or Libya, as well as species that are rare and threatened in Tunisia. The main threats to the site are grazing, collecting of esparto (*Stipa tenacissima*) for handicrafts, medicinal plants and firewood. Fire and climate change are also a threat to this IPA. The Toujane site belongs to the state and is protected by the Forestry Department. It is classed as a sensitive natural area.



▲  
*Sphagnum auriculatum* in threatened wetland habitat, Tunisia  
© A. Daoud-Battour

### Further reading

Z. Ghrabi Gammar, 2010. *Proposition de Zones Importantes pour les Plantes de Tunisie*, May [www.plantlife.org.uk]



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# Libya

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[Fig. 12] IPAs of Libya

- 01 Al Jabal Al Akhdar
- 02 Tawuoryhe Sebkha
- 03 Jabal Nafusah
- 04 Messak Mountain
- 05 Jabal Aweinat

### IPA Summary

Five confirmed IPAs have been identified in Libya to date: Al Jabal Al Akhdar, Tawuorgha Sebka, Jabal Nafusah, Jabal Aweinat and Messak mountain; with a further five that require study to confirm their status as internationally significant sites for plants (Alheesha, Farwa Island, Mamarica, Jabal Al Harouj and Benghazi coast). IPAs in Libya are found in the coastal, mountain and desert habitat types. Al Jabal Al Akhdar IPA (The Green Mountain) in the Cyrenaica region of north east Libya is the largest and most significant IPA in Libya. The unique physiographic and climatic conditions which isolate the mountains of Cyrenaican from the rest of Libya, have resulted in Al Jabal Al Akhdar holding 75 – 80% of the Libyan flora and a significant proportion of Libya's endemic plant species, despite only



covering 1% of the Libyan territory. This site was the primary focus for the IPA investigation in this project and is described in detail below.

The other confirmed Libyan IPAs include the hot springs and open canals of Tawuorgha and the limestone formations of Jabal Nafusah IPA which stretch 500km from the Tunisian border to the Niggaza area on the Mediterranean coast. The latter encompasses a recently established national park Sha afeen. The Environmental General Authority (EGA) is considering the creation of a protected area at Alaweinat IPA in the south eastern corner of the country.

Libyan IPAs face a number of threats including development of tourism infrastructure, overgrazing of livestock, forest cutting for wood and charcoal and the spread of invasive alien species. Unregulated development at the coast is a particular threat. Planning processes are erratic and environmental impact assessments (although required by law) are seldom completed or adhered to.

- Number of IPAs: 5 (4 in the Mediterranean region)
- Number of IPAs containing >20 single country or very restricted range species: 1

▲  
*Sedum cyrenaicum* endemic to  
 Cyrenaica peninsula  
 © S.Jury



▲  
*Thapsia garganica* var. *sylphium*  
 endemic to the Cyrenaica peninsula  
 © S.Jury

### Libya: flora, vegetation and plant conservation

Libya occupies an area of about 1.7 million km<sup>2</sup> most of which is desert (the Sahara). The most important areas for plant diversity are the coastal strip and mountains of the Mediterranean coastline (1900km).

The original coastal vegetation is dominated by wormwood (*Artemisia campestris*) and white broom (*Retama raetam*), with early spring flowering annuals such as *Senecio gallicus*, *Hussonia pinnata*, *Eruca sativa*, *Chrysanthemum segetum*, *Malva sylvestris* and *Erodium laciniatum*, and the perennial herb *Echium angustifolium*. These species cover large areas for a short time after the winter rainfall.

The oases and valleys of the Sahara have sparse vegetation that is low in diversity and includes date palm trees (*Phoenix dactylifera*), *Tamarix* spp., white broom (*Retama raetam*), *Ziziphus lotus*, European boxthorn (*Lycium europaeum*) and *Acacia tortilis*. Herbaceous plants include *Artemisia judaica*, *Hyoscyamus muticus* and *Zilla spinosa*, though perennial grasses such *Panicum turgidum*, *Stipagrostis pungens* and *S. plumosus* predominate.

In total there are approximately 1750 plant species in Libya, 4% of which are Libyan endemics. Phytogeographically, the flora is predominantly Mediterranean, with strong links to the Eastern Mediterranean (Palestine to Greece), more so than with the rest of North Africa; particularly strong are the links to Crete. Approximately 50% of the Libyan endemics are endemic to Cyrenaica. Kaiser & El-Gadi (1984), estimate that there are approximately 26 endemic plant species on the coastal belt of Cyrenaica. Two plant genera, *Pachyctenium* Maire and *Libyella* Pamp are endemic to Al Jabal Al Akhdar, each contain one species; *Pachyctenium mirabile* and *Libyella cyrenaica*.

### Al Jabal Al Akhdar IPA (The Green Mountain) – a priority IPA

Jabal Akhdar dominates the Cyrenaica region, located in the north east, it is a biogeographic 'island' with the Mediterranean Sea to the north and west, Marmarica plateau to the east and the Sahara desert to the south. It rises from sea level through three levels of escarpments and plains to 882 m. The northern most mountain escarpments (predominantly sandstone) are frequently dissected with deep wadis and the southern slopes descend gradually to the Sahara desert. It is relatively wet (600mm), red alluvial *terra rosa* soils dominate and therefore is the most important area for agriculture (fruits, cereals and vegetables) in Libya. 100 - 140 species, sub species or varieties are endemic to Al Jabal Al Akhdar. The vegetation communities are (from sea level): coastal plain, coastal escarpment, central plateau and upper escarpment, upper plateau.

The coastal plain consists of the sandy beaches, salt marshes and rocky coasts. As in the majority of Mediterranean dune communities *Elytrigia juncea* (L.) Nevski subsp. *juncea* is common, its association on Jabal Akhdar with *Centaurea pumilio* L. and *Silene succulenta* is unusual. Endemics of the dunes include *Helianthemum cyrenaicum*, *Anthemis*





*taubertii*, *Teucrium zanonii* and *Plantago libyca*. The salt marshes are analogous to others in the Mediterranean with endemic species such as *Frankenia syrtica* and *Limonium teuchirae*.

The coastal escarpments are dominated by *Juniperus phoenicea* scrub/forest. Endemic species include *Cyclamen rohlfsianum*, *Micromeria conferta* and *Stachys rosea*. The wadis are poorly known; the vegetation comprises *Juniperus phoenicea* scrub/forest on the slopes, with dense semi-deciduous mixed woodland in the channels dominated by *Quercus coccifera*, *Pistacia lentiscus*, *Arbutus pavarii*, *Ceratonia siliqua*, *Olea europaea* and *Cupressus sempervirens*. These wadis are rich in endemic plant taxa, e.g. *Arum cyrenaicum*, *Erica sicula* subsp. *cyrenaica*, *Onosma cyrenaica* and *Nepeta cyrenaica*.

The central plateau of Al Jabal Al Akhdar is used heavily for agriculture. The vegetation of this area is a mixture of *maquis* and a shrubby *batha* community in areas of grazing and/or shallow soils. Patches of dense woodland also occur on the upper escarpment above the central plateau. The tree layer here is dominated by *Cupressus sempervirens*, *Juniperus phoenicea*, *Olea europaea*, *Quercus coccifera*, *Ceratonia siliqua* and *Pinus halapensis*. The upper plateau is also heavily used for agriculture, with only small patches of *Juniperus* remaining. *Batha* forms a major plant community in this area, again often dominated by *Sarcopoterium spinosum*, *Phlomis floccosa*, *Pallenis spinosa* and a rich diversity of grasses and ruderal species. The upper plateau site of Sidi Al Hamri is one of two known locations for *Pachyctenium mirabile*.

Many areas of Al Jabal Al Akhdar lack botanical data, which greatly hinders conservation planning. Four areas within Jabal Akhdar were investigated during the compilation of this report and are described in more detail within the national report (see references): Ain Estowa, Dabbusia spring, Morcus Valley and Spring and El Kouf Valley. The principal threats to the conservation of this IPA are: heavy grazing and inappropriate development and agricultural activities. There is poor environmental planning & management, and the coastal zone is being developed without detailed environmental impact studies. Deforestation is occurring for domestic fuel and charcoal and there is die-back of *Juniperus* forest.

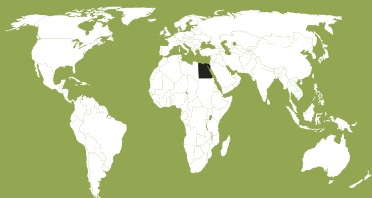


*Cupressus sempervirens* in Wadi Mahboul, Al Jabal Al Akhdar  
© S.Jury

“One hundred to one hundred and forty species, sub species or varieties are endemic to Al Jabal Al Akhdar”

#### Further reading

El-Rtaib, F. 2010. *The Country Report - Important Plant Areas in Libya* [Black and white report which can be found at [www.plantlife.org.uk](http://www.plantlife.org.uk)]



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# Egypt

K. H. Shaltout and E. M. Eid



[Fig. 13] IPAs of Egypt

- |   |                             |
|---|-----------------------------|
| <b>01 North Sinai Mountain</b>                | <b>17 Lake Nasser</b>       |
| <b>02 Lake Bardawil</b>                       | <b>18 Wadi Allaqui</b>      |
| <b>03 Lake Manzala</b>                        | <b>19 Saluga and Ghazal</b> |
| <b>04 Lake Burullus</b>                       | <b>20 Halayeb triangle</b>  |
| <b>05 Lake Edku</b>                           |                             |
| <b>06 Lake Mariut</b>                         |                             |
| <b>07 Omayed Biosphere Reserve</b>            |                             |
| <b>08 Moghra Oasis</b>                        |                             |
| <b>09 Western Mediterranean Coastal Dunes</b> |                             |
| <b>10 Sallum Area</b>                         |                             |
| <b>11 Wadi El-Rayan</b>                       |                             |
| <b>12 Saint Katherine</b>                     |                             |
| <b>13 Nabq</b>                                |                             |
| <b>14 Hurghada</b>                            |                             |
| <b>15 Wadi El-Gemal</b>                       |                             |
| <b>16 Dungul and Dinegil Oases</b>            |                             |

### IPA Summary

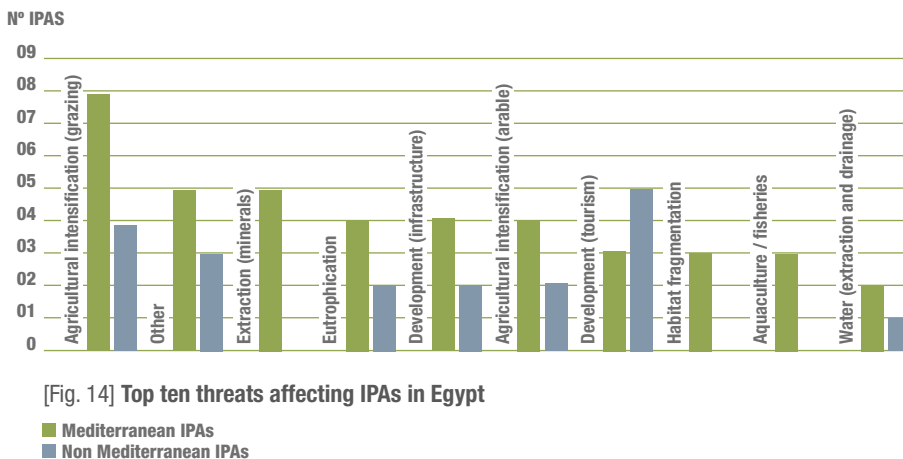
Twenty IPAs have been identified in Egypt to date, with six proposed that require further study to confirm their status as internationally significant sites for plants. Of these, ten are located within the Mediterranean region and five of those contain single country endemics or very restricted range species.

The Mediterranean IPAs of Egypt consist of five coastal lakes or lagoons, including the only oligotrophic hypersaline lake on the Egyptian Mediterranean coast and three lakes within the Nile Delta; as well as the limestone mountains of North Sinai, the coastal ridges and depressions of Omayed Biosphere Reserve, the Moghra Oasis, the oolitic sands of the Western Mediterranean coastal dunes and the plateau of Sallum on the border with Libya. Significant species on these sites include the relict patches of *Juniperus phoenica* populations in North Sinai, Egyptian endemics *Astragalus camelorum*, *Bellevallia salah-eidii*, *Bromus aegyptiacus*, *Sinapis allionii*, *Sonchus macrocarpus* (of the coastal lagoons) and *Anthemis microsperma*, *Atractylis carduus* var. *marmarica*, *Pancratium arabicum* and *Zygophyllum album* var. *album* (of the coastal dunes).

Floristically, the richest IPA in Egypt is the mountainous Saint Katherine IPA. It contains around 500 vascular plant species and approximately 50% of Egypt's endemic plant flora. This huge protected site covers over 5,000 km<sup>2</sup> of South Sinai and rises up to 2641 m; it is outside the Mediterranean region.

- Number of IPAs: 20 (10 in the Mediterranean region)
- Number of IPAs containing single country endemic species: 5 in the Mediterranean region; 3 elsewhere in Egypt
- Number of IPAs containing very restricted species (stenoendemics): 1 in the Mediterranean; 2 elsewhere in Egypt
- Number of IPAs containing >20 single country or very restricted range species: 1 (not Mediterranean)

### Threats to IPAs in Egypt



▲ Wadi vegetation, Saint Katherine IPA  
© K. Shaltout



▲ *Hyoscyanus boveanus*  
© K. Shaltout



▲  
Sand dunes Lake Burullus  
IPA Egypt  
© K. Shaltout

“The preliminary red data list for the vascular plants of Egypt classifies nearly 450 species as threatened on a national level, although these are not necessarily threatened across the Mediterranean region”

IPAs in Egypt face numerous threats, particularly from overgrazing, tourism and infrastructure related development, eutrophication and mineral extraction.

### Egypt: flora, vegetation and plant conservation

Egypt is situated in the south east of the Mediterranean Sea; her coast includes the delta of the River Nile which bifurcates north of Cairo into two branches that enter the Mediterranean at Rosetta and Damietta promontories. Egypt's diverse flora contains over 2300 vascular plant species and subspecies, and approximately 190 species and subspecies of mosses and hepatics. This reflects the long Mediterranean and Red Sea coasts combined with Egypt's position between Africa and Asia. Four floral zones are recognised: Mediterranean-Sahara regional transition zone, Sahara-Sindian regional zone, Irano-Turanian regional centre of endemism and Sahel regional transition zone.

The preliminary red data list for the vascular plants of Egypt classifies nearly 450 species as threatened on a national level, although these are not necessarily threatened across the Mediterranean region. There are twenty seven protected areas across the country, which are ecologically significant sites, twelve of these, or parts of them, are also IPAs.

### Three Egyptian IPAs that are priorities for conservation action

#### 1. Western Mediterranean coastal dunes IPA / Alkothban Alsaheilyya

Situated along the coastline west of Marsa Matrouh (100 km), this IPA contains snow-white dunes made from coarse, calcareous oolitic sand which is more than 90%  $\text{CaCO}_3$  and almost free from salts. Close to the shore, the dunes are small and active, while inland they are stabilised and vegetated. This site remains following the destruction of much the coastal dune belt west of Alexandria over the past twenty years through construction of summer resorts. A total of 219 species (116 annuals and 103 perennials), belonging to 151 genera and 44 families have been recorded. Some 30 species have unique occurrence in these dunes, most are endemic to the Mediterranean; for example *Anthemis microsperma*, *Atractylis carduus* var. *marmarica*, *Pancratium arabicum*, *Helianthemum sphaerocalyx*, *Onopordum alexandrinum*, *Plantago crypsoides*, *Centaurea alexandrina*, *Centaurea glomerata*, *Asphodelus aestivus*, *Ajuga iva* and *Sonchus bulbosus*. Mediterranean coastal dunes are recognised as a threatened habitat across the region.

Threats to the site include overgrazing, collecting and cutting, clearing land for agriculture, habitat loss, anthropogenic disturbance linked to tourism and quarrying. Currently there are no conservation activities within the IPA. As an urgent priority, it is recommended that the best sites within this stretch of dunes should be located and protected as nature reserves.

#### 2. Sallum Area

This IPA extends for about 120 km from Sallum on the Egyptian-Libyan frontier to Sidi Barrani on the Mediterranean coast, varying in



width between 2 and 36 km. The total area is 4374 km<sup>2</sup>, and five major geomorphologic units can be distinguished (from the coast in the north to the fringes of the Diffa plateau in the south): Sallum plateau, coastal saline depressions, inland sandy plains, inland rocky plains and shallow wadis. Agriculture (barley, olive and fig crop and grazing livestock) is the main land use, mainly by Bedouin. A total of 219 species were recorded in this area. These include a number of Mediterranean endemics, some of which are restricted to Egypt and Libya and assessed as rare in Egypt: e.g. *Allium barthianum*, *Bellevalia sessiliflora*, *Carduncellus mareoticus*, *Carthamus glaucus* and *Verbascum letourneuxii*.

Major threats include agricultural expansion and intensification of arable land, overgrazing and over cutting of shrubby plants. There are no conservation activities on this site, but it is newly declared as a protected area.

### 3. Saint Katherine IPA

This IPA is also a protected area occupying much of the central part of South Sinai, its diverse landscapes contain many habitats associated with wadis, caves, gorges, plains, mountains, hills, waterfalls and oases. The highest mountains Gebel Saint Katherine (2641m), Gebel Um Shomer (2586m) and Gebel Mousa (2285m), were formed during the Great African Rift around 24 million years ago which led to the creation of the Red Sea and the Aqaba Gulf. This mountainous area is bordered to the north by El-Tih calcareous plateau (540-1620m), the considerable rainfall drains into the Gulf of Suez and Aqaba through a network of deep gorges and relatively shallow wadis.

The site contains around 500 vascular plant species, 30 of which are endemic to Egypt (ca 50 % of the endemic species in Egypt) such as *Silene oreosinaica*, *Veronica kaiseri*, *Primula boveana* and *Allium sinaiticum* which are classified as nationally endangered species. In addition, this area contains 85 moss taxa (48.8 % of moss taxa recorded in Egypt), including the endemic *Tortula kneuckeri* and *Grimmia anodon* var. *sinaitica*. It contains also one hepatic species *Riccia cavernosa*. Wadi habitats are particularly under pressure and the site as a whole is threatened by agricultural expansion (especially downstream of the wadis), tourism development linked to transport and hotels, overgrazing, over collection of medicinal plants and drought.

St Katherine IPA is among the network of the Egyptian protectorates that have a management team and a reasonable management facility.



**Fagonia Garden**  
© Ilf El Kebir



**Nabq IPA Egypt**  
© K. Shaltout



**Endemic species, *Primula boveana* in Saint Katherine Egypt**  
© K. Shaltout

#### Further reading

Shaltout, K.H. and Eid, E. M. 2010. *Important Plant Areas in Egypt with emphasis on the Mediterranean region*. [Black and white report which can be found at [www.plantlife.org.uk](http://www.plantlife.org.uk)]



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# Occupied Palestinian Territories

B. Al-Sheikh



[Fig. 15] IPAs in Palestine

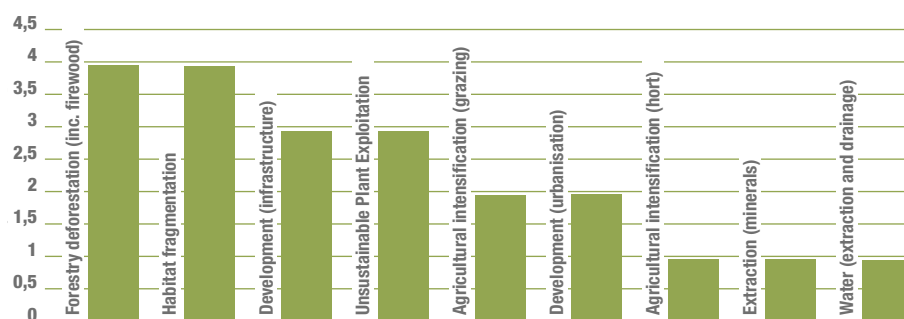
- 01 Faqoua` - Jalaboun
- 02 Wad Alhrameyah - Wad Elbalat - Um Safa - Beit Illo - Ein Samya
- 03 Wad Qana- Wad Eshai`r
- 04 Yaseed-Ibzeik
- 05 Dead Sea Coast
- 06 Khali (Hebron) Gradient

## IPA Summary

Nine IPAs have been identified in Palestine; four have been confirmed and described as internationally important sites the remainder require further investigation, due to access difficulties and lack of capacity. Three IPAs contain single country endemics and all sites contain species that have very restricted distributions but cross adjacent borders for example *Iris haynei* in Palestine and Israel. The current distribution of many of these locally endemic species is not known (see section 04).

The IPAs of Palestine are dominated by maquis (chaparral) vegetation – both dense and open, with *Pistacia palaestina*, *P. lentiscus*, *Rhamnus palaestinus*, *Quercus calliprinos* and *Q. boissieri*, frequently interspersed with ancient olive groves. The softer leaved garrigue (phrygana) with *Cistus incanus*, *C. salvifoliosus*, *Smilax aspera*; and many medicinal and aromatic species such as *Origanum syriaca*, *Saturja thymbra* and *Teucrium* spp. is found on some IPAs.

Remnants of once dense carob forest (*Ceratonia siliqua*) occur on some



[Fig. 16] Threats affecting IPAs in Palestine

## Palestine: flora, vegetation and plant conservation

Palestine is situated in South West Asia in the east of the Mediterranean basin. The targeted area (5800 square km) has 1600 vascular plant species, tremendously high plant diversity for such a small area; it has three biogeographical areas: Mediterranean, Irano-Turanian (semi-desert) and extreme desert. Many habitats present are associated with the climatic transition between Mediterranean and extreme desert. The semi-desert belt (Transition) has higher diversity than other two areas. The preliminary red list of Palestine is available electronically from the author and contains 298 vascular plant species, some of which are globally threatened.

### Three Palestinian IPAs that are priorities for conservation action

#### 1. Faqoua` - Jalaboun IPA

Situated in Jenin in the north eastern part of the West Bank, Faqoua`-



▲  
*Iris haynei*  
© B. Al-Sheikh

“Since the 1930s carob forest (*Ceratonia siliqua*) and the maquis on the mountains at the edge of Marj Ibin Amer has come under intense pressure from deforestation and is very degraded”



▲  
Overcollection of medicinal plants  
affects many IPAs in Palestine and Syria  
© B. Al-Sheikh

Jalaboun IPA has a typical Mediterranean climate and is covered largely by open maquis (chaparral) interspersed with olive groves and fields of wheat and pasture. The latter are part of the famous and most fertile meadow in the Middle East, Marj Ibin Amer. The vegetation is dominated by *Rhamnus palaestinus*, *Quercus calliprinos*, *Pistacia lentiscus*, *Calycotome villosa*, *Ruta chalapensis*, *Sarcopoterium spinosa* and some *Ceratonia siliqua* trees, in addition to other aromatic and medicinal dwarf shrubs for e.g. *Salvia fruticosa*, *Teucrium divaricatum*, *Thymbra spicata*, *Teucrium polium* and *Foeniculum vulgari*. The most restricted species is *Iris haynei* which is a site restricted endemic (with a range of <math><100\text{km}^2</math>), it is present both sides of the Separation Wall in Palestine and Israel. Other Palestinian endemics on this site include *Delphinium ithaburense*.

Since the 1930s carob forest (*Ceratonia siliqua*) and the maquis on the mountains at the edge of Marj Ibin Amer has come under intense pressure from deforestation and is very degraded. The destruction has been driven by demand for fuel, for domestic and commercial use. This situation is likely to deteriorate as the villages are surrounded to the north and east by the Separation Wall, which is forcing expansion to the west and south and increasing pressure at this site.

Raising public awareness is a priority action on this site through publicising



the existence of *Iris haynei* and its status as a unique species to this area; possibly undertaking *ex situ* conservation of this species in local gardens; educating local collectors of aromatic plants on methods of sustainable harvesting; implementation of the law to prevent uprooting of certain species; and finally through decreasing grazing potentially through fencing certain areas with the cooperation of the local council.

## 2. Wad Qana-Wad Eshai'r

Wad Qana-Wad Eshai'r IPA is situated in Salfit in the West Bank between 500–775m on the mountainous ridge of Palestine. It has a Mediterranean climate with mean annual rainfall of 676mm. The vegetation is dominated by maquis (chaparral) with some areas of *Pinus halapensis*. The most frequent species are *Pistacia palaestina*, *P. lentiscus*, *Rhamnus palaestinus*, *Quercus calliprinos*, *Cistus incanus*, *C. salviifolius*, *Smilax aspera*, *Calycatome villosa*, *Styrax officinalis*, *Lonicera etrusca*, *Ruta chalapensis*, *Sarcopodium spinosa*, *Inula viscosa* and some shrubs and trees e.g. *Quercus boissieri* and *Ceratonia siliqua*. Other aromatic and medicinal dwarf shrubs include *Salvia fruticosa*, *Origanum syriaca*, *Thymbra spicata*, *Teucrium polium*. The area is a reservoir of medicinal plants for Salfit and Nablus cities and contains many species protected by law such as *Ophrys* species and *Tulipa agenesis*. The IPA also contains olive groves that produce more than 30,000 tones of olive oil in good years, also well as weak springs with associated wetland species.

Wood cutting, over harvesting of medicinal plants, agricultural expansion and road construction all threaten this IPA, and there are a number of very active quarries where white gold is being mined. Wad Qana-Wad Eshai'r is currently being considered by the Palestinian Authorities as a natural reserve. Improving the local community awareness of the importance of this site is also a priority.

## 3. Yaseed-Ibzeik IPA

Yaseed-Ibzeik IPA is situated in Nablus in the West Bank the area is typically Mediterranean and dominated by maquis (both intact and degraded) carob woodland and garrigue (phrygana). The area has many endemic species like *Ferula orietalis*, *Iris atrufusca*, *Iris lortetii*, *Biarum pyrami*, *Teucrium montbretii* and *Phyllitis sagitata*; it is also rich in more widespread Mediterranean endemic species.

The area is subjected to heavy grazing, cutting for home use, overharvesting of medicinal plants – some formerly prolific local populations are nearly extinct – and shifting from traditional (extensive) to modern (intensive) agricultural practices with increased used of herbicides and chemical fertilisers with a subsequent reduction in farmland biodiversity. In addition overpumping of ground water has dried out the springs and destroyed their plant communities.

Increasing public awareness of the importance of the site and its species is crucial for its conservation. In addition to implementing laws which prevent uprooting of species, teaching sustainable harvesting techniques for



▲  
*Allium gasunense* site restricted  
endemic species  
Palestine  
© B. Al-Sheikh

### Further reading

Al-Sheikh, B. 2010. *The Country Report - Important Plant Areas in Palestine* [Black and white report which can be found at [www.plantlife.org.uk](http://www.plantlife.org.uk)]



# Israel

A. Shmida and G. Pollak



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[Fig. 17] IPAs in Israel

- |                    |                    |
|--------------------|--------------------|
| 01 Meiron          | 10 Har Negev       |
| 02 Hula            | 11 Hatzeva         |
| 03 Mount Carmel    | 12 Sedom           |
| 04 Affula          | 13 Eilat Mountains |
| 05 Poleg           | 14 Acre            |
| 06 Dead Sea Coast  | 15 Netofa          |
| 07 Hebron Gradient |                    |
| 08 Lahav           |                    |
| 09 Nizana Sands    |                    |

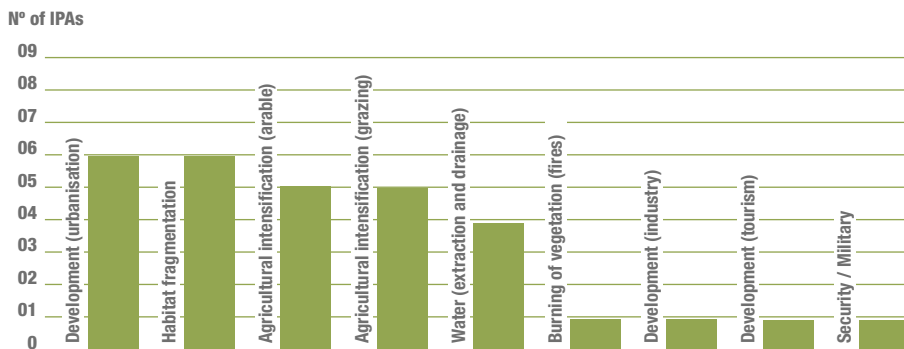
### IPA Summary

Fifteen IPAs have been identified in Israel; seven have a high priority for conservation. These sites encompasses the following habitats: Mediterranean maquis (chaparral); Mediterranean-desert transition (for e.g. Hebron IPA); desert shrubland (Har HaNegev); extreme desert oasis (Dead Sea coast); coastal plain (Poleg), including the unique vegetation associated with the sandy habitats on Hamra soil (red sandy loam) and kurkar (calcareous sandstone); sand dunes; coastal seasonal pools; wadi beds; wetlands and swamp (Hula); springs and riparian vegetation and coastal salt marshes (Acre). Significant species include the Israeli endemics *Allium negense*, *Bufonia ramonensis* and *Ferula daninias* well as numerous regional endemic species such as *Iris atrofusca*, *I. vartanii*, *Mosheovia galilae* and *Rheum palaestinum*.

- Number of IPAs: 15
- Number of the seven priority IPAs containing single country endemic species: 4
- Number of the seven priority IPAs containing very restricted species (steno-endemics): 7

### Threats to IPAs in Israel

Habitat fragmentation and urbanisation are the greatest threats to IPAs in Israel.



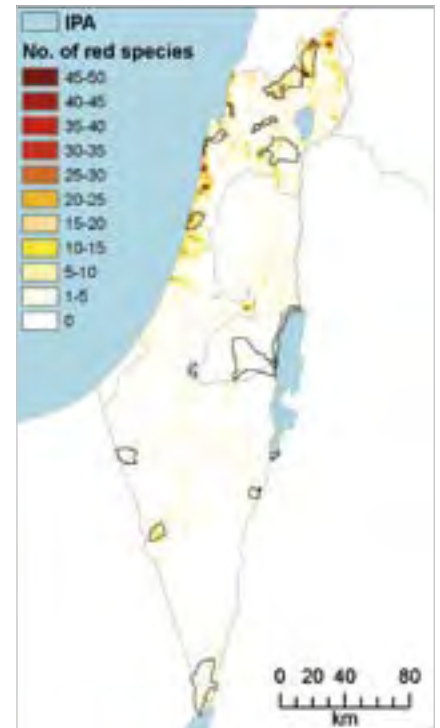
[Fig. 19] Threats affecting the seven priority IPAs in Israel

### Israel: flora, vegetation and plant conservation

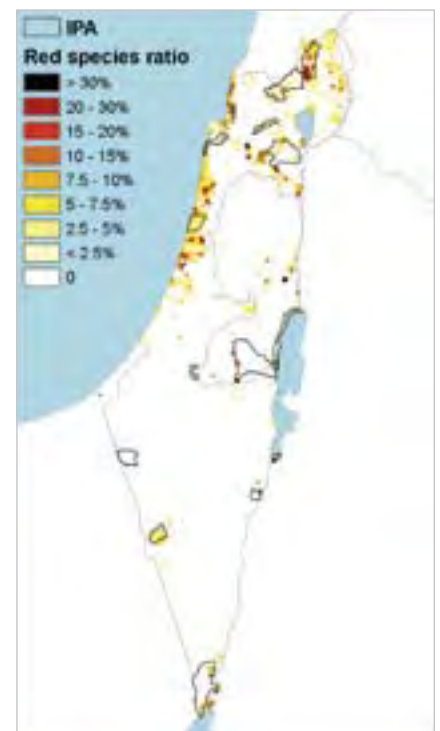
Israel is a small country (20,770 sq km) and about 70% desert nevertheless it is very rich in plant diversity. The flora of Israel comprises 2272 different wild species from 128 families and 775 genera. 414 of these species are threatened (critically endangered, endangered and vulnerable) on a national level and 56 are national endemics. While the number of the Red Plants of Israel is high compared with homologous countries, the number of endemic species is much lower.

The richness of the flora is due to Israel's geographical position between Africa and Asia, where three phytogeographical regions intersect: the

[Fig.18] Hotspots of Israel's red list plants compared with the 15 IPAs (Levin et al unpublished)



N° of national Red List species



Red Species Ratio (N° of red list species/ total richness)



▲  
*Campanula heirosolymthana*  
 a typical Levantine annual  
 © O. Golan

“Israel is a small country (20,770sq km) and about 70% desert nevertheless it is very rich in plant diversity. The flora of Israel comprises 2272 different wild species from 128 families and 775 genera”

Mediterranean, the Irano-Turanian and the Saharo-Arabian. At this crossroads a wide range of habitats, altitudes and climates are present, where temperate species coexist alongside species from tropical, desert and xero-alpine climates. Steep geomorphological and ecological gradients rise from the sea, range over lush green arboreal mountains and descend to extreme desert around the Dead Sea, the lowest region on earth.

47.8% of the wild plants in the Mediterranean and desert regions are annuals that occupy small niches and are known for their fast speciation rate. Israel's flora reflects these characteristics. The long co-evolution of the local flora with human culture in the Fertile Crescent yields a rich and diverse annual and antipastoral flora well adapted to the disturbed habitats associated with human civilization.

As Israel's borders cut across the three phytogeographical regions, there is a relatively low rate of national endemism in the flora with only 44 strict endemic plant species and 12 more “near-national endemics” (whose distribution extends just a few kilometres over the border into adjacent states).

### Three IPAs in Israel that are priorities for conservation action

#### 1. Meron IPA

Meron IPA is located in the Har Meron and Wadi Dishon region in the mountain area of Galilee in north Israel. Har Meron is the most humid area in Israel, with 800-1000 mm annual rainfall, and over 800mm snow falls one to three times each winter. The vegetation is Mediterranean maquis (chapparal) dominated by *Quercus calliprinos* and *Pistacia palaestina* and at the higher elevations also by *Quercus boissieri*. This is the richest mesic maquis region, 76 species of trees and shrubs are found in Israel only in this northern region. Wadi Dishon sub region is located at the rain shadow of Mt. Meron, where there is a steep gradient from humid Mediterranean to Mediterranean-desert transition vegetation. The vegetation changes from dense maquis to open woodland dominated by *Quercus ithaburensis* and *Pistacia atlantica*, accompanied by many steppe herbaceous species. *Iris lortetii* is endemic to that region and threatened.

Meron contains sixty seven nationally threatened species, 12 Israeli endemics such as *Iris lortetii* and *Vicia hulensis* and 47 species with restricted distributions in the eastern Mediterranean e.g. *Campanula sidoniensis*, *Iris bismarckiana*, *Mosheovia galilaea*, *Orchis israelitica* and *Sedum palaestinum*. A number of species reach their southern extension on Meron IPA for e.g. *Prunus ursine*, *Arabis alpina* and *Juniperus oxycedrus*. Inland the land use is mostly agricultural and in transition from traditional cultivation to intensive methods. Here natural vegetation occurs in abandoned fields, in margins of cultivated areas and in planted groves where many threatened and endemic plants are represented (e.g. *Mosheovia galilaea*, *Teucrium spinosum* and *Potentilla reptans*).

Meron IPA is threatened by overgrazing cattle; habitat fragmentation through reclamation of land for grazing and military roads; new settlements



and expanding old villages; over pumping ground water in wadies and springs; fires due to military activity and agricultural expansion. Most of the area is included in the Har Meron Nature reserve which is protected, though some over grazing occurs.

▲  
Meron IPA  
© A. Shmidá

## 2. Hula Valley

The Hula valley is located in north-east Israel in the northern part of the Dead-Sea rift. The climate is typically Mediterranean with 400–650 mm rainfall between October and May. The vegetation is dominated by Oak-Pistacia woodland (*Quercus ithaburensis* and *Pistacia atlantica*) on the dry habitats and wetlands in the lower areas. Most of the natural vegetation has been destroyed by modern agriculture in the last 60 years but few small nature reserves have been established. The Hula swamp was once the largest wetland habitat in the Levant until it was drained in 1965. Significant wetland habitat was destroyed and five wetland plant species became extinct from Israel, including *Berula erecta*, *Marsilea minuta* and *Nymphaea alba*. Rich water plant flora, including wetland species at their most southern extent, can be found in the marginal springs which drain to the Hula Lake, this remains under severe threat. The Hula reserve is the most northerly site for tropical *Cyperus papyrus*.

Hula Valley contains three Israeli endemics and numerous east Mediterranean restricted range species, as well as 69 nationally threatened species. The important habitats are highly fragmented and threatened by water extraction, grazing, agricultural activities and urban development. Only a few small reserves remain which could be included under a protection mechanism by the Ministry of Agriculture. A management plan is badly needed for this IPA.

“In Meron natural vegetation occurs in abandoned fields, in margins of cultivated areas and in planted groves where many threatened and endemic plants are represented”



#### Maquis habitat on Meron IPA

© A. Shmida



#### Hebron gradient Annual poppies and olives Transition zone

© Oz Golan

“The Hula swamp was once the largest wetland habitat in the Levant until it was drained in 1965”

#### Further reading

Shmida, A. and Pollak, G. 2010. *Israel IPA general report* [Black and white report available on Plantlife website [www.plantlife.org.uk](http://www.plantlife.org.uk)]



### 3. Hebron Gradient IPA

This site straddles the border between Israel and the West Bank of Palestine in the south. The Hebron – Eon Gedi Gradient is the most well preserved transition between the Mediterranean and desert vegetation in the Middle East. The gradient runs west to east in the rain-shadow of the Judean-Samaritan ridge where altitude drops from 1010m-420m in the east Judean desert, and the rainfall from 450 mm to 76mm.

Three vegetation belts typical of the Levant are found: open Mediterranean maquis (chaparral), Mediterranean transition and Hot Desert Oasis - where springs of freshwater are found within extreme hot and arid environments. Sudanese (xero-tropical) species are found in these oases e.g. *Capparis deciduas*, *Maerua crassifolia*, *Grewia villosa* and *Cordia sinensis*. The Hebron ridge hosts many Mediterranean plants within degraded and grazed *Quercus calliprinus* maquis including a rich annual flora. South along the ridge species endemic to transitional mountains of the Levant are found. Fifteen Israeli endemics species occur in Hebron IPA as well as numerous species with restricted range in eastern countries e.g. *Iris atrofusca*, *I. vartanii*, *Petrorhagia arabica* and *Suaeda palaestina*.

The site is threatened by sheep grazing which has changed the composition of the flora, increasing spiny plants and reducing overall diversity. Habitat fragmentation, agricultural expansion, urban development, tourism and water exploitation along the Dead Sea coast are also causing concern. This site is not protected and is in need of a management plan.

# Lebanon

Yazbek M., Machaka-Houri N., Al-Zein M.S., Safi S.  
Sinno N. and Talhouk, S.N.T.



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[Fig. 20] IPAs of Lebanon

- |                                  |                         |
|----------------------------------|-------------------------|
| 01 Mount Makmel                  | 12 Jbail Coast          |
| 02 Hermel Plain                  | 13 Wadi Jannah          |
| 03 Aarsal                        | 14 Keserwan             |
| 04 Aammiq                        | 15 Sannine - Knaisseh   |
| 05 Mount Hermon                  | 16 Chouf                |
| 06 Menjez                        | 17 Nahr Ed-Damour       |
| 07 Qammouaa-Dinnyeh- Jurd Hermel | 18 Beirut – Jiyeh Coast |
| 08 Palm Islands                  | 19 Tyre - Naqoura       |
| 09 Bcharreh-Ehden                | 20 Rihane               |
| 10 Ras Chekka                    |                         |
| 11 Tannourine                    |                         |



▲  
**Cedar of Lebanon (*Cedrus libani*), in Maaser forest. Although protection measures such as the creation of the Al-Shouf Cedar Nature Reserve have been undertaken, the Cedar woodlands of Central Mount-Lebanon are threatened by overgrazing, unregulated tourism, and a high occurrence of forest fires in forests below the slope.**

Lebanon

© Michel Gunther / WWF-Canon

### IPA Summary

In the current study the Lebanese team worked in bilateral cooperation with IUCN, Plantlife and WWF to define twenty IPAs in Lebanon using published literature and consultations with national experts. The IPAs of Lebanon are distributed throughout the country and are representative of its major ecosystems and habitats. Although as expected, the majority of the IPA sites lie on the western slopes of the Mount Lebanon range and include Qornet Es-Sawda (the highest peak in the country at 3088m). IPAs are also found on the Eastern Mediterranean shore, the Anti-Lebanon mountain range, the semi arid areas of the Bekaa valley and the marshes of West Bekaa.

Endemic and/or threatened species are found in almost every designated IPA, most of them contain more than 10 nationally endemic species and some sites are exceptionally rich in endemics: Bcharreh-Ehden (50 species), Chouf (32), Makmel (25) and Keserwan (25).

They include threatened endemics represented in a single IPA: *Vicia canescens* Labill (in Mount Makmel IPA), *Chaerophyllum aurantiacum* Post (Tannourine IPA), *Centaurea mouterdii* Wagenitz. (Rihane) and *Tulipa lownei* Baker (Chouf) or within more than one IPA for example: *Matthiola crassifolia* Boiss. et Gaill., *Melissa inodora* Boiss., *Viola libanotica* Bornm. and *Iris sofarana* Foster. In addition to endemics, the designated IPAs include some species that are at the edge of their distribution range such as *Abies cilicica* (Antoine & Kotschy) Carr found in Bcharreh-Ehden IPA and *Ostrya*



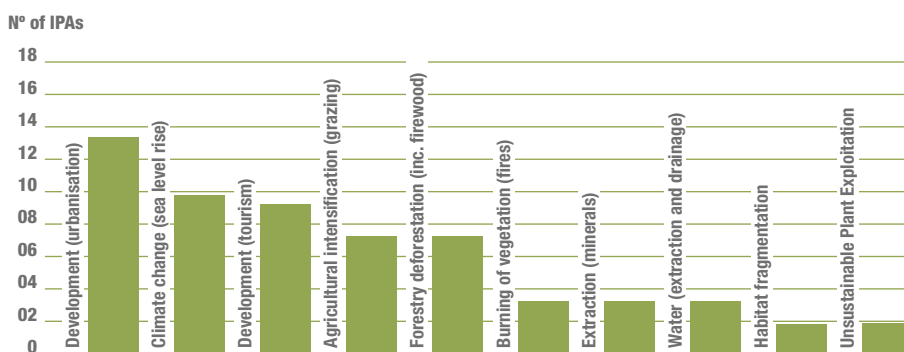
*carpinifolia* Scop. in Jabal Moussa (Wadi Jannah IPA). Although all identified IPAs contain species with trans-boundary distributions, many contain (very local) steno-endemics (see section IV on restricted range species).

Qammouaa-Dinnyeh-Jurd Hermel, Palm Islands, Bcharreh-Ehden, Tannourine and Tyre-Naqoura IPAs include entire nature reserves or parts thereof. Aamiq, Palm Islands, Ras Chekka and Tyre Naquora include Ramsar sites. Qadisha valley is a natural heritage site, Wadi Jannah, Chouf and Rihane are bioserves and Qammouaa-Dinnyeh- Jurd Hermel is under consideration for some kind of protection.

- Number of IPAs: 20
- Number of IPAs containing single country endemic species: 16
- Number of IPAs containing very restricted species (stenoendemics) within Lebanon: 12

### Threats to IPAs in Lebanon

Almost every type of habitat in Lebanon is threatened; urban expansion is invading every mountain, coast, plain, and valley. Examples of IPAs facing anthropomorphic threats include the coast (Beirut–Jiyeh Coast and Tyre-Naqoura), dry plains (Hermel Plain), wetlands (Aammiq), riparian ecosystems (Wadi Jannah and Nahr Ed-Damour), as well as mountains and valleys in most of the IPAs of Mount Lebanon. The expansion and intensification of agriculture, deforestation and climate change (are also frequent threats to IPAs (Fig. 21).



[Fig. 21] Top ten threats affecting IPAs in Lebanon

### Lebanon: flora, vegetation and plant conservation

Lebanon hosts a rich variety of wildlife including many rare and endemic plant species, due to variation in topography, habitats and climate. Around 2,790 species of vascular plants comprise the Lebanese flora, including approximately 92 national endemic species. Two floristic ensembles are recognised in the country; Mediterranean and Presteppic Mediterranean, they are represented in almost all of their vegetation levels.



▲  
*Silene makmeliana*  
Restricted to small areas of Lebanon and Syria  
© N. Machaka-Houri



▲  
Wadi Nahr Ibrahim  
Lebanon  
© N. Machaka-Houri



“Almost every type of habitat in Lebanon is threatened; urban expansion is invading every mountain, coast, plain, and valley”



▲  
*Arbutus andrachne*  
 El Chouf, Lebanon  
 © Pedro Regato

The Mediterranean ensemble includes diverse vegetation series, such as the:

- Thermomediterranean serie of *Ceratonia siliqua* and *Pistacia lentiscus*
- Thermo- and Eu-mediterranean series of *Pinus brutia* and *Cupressus sempervirens*
- Thermo-, Eu- and Supra-mediterranean series of *Pinus pinea*, *Quercus calliprinos* and *Q. infectoria*,
- Eu-mediterranean series of *Ostrya carpinifolia*, *Fraxinus ornus* and *Q. cerris*
- Mountainous series of *Cedrus libani* and *Abies cilicica* and *Q. cedrorum* and *Q. brantii* ssp. *look*
- Mountainous and Oro-mediterranean series of *Juniperus excelsa*

The Presteppic Mediterranean ensemble includes:

- Presteppic mediterranean and supra-mediterranean series of *Q. calliprinos* and
- Presteppic mountainous and oro-mediterranean series of *J. excelsa*.

“Efforts to produce inventories for elaborating management of sites remain hindered by the absence of baseline data”

Lebanon has been designating protected areas since the 1930s. These currently include nature reserves (8 sites), natural sites protected by decision of the Minister of Environment (Forests and Landscape, 8 sites; River and streams, 8 sites), Hima and forests declared by the Minister of Agriculture (17), tourism sites declared by the Ministry of Tourism (14), natural sites & monuments declared by decrees (8), and sites of natural and/or ecological importance in need of protection.

To manage its biodiversity, Lebanon, a signatory of the Convention on Biological Diversity (CBD), has devised management teams consisting of a

consortium of private and public groups including local non-governmental organisations (NGOs) and municipalities. The management teams have subsequently contracted national and international scientists to produce species inventories in order to elaborate management approaches. These efforts remain hindered by the absence of baseline data identifying ecosystems, habitats, assemblages and populations, as well as the absence of species maps and a formal threat status for species (provided for example by a red-listing process).

### Three Lebanese IPAs that are priorities for conservation action

#### Makmel

This IPA comprises a chain of high mountain peaks in the North of Lebanon covered with snow for long periods, sometimes more than six months. Al-Qournet es-Sawda, the highest peak along the Eastern Mediterranean coast is within this site. The vegetation is predominantly oromediterranean and the area is very rich in plant species (ca. 200 recorded). It is home to 47 species restricted to the Eastern Mediterranean, 6 endemic to Lebanon, Syria and Turkey, 36 to Lebanon and Syria and 25 to Lebanon.

#### Qammouaa- Dinnyeh

Qammouaa- Dinnyeh IPA is situated mostly in the Akkar district in North Lebanon and contains the largest continuous stands of natural forests in Lebanon. A huge diversity of forest types occur at this site: Calabrian pines, mixed cedar, fir and juniper, mixed fir and cedar, pure fir, evergreen oak and relic turkey oak stands. The area covers four vegetation series: the Eu-, Supra-, Mountainous and Oro-Mediterranean and it is characterised by a wide variety of landscapes: valleys, forests, rivers, gorges, rocky cliffs and mountains. 320 species plant species have been recorded: 82 species are restricted to the Eastern Mediterranean, 6 are endemic to Lebanon, Syria and Palestine, 17 to Lebanon and Syria, 9 to Lebanon, Syria and Turkey, 10 to Lebanon and 2 threatened species according to experts' opinion.

#### Jabal Moussa- Nahr Ibrahim

Situated on the western slopes of Mount Lebanon, in the central part of the country, this IPA extends along the southern banks of Nahr Ibrahim (Ibrahim River). The site has been continuously inhabited for more than a thousand years and contains Roman inscriptions, deserted houses and wells. The importance of this IPA resides not only in its species and ecosystem diversity (deciduous oak-pine woodlands, mixed evergreen-deciduous woodlands and garrigue) but it is also the southernmost limit of *Ostrya carpinifolia* in the Eastern Mediterranean. The core area of the Jabal Moussa Biosphere, one of Lebanon's globally recognised Important Bird Areas (IBA) is included and it is one of Lebanon's sites for old growth trees. The IPA is very rich in plant species (216 species) and is home to 61 species restricted to the Eastern Mediterranean, 8 endemic to Lebanon, Syria and Palestine, 2 endemic to Lebanon and Syria, 8 to Lebanon, Syria and Turkey, 13 to Lebanon and 10 threatened species according to experts' opinion.



▲  
Forest in Qammamine village  
Devil's valley, Lebanon  
© N. Machaka-Houri



▲  
Remnant *Cedrus libani* forest under  
Al-Quornet es-Sawda peak  
Makmel IPA  
© N. Machaka-Houri

#### Further reading

Yazbek M., Machaka-Houri N., Al-Zein M.S., Safi S., Sinno N. and Talhouk S. 2010. *Important Plant Areas of Lebanon*. ISBAR (AUB)/IUCN [Black and white report which can be found at [www.plantlife.org.uk](http://www.plantlife.org.uk)]



# Jordan

Dawud al- Eisawi



[Fig. 22] IPAs in Jordan

- |                        |                 |
|------------------------|-----------------|
| 01 Wadi Rum            | 07 Lava Safawai |
| 02 Dana Nature Reserve | 08 Burqu'       |
| 03 Karack              | 09 Ajlum        |
| 04 Salt                | 10 Bayer        |
| 05 Alouk               | 11 Azraq        |
| 06 Um Queis            | 12 Mujib        |

# Syria

H. Hmidan, Z. Shater, F. Al-Mahmoud, S. Karzon, N. Sanadiki, R. Hamoudeh, A. Al-Hasan, A. Almasri and A. E. Darwich



[Fig. 23] IPAs in Syria

- |                              |                           |
|------------------------------|---------------------------|
| 01 Karatchok-Tigris          | 20 Daher al Qseir         |
| 02 Kurd Dag                  | 21 Al Kabeer al Jonubi    |
| 03 Jabal Abdul Aziz          | 22 Akkoun                 |
| 04 Jabal Al Wastani          | 23 Anti-Lebanon           |
| 05 Hass-Jabbul               | 24 Qalamoun               |
| 06 Jisr al shogur            | 25 Qassioun               |
| 07 Fronloq-Kasab             | 26 Rakhleh - Wadi al Qarn |
| 08 Umm Al Tuyur-Bassit       | 27 Utaiba - Hijane        |
| 09 Salma-Haffeh              | 28 Hermon                 |
| 10 Slenfeh-Jaubet et Berghal | 29 North Golan            |
| 11 Ghab                      | 30 Es Safa                |
| 12 Jabal Bishri              | 31 Lajat                  |
| 13 Abu Qbeis                 | 32 Jabal Al Arab          |
| 14 Kanfo                     | 33 Yarmuk Valley          |
| 15 Mayadin                   |                           |
| 16 Massiaf-Qadmous           |                           |
| 17 Al Bil As                 |                           |
| 18 Jabal al Sha ir           |                           |
| 19 Jabal Abu Rujmain         |                           |



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▲  
Anti-Lebanon IPA has exceptional  
local endemism  
© H. Hmidan

### IPA Summary

Thirty three IPAs have been identified in Syria, plus a further ten sites that require fundamental botanical research before they can be confirmed as IPAs. These IPAs are located throughout the country within each of the nationally recognised Mediterranean bioclimatic divisions: humid, sub-humid, semi arid, arid and Saharan. A large number of sites are mountainous, located within the parallel coastal and the eastern mountain ranges as well as in the isolated mountains of the interior. They include the endemic plant centres of the Northern Levant such as Kurd Dag IPA (endemics include *Onosma cinerea*, *Cicer bijugum* and various *Astragalus* spp.); centres of endemism in Antioch and Amanus; sites capturing Euro-Siberian plant species at their southern limit (for e.g. *Smilax excelsa*, *Iberis sempervirens* and *I. taurica* on Frolonq-Kasub IPA); and the best examples of *Cedrus libani* and *Abies cilicica* forests (Slenfeh-Jaubet al Berghl), which are threatened across the whole Mediterranean.

The level of local endemism is exceptionally high in Syria (as across the whole of the Levant). Restricted range endemic species can be found in nearly every IPA, mega diverse hotspots for restricted range species include in Qassiun and Anti Lebanon IPAs, the extraordinary diversity of the latter is in part due to the presence of sub alpine and alpine habitats which are absent elsewhere in the country (restricted range species on Anti Lebanon include *Iris antilibanotica*, *Thymus alfredae*, *Silene schlumbergeri*, *Alyssum subspinosum*, *Astragalus antilibani*, *Ferulago frigida*). The isolated mountains of the interior are dominated by Syrian steppe vegetation and also harbour many local endemics, one of the richest sites being Jabal Abu Rujmain IPA which lies between the arid and Saharo-mediterranean bioclimatic zone and contains over 20 restricted range (and country endemic species) e.g. *Iris postii-mout*, *Onobrychis pinnata*, *Ajuga rechingeri*).

Threatened wetlands are also represented in the Syrian IPA inventory - in the shallow saline lake of Hass Jabbul IPA, the riparian sites of Mayadin (the Euphrates) and Al Kabir al Jonubi (coastal river), and remnant swamp vegetation at Ghab and Utaib-Hijaneh. In the south of Syria IPAs such as Es Safa contain the northern limits of the Saharo-Arabian flora (*Kickxia aegyptica* and *Rheum palaestinum*) and Jabal al Arab – with its vast diversity and local endemism due its unique position at the junction of the sub-humid and semi-arid Mediterranean bioclimatic zones.

Seven of the IPAs in Syria are partially or totally protected, including one Ramsar site (internationally important wetland), and three have some form of management plan active on part or all of the site.

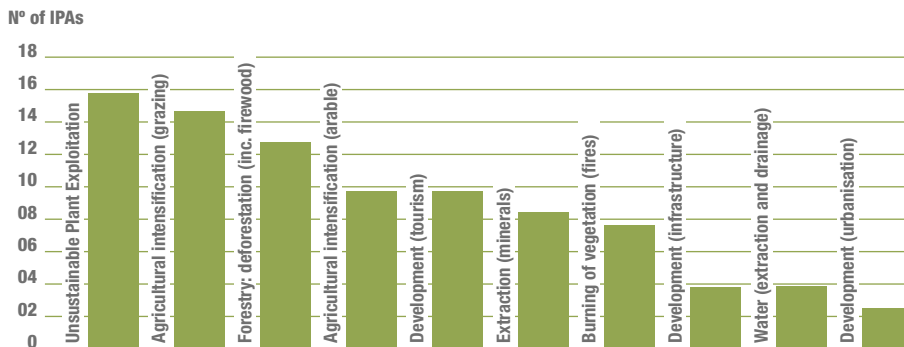
- Number of IPAs: 33
- Number of IPAs containing single country endemic species: 25
- Number of IPAs containing very restricted species (steno-endemics): 27
- Number of IPAs containing >20 single country or very restricted range species: 5



### Threats to IPAs in Syria

The most frequent threat to IPAs in Syria is the unsustainable collection of herbs and medicinal plants (affecting 91% of sites) this is closely followed by the threat from overgrazing. Deforestation (specifically gathering leaves and branches for fodder and wood for fuel) is another major cause for concern, which is exacerbated by burning on 14 IPAs. Tourism development and extraction of minerals are concerns on 50% of Syrian IPAs.

▲  
*Pistacia atlantica*  
 open woodland, Syria  
 © H. Hmidan



[Fig. 24] Top ten threats affecting IPAs in Syria



▲  
*Sideritis nuarsariensis*  
© F. Al- Mahmoud

“Altitude, latitude, orographic shadow effects and distance from the Mediterranean are the main factors that affect the climate; precipitation tends to decrease from west to east and from north to south”

### Syria: flora, vegetation and plant conservation

Syria is located at the eastern end of the Mediterranean Basin and forms an integral part of the Levant countries. Syrian territory includes 183km of Mediterranean sea coast, plains, mountain ranges, plateaus and semi-deserts. Over 60% of the country is a plateau between 200-600m and mountains between 600 and 2000m form the remainder. The climate is Mediterranean with precipitation in the cool seasons of the year, summers are hot and dry. Altitude, latitude, orographic shadow effects and distance from the Mediterranean are the main factors that affect the climate; precipitation tends to decrease from west to east and from north to south.

Five Mediterranean bioclimatic zones are recognised: humid, sub-humid, semi arid, arid and Saharan, defined by gradually decreasing rainfall. In the humid Mediterranean the vegetation is evergreen forest covering in the coastal mountains and some high peaks of the eastern mountain chain. At lower elevations this is dominated by *Quercus infectoria*, *Quercus calliprinos*, *Pinus brutia*, *Pistacia lentiscus*, *Fraxinus ornus* and at higher elevations by *Quercus infectoria*, *Abies cilicica*, *Cedrus libani*, *Juniperus* and *Picea*. Sub-alpine forest (*Juniperus excelsa*) and meadows are found over 2000m. The main vegetation type in the sub-humid Mediterranean zone is degraded oak forest (*Quercus calliprinos*, *Quercus ithaburiensis*, *Pistacia palaestina*) found on the coastal plains, the mid to high altitudes of the Eastern mountains, Golan Heights, and the highest peaks of Jabal al-Arab.

Open degraded steppic woodlands (*Pistacia atlantica*, *Crataegus* sp., *Amygdalus* sp.) with grasses and legumes are found in the semi-arid zone on the eastern slopes of the Eastern mountain chain and the adjacent plains of Aleppo, Hama, Homs and the fringes of the Fertile Crescent (high peaks of the inner mountains and the Upper Jezira area). The arid zone comprises the western and the northern limits of the eastern plateau including Jezira plains, grasses and shrubs dominate (*Astragalus*, *Salsola*, and *Artemisia*). The Saharan zone is in the east and the southeast where perennial formations of dwarf shrubs are found (including species of *Achillea*, *Anabasis* and *Haloxylon*).

The Syrian flora includes 3077 species belonging to 133 families and 919 genera, the majority of which are Mediterranean or Irano-Tauranian. Syria has approximately 243 endemic species however historically, the Syrian and Lebanese floras have been treated together in which case there are 330 endemic species to both countries; around 8% of the joint flora. The genera *Iris*, *Astragalus*, *Centaurea* and *Allium* have the largest percentage endemism in Syria.

### Three Syrian IPAs that are priorities for conservation action

The national expert team identified the following IPAs as priorities for conservation action: Kurd Dag, Salma Haffeh, Ghab, Anti Lebanon and Jabal al Arab – three of these are described in detail below.



### 1. Kurd Dag IPA

Kurd Dag is an elevated calcareous mountain massif which occupies the north-western corner of Syria and is an important example of the well preserved vegetation associated with the Eastern mountain chain. It forms the southern continuation of Taurus Mountains parallel to the Amanus Mountains in Turkey, running 50 km from the north-east to the south-west, its highest point is *Kutchuk Darmik* at 1230m. Sub-humid to semi-arid Mediterranean bioclimatic conditions prevail over the site. Botanically it is a centre of endemism for the Northern Levant due to the large numbers of species restricted to South Turkey/North Syria for example *Vaccaria liniflora*, *Ranunculus millefolius*, *Astragalus antabicus*, *Astragalus darmikii*, *Vicia qatmnesis*, *Psoralea jaubertiana*.

The site is threatened by agricultural expansion, overgrazing of livestock, wood collection for fuel, collection of herbs and medicinal plants and burning of weeds in the adjacent agricultural lands. There are also concerns about extraction of minerals and construction of dams on this site. The site has no legal protection and no management plan.

### 2. Anti Lebanon IPA

This mountain range on the Syrian-Lebanese border is the most important centre of endemism for Syria and the only Syrian IPA to possess sub alpine and alpine habitats. The majority of the site is above 2000m and forms a large extended area of high uplands, unique to the Levant countries. The maximum height is 2616m at Tala'at Musa peak. The numerous mountain peaks, steep slopes, vertical cliffs and deep valleys provide diverse plant habitats. Precipitation is modest due to the rain shadow effect of the Lebanese mountains and the whole area is located within the semi-arid Mediterranean bioclimatic zones. Low temperatures and long period of snow and frost allow the survival of sub-alpine and alpine vegetation, this isolation promotes speciation that has resulted in large numbers of narrow endemics.

Thirty eight species on this site are restricted to the Anti Lebanon IPA e.g. *Phagnolon linifolium*, *Helichrysum pygmaeum*, *Thymus alfredae* and *Ferulago frigida* over 50 additional species recorded here are restricted to specific mountain ranges in Syria and/or Syria and Lebanon.

Numerous threats affect this very large IPA: agricultural expansion, overgrazing, wood gathering for fuel, over collection of medicinal plants, burning of weeds, mineral extraction and development for tourism, transport and urbanisation. A protected area covers about 60% of the IPA.

### 3. Jabal al Arab IPA

Jabal al Arab (also known as Jabal Druze or Jabal Hauran) is the second most important site for endemism in Syria and a unique site for basalt habitats. The site consists of a convex volcanic massif extending over southern Syria, the highest point on this plateau is *Tall Ghineh* at 1803 m



*Juniperus* on Anti-Lebanon IPA  
© H. Hmidan



*Orchis tridentata*  
Abu Quies IPA  
Syria  
© F. Al- Mahmoud



**Jabal Al Arab IPA**  
Centre of endemism for Syria  
© H. Hmidan

### Further reading


Hmidan, H., Shater, Z., Al-Mahmoud, F., Karzon, S., Sanadiki, N., Hamoudeh, R., Al-Hasan, A., Almasri, A. and Darwich A.E. 2010. *Syria country report on the identification of Important Plant Areas (IPAs) in Syria (Rapid assessment)*. Syrian Society for Conservation of Wildlife (SSCW) [Black and white report which can be found at [www.plantlife.org.uk](http://www.plantlife.org.uk)]

in the core of the IPA. No permanent water courses are present but many valleys (wadis) drain the mountain, these are deep and short on the eastern slopes and longer and shallower in the west. A few permanent and seasonal lakes and pools can be found within the IPA. Jabal al Arab is exposed to Mediterranean winds through the Golan-Galilee gap and so the sub-humid and the semi-arid Mediterranean zones meet on this mountain, accounting for the remarkably diverse and unique flora. *Gagea procera*, *Allium drusorum* and *Iris auranitica* are among the species unique to this range. Over 20 restricted range species can be found here as well as a number of species whose southern or northern limit fall within the IPA. Nationally (but not regionally) threatened habitats are pools, basaltic rocks, *Quercus look* and *Pistacia atlantica* open woodlands.


The threats to this site are many and mirror those of the Anti Lebanon IPA, only 2% of the site is protected and there is no management plan.

# Albania

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[Fig. 25] IPAs in Albania

- |                                     |  |                              |
|-------------------------------------|--|------------------------------|
| 01 Grykëderdhja e Bunës - Velipojës | 16 Kolsh - Mali i Runës                | 31 Lugina e Gjergjevicës     |
| 02 Skoda Lake and Buna River        | 17 Bjeshka e Oroshit                   | 32 Drenovë - Nikolicë        |
| 03 Lugina e Cemit                   | 18 Kunorat e Lurës                     | 33 Parku i Divjakës          |
| 04 Alpet Veriore Shqiptare          | 19 Zall - Gjoçaj                       | 34 Këneta e Roskovecit       |
| 05 Pashtrik - Morinë                | 20 Liqeni i Zi                         | 35 Vjosës (Vlorë)            |
| 06 Gjallicë - Koritnik              | 21 Grykëderdhja e Drinit - Ceka - Vain | 36 Karaburuni - Mali i Çikës |
| 07 Korabi                           | 22 Qafë Shtamë                         | 37 Kanioni i Gjipesë         |
| 08 Rrajcë - Shebenik - Jabllanicë   | 23 Mali me Gropa - Bizë - Martanesh    | 38 Bredhi i Hotovës          |
| 09 Liqeni i Ohrit                   | 24 Krujë _Tujan                        | 39 Porto Palermo             |
| 10 Mali i Thatë                     | 25 Parku i Dajtit                      | 40 Kardhiq                   |
| 11 Liqenet e Prespës                | 26 Kepi i Rodonit - Pylli i Ishmit     | 41 Rrëzomë                   |
| 12 Gramoz - Shelegur                | 27 Holtë - Bulçar                      | 42 Borsh - Lukovë            |
| 13 Lugina e Vjosës - Çarshovë       | 28 Shpat - Polis                       | 43 Bistricë - Muzinë         |
| 14 Zhej - Nemërçkë                  | 29 Guri i Topit - Valamarë             | 44 Ksamil                    |
| 15 Kepi i Stillos                   | 30 Tomorri                             | 45 Liqeni i Butrintit        |



**Gramozi IPA**  
Ten European threatened habitats are found here, including four priority habitats threatened throughout the Mediterranean.  
© REC Albania

### IPA Summary

Forty five IPAs have been identified in Albania covering an area of 384,824 hectares and including 15 transboundary sites; 4 with Montenegro, 2 with Kosovo, 5 with Macedonia FYR and 4 with Greece. These IPAs contain a huge variety of habitats; forests, maquis, grassland and wetland and are located throughout the country, in the mountain ranges in the north, south and east as well as along the coast in the west and around the lakes in the east. One hundred and thirty three European threatened habitats (from the EU Habitat Directive and the Bern Convention annexes) are found in Albania and have been used alongside threatened species to identify Albania IPAs under criterion C.

One hundred ninety six red listed species can be found on these 45 IPA, these are not all 'threatened' but are frequently 'rare' on a nationally or global scale. Many are also Albanian and/or Balkan endemic species. Globally threatened species such as *Wulfenia baldacci* and *Ligusticum albanicum* are two endemics that are restricted to the Northern Albanian Alps. Two regionally threatened mosses are also restricted to a single site in Albania: *Buxbaumia viridis* (to Northern Albanian Alps IPA) and *Mannia triandra* (to Karaburun - Mali i Çikës IPA). The regionally threatened aquatic fern *Salvia natans* is found on Roskoveci swamp and the threatened vascular plant *Marsilea quadifolia* is found in Shkodra Lake and *Fritillaria messanensis* subsp. *gracilis* in Gjallicë-Koritnik.

Albanian IPAs are subject to various levels of protection some sites have more than one type of designation.



Level of protection	No. of IPAs
Strictly Protected Area	5
National Parks	13
Monuments of Nature	2
Natural Managed Reserve	6
Landscape/Seascape Protected Area	4
Landscape Protected Area	4
Protected Resource Area	2
Ramsar Wetland Site	2
No protected status	7

▲  
Pashtrik IPA  
© REC Albania

Seven IPAs have no protected area status and for others there are no clear management plans to provide information on how to safeguard the biodiversity present, special attention should be given to these sites.

- No. of IPAs: 45
- No. of IPAs from 10 selected sites with single country endemic species: 8
- No. of IPAs from 10 selected sites with very restricted species (steno-endemics): 8

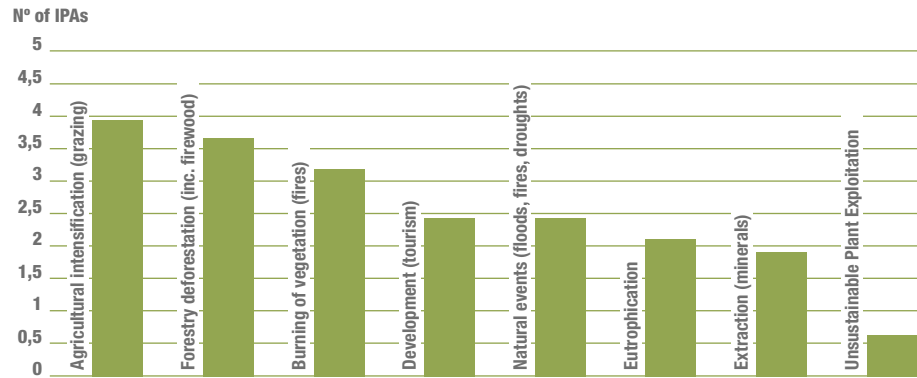
### Threats to IPAs in Albania

The main threats to IPAs in Albania are overgrazing, illegal deforestation, burning of vegetation, tourism development and recreational habitat fragmentation and eutrophication (enrichment).

“Seven IPAs have no protected area status and for others there are no clear management plans to provide information on how to safeguard the biodiversity present”



▲  
*Solanathus albanicus*  
Albanian endemic species  
© REC Albania



[Fig. 26] Threats affecting 10 selected IPAs in Albania

### Albania: flora, vegetation and plant conservation

Albania is situated in the north east of the Mediterranean basin, covering 28,748km<sup>2</sup> including 480km of coastline on the Adriatic and Ionian Seas. Albania shares borders with Montenegro, Kosovo, Macedonia FYR and Greece and is an integral part of the Balkan Peninsula; an area of considerable plant endemism. Mountains cover two thirds of Albania; these are frequently rugged and difficult to access. Prokletije range in the north is the southern end of limestone massif of the Dinaric Alps, mountains of the Serpentine zone (named after the bed rock) extend from Prokletije south to the Greek border and in the east the Eastern highlands form the border with Macedonia (including the highest peak in Albania, Mount Korabi – 2754m). Three important lakes occur on the eastern border with Macedonia and Greece: Ohrid (the deepest lake in the Balkans, Macro Prespa and Micro Prespa while Albania shares the biggest lake in the Balkans (Lake Shkodra) with Montenegro. The coastline also has a high biological diversity with approximately 100 km<sup>2</sup> of wetlands (most of them adjacent to the Adriatic Sea). The Albania flora contains 3200 species of vascular plants of which 27 are national endemics and 160 endemic to the Balkans. Approximately 30% of the European flora is present in Albania.

The latest Albanian national plant red list was produced in 2007 (Order Nr.146, dt. 8.5.2007) and contains 365 plant species, 74 % of which are threatened on a national level (CR, EN, VU). The country has 53 protected areas and monuments (June 2010).

### Three Albanian IPAs that are priorities for conservation action

#### 1. Gramozi Mountain IPA (Mali i Gramozit)

Gramozi Mountain IPA is located in the south-east of Albania in the north Pindos Mountains on the border with Greece. The site is dominated by pasture, with forests with *Abies borisii-regis* and *Fagus sylvatica* in the south east of the site. There are also large communities of endemic black pine forest (*Pinus nigra*).

Ten European threatened habitats (forest, grassland and screes) are found on this IPA including four priority habitats that are threatened throughout the Mediterranean: semi-natural dry grasslands and scrubland on calcareous substrates, *Juniperus communis* formations on heaths or calcareous grasslands, (sub-) Mediterranean pine forests with endemic black pines and *Juniperus oxycedrus* woods. Various restricted range species are present on the site such as *Cistus albanicus* and *Chaerophyllum heldreichii*, (which are threatened and endemic to Albania), and Balkan endemics such as *Crocus cvijicii* limited to mountains in south west Macedonia/south east Albania/north east Greece.

Threats from natural events (disease/fire/drought) have increased over the last five years, overgrazing and unsustainable plant exploitation are also significant threats to the integrity of this site. The IPA is not protected and there is no management plan.

## 2. Korabi Mountain IPA (Mali i Korabi)

Korabi Mountain IPA is located in north eastern part of Albania and the mountain crosses the border into Macedonia FYR (where it is also an IPA). The area has predominately limestone substrates with outcrops of siliceous rocks at higher elevations. A significant part of the site is alpine pastures where many local endemic species are found; *Draba korabensis*, *Ranunculus degenii* and *Ranunculus wettsteinii* are only found on Korabi mountain and *Phyteuma pseudorbicularis*, *Scrophularia bosniaca*, *Viola kosaninii* and *Crocus scardicus* are Balkan endemics with very restricted ranges. Thirteen European threatened habitats are present on this site (alpine grassland, rocky habitats, river and forests) including the priority habitats: Endemic forests with *Juniperus* spp., specific calcareous or basophilic grasslands, xeric sand calcareous grasslands and active raised bogs.

Deforestation is an increasing threat and overgrazing is a severe problem at this IPA. This site will be proclaimed as a protected area in 2010/11.

## 3. Tomorri Mountain IPA (Mali i Tomorrit)

Tomorri Mt. is the highest mountain in south-western Albania. The upper part is pasture, whereas the sub alpine belt is dominated by forest of Bosnian pine (*Pinus heldreichii*) and beech (*Fagus sylvatica*). The site is also an important point of pilgrimage for the region. Threatened species *Astragalus autranii*, *Carduus cronicus* and *Onosma mattirolii* are endemic to this mountain site. Considerable numbers of Balkan endemics species are also present: *Pinus heldreichii*, *Melampyrum heracleoticum*, *Fritillaria graeca*, *Centaurea graeca*, *Pedicularis graeca* and *Sideritis raeseri*. Tomorri hosts twelve European threatened habitats including four priorities: specific calcareous or basophilic grasslands, xeric sand calcareous grasslands and *Juniperus communis* formations on heaths or calcareous grasslands. Overgrazing and burning of vegetation are severe at this site the threat from deforestation is decreasing. This area (4000 ha) was declared a Protected Area in 1996 in the category of 'National Park'.

“Threats from natural events (disease/fire/drought) have increased over the last five years, overgrazing and unsustainable plant exploitation are also significant threats to the integrity of Gramozi Mountain IPA”

### Further reading

Dida M., Dragoti N., Kromidha G., Fierza Gj. 2004. *Albanian Natural Areas-National Parks*. (in Albanian)

Ministry of Environment, Forestry and Water Administration (MEFWA) studies:

- 2006. *Study for the increase of the Protected areas in Albania* (in Albanian)
- 2007. *Biodiversity Enabling Activity*; 370 pp.
- 2007. *Albanian national plant red list*.
- Various studies for the proclamation of protected areas (the Divjakë-Karavasta ecosystem, the Kruja Mountain-Qafë Shtama mountainous ecosystem, the Mali me Gropa-Bizë-Martanesht mountainous ecosystem)
- Quiro, M. 2010. *Important Plant Areas of Albania*. [Black and white report which can be found at [www.plantlife.org.uk](http://www.plantlife.org.uk)]



# 04

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## section



# RESTRICTED RANGE SPECIES IN THE SOUTH AND EAST MEDITERRANEAN

.Describing restricted range or locally endemic species within this Mediterranean project  
 .Preliminary restricted range species in North Africa and the Middle East

There are approximately 13,000 plant species, sub species and varieties endemic to the whole Mediterranean region, i.e. they are found only within this region and nowhere else on earth. That around 45% of the region's flora is endemic is significant in itself, but many of these species and sub species are restricted to particular sub-regions within the Mediterranean e.g. the Magreb, Levant or the Balkans or even further restricted to one small region of <math><5,000\text{km}^2</math> or one 'site' of <math><100\text{km}^2</math> – in many cases they may be known from one or two IPAs. These species can be found within a single country or have restricted distributions that cross national borders.

Within the south and east Mediterranean those species whose range is restricted within single countries (single country endemics) are often better known than those that have restricted distributions across borders; simply because historically plant species have been investigated on a national basis. The distributions (and status') of those species that have restricted ranges but occur across national borders, are not well known or well documented, however they are an important component of the diversity and one that is believed to be very threatened.

A definitive list of restricted range (local endemic) plant taxa for two of the Mediterranean sub regions within this project (North Africa and the Middle East) does not exist, though there is reasonable to very good knowledge of the distribution of national endemic species within countries. Local species endemism is an important element of IPA identification in the region (especially as the global threat status of most species is unavailable and national threat assessments are of limited use for regional prioritisation).

This lack of a definitive regional list of restricted range species was recognised as an important element needed to inform IPA identification work. Country IPA teams therefore started the process of building distribution lists of these restricted range species (occurring in an area <math><5.000\text{km}^2</math>), alongside the preliminary IPA assessment.



▲  
 Lebanese endemic, *Cousinia libanotica*  
 on Makmel IPA  
 © N. Machaka-Houri



[left page]  
 Aerial view of El Feidja National Park, an important watershed for north Tunisia and a unique conservation area for rare species such as the Barbary deer  
 El Feidja National Park, Tunisia  
 © Michel Gunther / WWF-Canon



*Argyrocystitis battandieri*, an endemic of  
Mediterranean cedar forests

© P. Regato



The process and preliminary results are described below, restricted range species lists were developed using existing data and expert knowledge. Assessing the threat status of these species has proved difficult beyond national level, and forms one of the recommendations for further work resulting from this project.

### Describing restricted range or locally endemic species within this Mediterranean project

The objective for this part of the project was to develop a preliminary list of restricted range species regardless of whether they were located in a single country or in multiple countries.

Plant taxa<sup>1</sup> (henceforth referred to as species) are often referred to as 'endemic' to a particular location, i.e. restricted to one place; the smaller the area they cover the more unique (and potentially the more threatened) those species are. Species limited to a very small locality are known as steno-endemic or 'site restricted'. Historically plant species have often been described as endemic to a particular country, e.g. endemic to Albania or Algeria, i.e. as a 'single country endemic'. This terminology has limited use. If the country is small the phrase 'single country endemic' may be significant because it may indicate a small distribution for that species, however if the country is large it may not be significant because the species distribution may also be large. Species of more significance may be 'multi-country endemics' that have very limited distributional ranges (for example a species present in Morocco and Algeria but only within a very local area on the coast that happens to cross the border). Despite universal recognition of multi-country endemism the terminology associated with it is confusing.

For this project terminologies were adopted to clarify the ranges were being ascribed to species (see box 2) and also to indicate certain 'sub' regions (box 3), this terminology has been used in this (first attempt) to draw together a list of restricted range species for these regions.



*Iris antilbanotica* restricted to the  
Anti-Lebanon mountains

© F. Al- Mahmoud

.....  
1 Taxa (plural) taxon (singular) is a general term for a taxonomic group whatever its rank – e.g. genus, species, sub species, variety. Within the project we have considered plant taxa with the taxonomic rank of species, sub species and variety, but henceforth 'species' is used in place of 'taxa' to improve the ease of reading the text.



## Box 02

### Endemic definitions used in this project



*Crassula vaillantii*  
© G. de Belair

A species whose distribution is confined to a given area or location and nowhere else in the world is said to be *endemic to that area*. **'Endemic' should never be used without a complement (ie. endemic to Syria, endemic to Jabal Akhdar)**

#### SINGLE COUNTRY ENDEMIC

- Species occurring only in one country (and nowhere else in the world)
- Symbol used: **SCE + country name** (ie SCE/SY = country endemic to Syria)

#### MULTICOUNTRY ENDEMIC

- Species occurring in two or more usually adjacent countries (and nowhere else in the world)
- Symbol used: **MCE + region + country names** ( e.g. MCE/Levant /SY-LB = sub Mediterranean endemic to Syria and Lebanon)

#### RESTRICTED RANGE ENDEMIC

- Species occurring in a restricted area (and nowhere else in the world) in **one or more** usually adjacent countries
- Extent of occurrence usually < 5'000 km<sup>2</sup>

- Symbol used: **RRE + Country name(s) + sub-national name** (e.g. RRE/MA/Atlas = restricted range endemic to Atlas mountain range in Morocco)

#### SITE RESTRICTED ENDEMIC

- Species occurring in only one site (and nowhere else in the world). Could occur in two countries.
- Extent of occurrence usually <100 km<sup>2</sup>
- Symbol used: **SRE + Country name(s) + local site name** (e.g.) SRE/MA/Toubkal = restricted range endemic to Toubkal in Morocco)

#### SUMMARY

- Multi Country Endemic : **MCE** / + region (if appropriate e.g, Magreb or Levant) + country names
- Single Country Endemic : **SCE** / + country name
- Restricted Range Endemic : **RRE** / + country name(s) + sub-national name (< 5'000 km<sup>2</sup>)
- Site Restricted Endemic : **SRE** / +country name(s) + local name (< 100 km<sup>2</sup>)

“The objective for this part of the project was to develop a preliminary list of restricted range species regardless of whether they were located in a single country or in multiple countries”



▲  
*Silene makmeliana* restricted to small areas of Lebanon and Syria  
© N. Machaka-Houri

### Box 03 Geographical entities

Various geographical entities are used in the tables of restricted range species found in appendix 3 these are explained below

REGION LEVEL 1	REGION LEVEL 2	REGION LEVEL 3
<b>NORTH AFRICA (SOUTH MEDITERRANEAN)</b> Morocco, Algeria, Tunisia, Libya, Egypt	Magreb (Morocco, Algeria, Tunisia)	Magreb - Algéro-Marocains (Morocco and Algeria) Magreb - Tuniso-algériennes (Algeria and Tunisia)
	Libya/Tunisia	
	Libya/Egypt	
<b>EAST MEDITERRANEAN</b> Syria, Lebanon, Israel, Jordan, Palestine, Egypt- Sinai region, Turkey*, Cyprus*	Levant/Egypt (Sinai)	
	Levant (Syria, Lebanon, Israel, Jordan, Palestine)	
	Syria/Turkey	
<b>DISJUNCT</b>	Taxa found in two or more countries that do not share immediate borders.	

\* This project has only considered those Turkish or Cypriot species that are also in the project region – not the whole flora of these countries.

The prefix Ibéro is often used to those species that are found on the Iberian Peninsula (in Spain and/or Portugal as well as in Morocco or Morocco and Algeria). Species from the Iberian Peninsula present in this region have not been included in the preliminary restricted range species list developed during this project.

### Preliminary restricted range species in North Africa and the Middle East.

The list of restricted range species for the south and east Mediterranean can be found in appendix 3 of this report. The challenges associated with putting together such a list should not be underestimated and the authors are keen to stress this is a very preliminary list and there remains considerable work to be done, not only on understanding the distributions of these species, but on verifying the taxonomy of the species (and sub species or varieties) – for example using the Euro + Med plantbase (<http://www.emplantbase.org/home.html>). There has been insufficient time to do a comprehensive check of the taxonomy during this project. The authors view the lists presented as the first step in the process of understanding the most restricted range species in the Mediterranean part of North Africa and Middle East, and hope they will help to identify those species for which conservation action maybe an urgent priority.

Our results suggest that within North Africa and the Middle East there are approximately 1195 restricted range plant species (sub species/varieties) that have a distribution/extent of occurrence of less than 5,000km<sup>2</sup> i.e. endemic to an area of less than 5,000km<sup>2</sup> within the region. There are a further 1195 species that are probably restricted but not enough is known to make an ‘educated guess’ on the extent of restriction, and at least 58 species (not included in the appendix) that are restricted to Morocco and/or Algeria and the Iberian Peninsula.

Of the 1113 species nearly 1000 are present in a single country (‘single country endemics’) for example *Abies marrocana* (Morocco), *Sixalix libyca* (Libya) and *Vicia hulensis* (Israel). Of the restricted range species 513 (around half) are classed as site restricted, i.e. they have a distribution of <100km<sup>2</sup> and 484 of these are believed to be restricted to a single country. For example *Teucrium heterotrichum* present only in the coastal mountains at Bhamra in Syria and *Campanula barborensis* in Oued el Kebir canyon, Algeria. Some of the restricted range species have very disjunct distributions e.g. *Fumaria bicolor* found in Italy and Algeria and *Arum cyrenaicum* in Libya and Crete.

“Our results suggest that within North Africa and the Middle East there are approximately 1195 restricted range plant species (sub species/varieties) that have a distribution/extent of occurrence of less than 5,000km<sup>2</sup> i.e. endemic to an area of less than 5,000km<sup>2</sup> within the region”

REGION	SUB REGION	SITE RESTRICTED SPECIES <100km <sup>2</sup>	RESTRICTED RANGE SPECIES <5,000km <sup>2</sup>	UNCERTAIN RANGE BUT LIKELY TO BE RESTRICTED <5,000km <sup>2</sup>
North Africa	Magreb	247	383	71
	North Africa various combinations	-	13	-
	Egypt (Sinai)	29	-	-
	Egypt and/or Libya	5	7	5
	Libya (Jabal Akhdar)	-	49	-
East Mediterranean	Levant/Egypt	1	13	9
	Levant	226	183	23
	Syria/Turkey	4	29	3
Disjunct		1	5	-

[Table. 6] Plant species endemism in sub regions within North Africa and the Middle East

The preliminary list of restricted range species for North Africa and the Middle East could be used alongside other variables (such as perceived threat to habitat, resources available) to help to prioritise threat assessments of plant species in the region. Those species that are restricted to <100km<sup>2</sup> may merit greater prioritisation, especially those that occur across country borders as it is likely the information available for those species is most limited.



# 05

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## section

# CONCLUSIONS AND RECOMMENDATIONS FOR PLANT CONSERVATION IN THE SOUTH AND EAST MEDITERRANEAN

The two hundred and seven Important Plant Areas documented through this project represent international priorities for biodiversity conservation in the south and east Mediterranean. This is the first time such a comprehensive assessment of important sites for plant diversity, involving botanical experts from every country as well as regional level experts, has been attempted; it is a huge step forward for plant conservation. Not only has large amounts of site specific information on plant diversity been made more accessible for those who manage sites; but the project has facilitated the development of in-country botanical expert teams, and the sharing of data and skills across the region. The project began as a response to the (almost complete) lack of easily accessible information on the best sites for plant diversity in North Africa and the Middle East, which was needed to prepare the Ecosystem Profile for the Critical Ecosystem Partnership Fund. It has delivered far more than the rapid ‘quick and dirty’ assessment that was anticipated. The country teams have seized the long over due opportunity raise the profile of the most critical element of Mediterranean diversity – plants.

None-the-less, all those involved are acutely aware that this project was largely a desk based study; the sites selected are undeniably important for plant diversity but there is considerable work to be done across the region to improve the accuracy of the data. This project has brought together enough data and information to start developing and implementing conservation measures on sites, and it is important these conservation measures start now; but further work on improving the distribution and threat data for plant species and habitats is needed alongside these.

The species distribution data available are not always detailed or comprehensive; some species are very poorly known, vegetation and habitat types are not comprehensively described or mapped across the region, checklists of sites are not always complete and the global threat status of the majority of species and habitats is not properly understood. Many of these IPAs need further investigation in the field to ‘ground truth’ the information presented and to add further data that will undoubtedly



▲  
Fieldwork on Gerbes IPA.  
© S. Benhouhou

◀  
[left page]  
Rural landscape and wetland in a  
Ramsar zone of El Kala National Park,  
Algeria  
©Michel Gunther / WWF-Canon



*Quercus cerris* spp. *pseudocerris*

Syria

© A. Almasri

be missing. In many countries additional Important Plant Areas may be discovered when more comprehensive field based investigations can be carried out.

**The extent of threats to IPAs in the south and east Mediterranean is now better understood.** Sixty seven percent of IPAs are threatened by overgrazing and nearly fifty percent by deforestation (largely for fuel). Over one third of sites are threatened by tourism development, agricultural intensification through arable farming and climate change. There is an urgent need to address the drivers of these threats.

**Initiatives for conserving plant diversity are few and poorly supported across the region.** Whilst protected areas (National Parks) are the main legislative approach to protecting sites, there is little evidence that they are supported by well structured management regimes or take account of the plants and vegetation. Current pastoral and forestry activities are not sustainable on most of these sites and there is a need for better legislation





to ensure development and modernisation (both crucially important for improving economies) is not counter productive and destroying natural resources and irreplaceable plant diversity.

**The flora of the South and east Mediterranean is incredibly diverse.**

A significant part of this diversity is unique to the region, of global importance to conservation and under great threat from intensive overgrazing, deforestation, development and climate change. The Important Plant Areas project has begun the process of highlighting the most important sites for plant diversity and the issues that must be addressed to ensure the natural resources contained within these sites are safeguarded for the future. The next phase of biodiversity conservation work in this region should use and build on the information presented here. It should seek to increase the capacity of botanists and conservationists across the region and begin on-the-ground activities in partnership with local communities to ensure these sites and the natural resources they contain are sustained for the future.



▲  
Camel in Tunisia  
© Nieves García

“All those involved are acutely aware that this project was largely a desk based study; the sites selected are undeniably important for plant diversity but there is considerable work to be done across the region to improve the accuracy of the data”



▲  
Plants and their pollinators are crucial to  
Mediterranean livelihoods  
© Sandra García

“The extent of threats to IPAs in the south and east Mediterranean is now better understood. Sixty seven percent of IPAs are threatened by overgrazing and nearly fifty percent by deforestation (largely for fuel)”

## RECOMMENDATIONS

Specific recommendations are included below however it is critical that all conservation-focused investment in the south and east Mediterranean includes investment in improving capacity across the whole ‘plant conservation skill set’. This is needed to: secure the *basic botanical skills* needed to identify plant species; enable *mapping of the distribution and status* (quality and integrity) of the flora and vegetation; undertake *appropriate and targeted actions* to ensure the conservation and sustainable use of plant species and habitats; and effectively advocate *positive change to environmental policy and its implementation*.

### IPA conservation

- 1) **RECOGNISE** Important Plant Areas as internationally significant priority sites for conservation in local, national and regional environmental policies and plans.
- 2) **TARGET** Important Plant Areas as priority sites for conservation action in the Mediterranean region. This will ensure that direct conservation action on priority plant sites can begin now, alongside the continued efforts to improve data.
- 3) **INCORPORATE IPAS** (where appropriate) into protected area networks.
- 4) **UPDATE** management plans for protected areas that contain IPAs to take account of new plant data presented and ensure effective implementation. Develop and implement management plans for IPAs where they do not exist (starting with top priority sites).
- 5) **ENSURE** Environment Impact Assessments are undertaken on development projects that affect IPAs and ensure their recommendations are enforced and monitored.
- 6) **TARGET IPAS** for the implementation of sustainable forest management and agri-environment scheme and projects.
- 7) **ENCOURAGE** communities whose livelihoods depend on plant resources to participate in IPA conservation planning activities (e.g. medicinal plant collectors, promoters of nature tourism, hunters, mountain guides).

### IPA data

- 8) **‘GROUND-TRUTH’** the plant species and habitat data associated with IPAs through fieldwork (starting with priority IPAs named in this report) and ensure that IPA plant features are properly mapped.
- 9) **INVEST** in the provision of comprehensive and up to date information on plant and habitats species in the south and east



Mediterranean, building on the work carried out in this project. This should include:

▲  
Mediterranean vegetation  
© Carla Danelutti

- a. A definitive list of restricted range, endemic plant taxa for the Mediterranean with and accurate data on their distribution, abundance and importance to the local community.
  - b. A regional IUCN Red List is for the Mediterranean (begin by focusing on restricted range species that are endemic to the region).
  - c. National IUCN Red Lists for vascular plants for all south and east Mediterranean countries.
  - d. A list of Mediterranean habitats and threatened habitats.
- 10) **ENABLE** the data associated with IPAs to be stored electronically (such as on the IPA database) so it can be updated easily via the web.

# 06

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## section

# APPENDICES

- .Important Plant Area and Important Forest Area criteria
- .IPAs identified
- .North Africa and Middle East preliminary list of restricted range species



▲  
Boats in Tunisia  
© Nieves García

### Appendix 1

#### Important Plant Area and Important Forest Area criteria

#### IMPORTANT PLANT AREAS

An Important Plant Area is a natural or semi natural site exhibiting exceptional botanical richness, and/or supporting an outstanding assemblage of rare, threatened and/or endemic species and/or vegetation of high botanic value.

In short IPAs are **INTERNATIONALLY SIGNIFICANT SITES FOR PLANTS** and their habitats

#### Broad criteria

- A** The site holds significant populations of species of global or regional concern
- B** The site has exceptionally rich flora in a regional context in relation to its biogeographic zone
- C** The site is an outstanding example of a habitat or vegetation type of global or regional importance

**Sites qualify as IPAs if they satisfy 1, 2 or all 3 criteria**

Detailed criteria with thresholds are shown below

CRITERION	DESCRIPTION	THRESHOLD	NOTES
<b>A (i)</b> <b>(threatened species)</b>	Site contains globally threatened species	All sites known, though or inferred to contain 5% or more of the national population can be selected, or the 5 <sup>1</sup> 'best' sites, whichever is the most appropriate.  <sup>1</sup> (In exceptional cases, for example where there are less than 10 sites in the entire country or there are between 5-10 large populations of a species, up to 10 sites can be selected)  (Populations must be viable or there is a hope that they can be returned to viability through conservation measures)	Species listed as 'threatened'* on IUCN global red lists
<b>A (ii)</b> <b>(threatened species)</b>	Site contains regionally threatened species		Species listed as 'threatened'* on regional IUCN red lists or regionally approved lists
<b>A (iii)</b> <b>(threatened species)</b>	Site contains national endemic species with demonstrable threat not covered by A(i) or A(ii)		Species listed as national endemic (on any recognised list or publication) and 'threatened'* on national red lists
<b>A (iv)</b> <b>(threatened species)</b>	Site contains near endemic/ restricted range species with demonstrable threat not covered by A(i) or A(ii)		Species listed as near endemic/ restricted range (on any recognised list or publication) and 'threatened'* on national red lists
<b>B</b> <b>(botanical richness)</b>	Site contains high number of species within a range of defined habitat or vegetation type	Up to 10% of the national resource (area) of each habitat or vegetation type, or 5 <sup>2</sup> best sites; whichever is the most appropriate.  <sup>2</sup> (In exceptional cases, for example there are between 5 and 10 exceptionally rich sites for a particular habitat, up to 10 sites can be selected for each level 2 habitat type)	Species richness can be based on a nationally created list of indicator species developed for each habitat or vegetation type. For example characteristic species and/or endemic species and /or nationally rare and scarce species (where the endemic and rare and scarce species are numerous and/or are characteristic for the habitat) Defined habitat or vegetation type taken from or based upon a regionally accepted classification
<b>C</b> <b>(threatened habitat or vegetation type)</b>	Site contains threatened habitat or vegetation type	All sites known, thought or inferred to contain 5% or more of the national resource (area) of priority threatened habitats can be selected, or a total of 20-60% of the national resource, whichever is the most appropriate.	Threatened habitats or vegetation taken from a regionally recognised list.

\* Criterion A, threatened species must be listed as **Critically Endangered (CR)**, **Endangered (EN)** or **Vulnerable (VU)** using the new IUCN criteria, or **Extinct/Endangered (Ex/E)**, **Endangered (E)** or **Vulnerable (V)** using the original IUCN categories

## Official lists for criterion A

### For Ai – Globally threatened

- **The IUCN Global Red List** including the World List of threatened trees 1998, and Global Red List 1997

### For Aii – Regionally threatened

- IUCN regional lists
- In Europe: the Habitats Directive and Bern Convention species lists, European Bryophytes 1995 (Global 2001), Fungi species proposed for the Bern Convention 2001, European Macrolichens 1989

### For Aiii and Aiv - Nationally threatened

- Threatened endemics and near endemics (restricted range species) from National Red lists

## Important Forest Areas

Forest Areas are scored using the criteria below and their relative importance is worked out according to the final score of each area.

All endemic relic/rare forest types exclusive of the country must be considered as IFAs. In this case the whole forest area of each type will be taken into account.

All forest types which, despite being frequent in the Mediterranean region or in other floristic regions, are present in the country only as relics must be considered IFAs (key role in climate change adaptation).

For the rest of the forest types the consultants should select the 'best' areas, according to the criteria:

### Rarity

Areas including endemic rare forest types exclusive of the country, endemic forest types at a sub-regional level (*i.e. North-African endemic, Middle Eastern endemic, Balkan endemic*), whose distribution is mainly limited to the country, and relic forest types.

### Faunistic/floristic importance

Presence in the area of rare/endemic threatened or relict ecosystem types, flora and fauna species (especially

birds); e.g. presence in the area of forests important for the biological cycles of some species (like stop-over sites for the migrant birds).

### Maturity

Areas with old growth forest formations close to their highest potential evolutionary level: areas with forests with a high diversity of age classes, regeneration, young and old trees, dead wood, etc.; areas, for some forest types, with a high number of old-growth individuals; areas with forests with especially well developed shrub and/or herb layer. Presence of animal species (especially birds) linked to mature forests

### Wilderness

Areas including natural forests with scarce or no human activity or under sustainable management

### Fragility

Areas including forests with low capacity to stand, respond and/or recover from the disturbances linked to the identified threats.

### Richness

Areas including different forest types, with especially rich flora and fauna inventories.

## Relative importance of IFAs

CRITERION	INDEX
Rarity	2.2
Faunistic/floristic importance	1.9
Fragility	1.8
Maturity	1.7
Wilderness	1.2
Richness	1.2

<b>RARITY</b>	IFAs including endemic forest types exclusive of the country: <b>score range 8-10</b>
	IFAs including endemic forest types at a subregional level (i.e. North-African , Middle Eastern, or Balkan endemic): <b>score range 5-7</b>
	IFAs including relic forest stands of wider distributed forest types in other geographical areas: <b>score range 3-4</b>
	IFAs not including rare forest types: <b>score range 1-2</b>
<b>FLORISTIC AND FAUNISTIC IMPORTANCE (IN ACCORDANCE WITH IUCN CATEGORIES)</b>	IFAs including forests with endangered species: <b>score range 8-10</b>
	IFAs including forests with significant vulnerable and rare species: <b>score range 5-7</b>
	IFAs including forests with significant declining, localized and insufficiently known species: <b>score range 3-4</b>
	IFAs including only forests with species of no significant importance (secure): <b>score range 1-2</b>
<b>MATURITY</b>	50-100% of the IFA include mature forests: <b>score range 7-10</b>
	25-50% of the IFA include mature forests: <b>score range 4-6</b>
	Less than 25% of the IFA include mature forests: <b>score range 1-3</b>
<b>WILDERNESS</b>	IFAs including only natural forests, with scarce or no human activities and difficult accessibility: <b>score range 8-10</b>
	IFAs inc. only natural forests, under sustainable management, far from settlements, accessible by secondary roads: <b>score range 5-7</b>
	IFAs including more than 75% of natural forests, under human intervention, accessible by roads: <b>score range 3-4</b>
	IFAs with less than 75% of natural forests: <b>score range 1-2</b>
<b>FRAGILITY</b>	IFAs including forests with low capacity to face the current threats identified in the area: <b>score range 7-10</b>
	IFAs including forests with medium capacity to face the current threats identified in the area: <b>score range 4-6</b>
	IFAs including forests with high capacity to face the current threats identified in the area: <b>score range 1-3</b>
<b>RICHNESS</b>	IFAs including more than 5 forest types, with particularly rich flora and fauna inventories: <b>score 10</b>
	IFAs including more than 5 forest types, with no particularly rich flora and fauna inventories: <b>score 9</b>
	IFAs including between 2 and 5 forest types, with particularly rich flora and fauna inventories: <b>score range 7-8</b>
	IFAs including between 2 and 5 forest types, with no rich flora and fauna inventories: <b>score range 5-6</b>
	IFAs including only 1 forest type, with particularly rich flora and fauna inventories: <b>score range 3-4</b>
	IFAs including only 1 forest type with no rich flora and fauna inventories: <b>score range 1-2</b>

## Appendix 2. List of IPAs identified

### IPAs in Albania

Grykëderdhja e Bunës - Velipojë	AL01
Skoda Lake and Buna River	AL02
Lugina e Cemit	AL03
Alpet Veriore Shqiptare	AL04
Pashtrik - Morinë	AL05
Gjallicë - Koritnik	AL06
Korabi	AL07
Rrajcë - Shebenik - Jabllanicë	AL08
Liçeni i Ohrit	AL09
Mali i Thatë	AL10
Liçenet e Prespës	AL11
Gramoz - Shelegur	AL12
Lugina e Vjosës - Çarshovë	AL13
Zhej - Nemërçkë	AL14
Kepi i Stillo	AL15
Kolsh - Mali i Runës	AL16
Bjeshka e Oroshit	AL17
Kunorat e Lurës	AL18
Zall - Gjoçaj	AL19
Liçeni i Zi	AL20
Grykëderdhja e Drinit - Ceka - Vain	AL21
Qafë Shtamë	AL22
Mali me Gropa - Bizë - Martanesh	AL23
Krujë _Tujan	AL24
Parku i Dajtit	AL25
Kepi i Rodonit - Pylli i Ishmit	AL26
Holtë - Bulçar	AL27
Shpat - Polis	AL28
Guri i Topit - Valamarë	AL29
Tomorri	AL30
Lugina e Gjergjevicës	AL31
Drenovë - Nikolicë	AL32
Parku i Divjakës	AL33
Këneta e Roskovecit	AL34
Pishë Poro - Grykëderdhja e Vjosës (Vlorë)	AL35
Karaburuni - Mali i Çikës	AL36
Kanioni i Gjipesë	AL37
Bredhi i Hotovës	AL38
Porto Palermo	AL39
Kardhiq	AL40
Rrëzomë	AL41
Borsh - Lukovë	AL42
Bistricë - Muzinë	AL43
Ksamil	AL44
Liçeni i Butrintit	AL45

### IPAs in Algeria

El Kala 1	DZ01
El Kala 2	DZ02
Edough Peninsula	DZ03
Guerbes	DZ04
Djebel Ouahch	DZ05
Parc National du Belezma	DZ06

Chaîne des Babor	DZ07
Parc Nazional de Taza	DZ08
Parc National de Gouraya	DZ09
Massif forestier de l'Akfadou	DZ10
Djurdjura National Park	DZ11
Theniet El Had	DZ12
Chrëa National Park	DZ13
Sahel d'Oran	DZ14
Mont Chenoua	DZ15
Ghar Rouban	DZ16
Cap Ténés	DZ17
Mounts Traras	DZ18
Iles Habibas	DZ19
Aures-Chelia	DZ20
Mont Zaccar	DZ21

### IPAs in Egypt

North Sinai Mountain	EG01
Lake Bardawi	EG02
Lake Manzala	EG03
Lake Burullus	EG04
Lake Edku	EG05
Lake Mariut	EG06
Omayed Biosphere Reserve	EG07
Moghra Oasis	EG08
Western Mediterranean Coastal Dunes	EG09
Sallum Area	EG10
Wadi El-Rayan	EG11
Saint Katherine	EG12
Nabq	EG13
Hurghada	EG14
Wadi El-Gemal	EG15
Dungul and Dineigil Oases	EG16
Lake Nasser	EG17
Wadi Allaqui	EG18
Saluga and Ghazal	EG19
Halayeb triangle	EG20
Wadi Al-Arish	EG21
Qattara Depression	EG22
El-Qasr	EG23
Ras El-Hekma	EG24
Quseima	EG25
Islands of the Nile Delta	EG26
Deltaic Black Sand Dunes	EG27
Gebel El-Shayeb	EG28

### IPAs in Israel

Meiron	IL01
Hula	IL02
Mount Carmel	IL03
Affula	IL04
Poleg	IL05
Dead Sea Coast	IL06
Hebron Gradient	IL07

Lahav	IL08
Nizana Sands	IL09
Har Negev	IL10
Hatzeva	IL11
Sedom	IL12
Eilat Mountains	IL13
Acre	IL14
Netofa	IL15

### IPAs in Jordan

Wadi Rum	J001
Dana Nature Reserve	J002
Karack	J003
Salt	J004
Alouk	J005
Um Queis	J006
Lava Safawai	J007
Burqu'	J008
Ajlum	J009
Bayer	J010
Azraq	J011
Mujib	J012

### IPAs in Lebanon

Mount Makmel	LB01
Hermel Plain	LB02
Aarsal	LB03
Aammîq	LB04
Mount Hermon	LB05
Menjez	LB06
Qammouaa-Dinnyeh- Jurd Hermel	LB07
Palm Islands	LB08
Bcharreh-Ehden	LB09
Ras Chekka	LB10
Tannourine	LB11
Jbail Coast	LB12
Wadi Jannah	LB13
Keserwan	LB14
Sannine - Knaisseh	LB15
Chouf	LB16
Nahr Ed-Damour	LB17
Beirut – Jiyeh Coast	LB18
Tyre - Naqoura	LB19
Rihane	LB20
La Martin Valley	LB21

### IPAs in Libya

Al Jabel El Akhdar	LY01
Tawuoryhe Sebkha	LY02
Jabal Nafusah	LY03
Messak Mountain	LY04





◀  
Ichkeul National Park Area  
surrounding Lake Ichkeul  
Tunisia

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Jabal Aweinat	LY05	Khali (Hebron) Gradient	PS06	Es Safa	SY30
<b>IPAs in Morocco</b>		<b>IPAs in Syria</b>		Lajat	SY31
Jbel Bouhachem	MA01	Karatchok-Tigris	SY01	Jabal Al Arab	SY32
Parc National de Talassemthane	MA02	Kurd Dag	SY02	Yarmuk Valley	SY33
Parc National d'Al Hoceima	MA03	Jabal Abdul Aziz	SY03		
Beni Snassene	MA04	Jabal Al Wastani	SY04	<b>IPAs in Tunisia</b>	
Jbel Bou-Naceur	MA05	Hass-Jabbul	SY05	Garâa Sejenane Majen Chitane Lake	TN01
Jbel Bou Iblane	MA06	Jisr al shogur	SY06	Dar El Orbi Peat Bog	TN02
Parc National de Tazekka	MA07	Fronloq-Kasab	SY07	Oued Ziatine 1 +2	TN03
Jbel Tichoukt	MA08	Umm Al Tuyur-Bassit	SY08	Ain Zana Natural Reserve	TN04
Parc National d'Ifrane	MA09	Salma-Haffeh	SY09	Sidi Ali El Mekki	TN05
Parc National du Haut Atlas Oriental	MA10	Slenfeh-Jaubet et Berghal	SY10	Dat Fatma Natural Reserve	TN 06A
Jbel Ayachi	MA11	Ghab	SY11	Sources du 18ème	TN 06B
Jbel Maâsker	MA12	Jabal Bishri	SY12	Camp du 18ème	TN 06C
Jbel Krouz	MA13	Abu Qbeis	SY13	Piste de Legba	TN 06D
Jbel Mgoun	MA14	Kanfo	SY14	Le Merij	TN 06E
Tamga and Aqqa Wabzaza	MA15	Mayadin	SY15	Majen Barbit	TN 06F
Parc National de Toubkal	MA16	Massiaf-Qadmous	SY16	Majen El Ouez 1	TN 06G
Aghbar	MA17	Al Bil As	SY17	Majen El Mouajène	TN 06H
Jbel Kest, Anezi et Jbel Imzi	MA18	Jabal al Sha ir	SY18	Sraï el Majen	TN 06I
Maamora	MA19	Jabal Abu Rujmain	SY19	Majen El Ma	TN 06J
		Daher al Qseir	SY20	Majen Sghaïer	TN 06K
		Al Kabeer al Jonubi	SY21	Majen El Ouez 2	TN 06L
<b>IPAs in the Occupied Palestinian Territories</b>		Akkoum	SY22	Majen Choucha	TN07
Faoua` - Jalaboun	PS01	Anti-Lebanon	SY23	La Galité Archipelago	TN08
Wad Alhrameyah - Wad Elbalat-		Qalamoun	SY24	Zembra and Zembretta National Park	TN09
Um Safa - Beit Illo - Ein Samya	PS02	Qassioun	SY25	Toujane	TN10
Wad Qana- Wad Eshai`r	PS03	Rakhleh - Wadi al Qarn	SY26	El Feija Jbel Ghorra	TN11
Yaseed-Ibzeik	PS04	Utaiba - Hijane	SY27	Ichkeul	TN12
Dead Sea Coast	PS05	Hermon	SY28	Jbel Zaghouan	TN13
		North Golan	SY29		

## Appendix 3.

## North Africa and Middle East preliminary list of restricted range species

Part 1: SITE RESTRICTED SPECIES: Extent of occurrence <100km<sup>2</sup>

## Site restricted species in North Africa/Magreb

This list was developed rapidly and should be treated as the first step in creating a list of restricted range (locally endemic) species for the project countries. The taxonomy given is not universally accepted and notes on species' ranges are indications only, not absolute. Around 60 restricted species present in Morocco and/

or Algeria and the Iberian Peninsula have not been included in these lists. Restricted species from Turkey (and other countries outside this project) have only been included where they also occur within project countries; the whole flora of Turkey has not therefore been considered.

Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs	Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs
» <i>Abies numidica</i> de Lannoy ex Carrière	DZ	Babor mountains (NE-Algeria)	» <i>Brassica spinescens</i> Pomel	DZ	Habibas islands, Cap Falcon (NW-Algeria)
» <i>Achnatherum mesatlasica</i>	MA	Jbel Bou Naceur	» <i>Bromus maroccanus</i>	MA	Parc d'I Hoceima
» <i>Adenocarpus artemisiifolius</i>	MA	Jbel Bou Naceur	» <i>Buffonia duvaljouvei</i>	MA	Parc d'Ifrane
» <i>Adenocarpus boudyi</i>	MA	Parc d'Ifrane	» <i>Buffonia murbeckii</i>	MA	2
» <i>Agrostis atlantica</i>	MA	Aghbar	» <i>Bufonia duvaljouvei</i> - ssp. <i>Gottelandii</i>	MA	Parc d'Ifrane
» <i>Alchemilla atlantica</i>	MA	2	» <i>Bufonia murbeckii</i>	MA	Jbel Mgoun
» <i>Alchemilla mairei</i>	MA	Toubkal	» <i>Bufonia strohlii</i>	MA	Jbel Bou lbane
» <i>Alyssum simplex</i> ssp. <i>edentulum</i>	MA	Parc d'Ifrane	» <i>Bupleurum faurelii</i>	MA	3
» <i>Alyssum speciosum</i>	MA	Parc d'Ifrane	» <i>Bupleurum mesatlanticum</i>	MA	Parc d'Ifrane
» <i>Anarrhinum fruticosum</i> ssp. <i>demnatense</i>	MA	Jbel Mgoun	» <i>Bupleurum plantagineum</i>	DZ	Gouraya national park
» <i>Andryala atlantica</i>	MA	Toubkal	» <i>Calendula eckerleinii</i>	MA	Parc d'Ifrane
» <i>Andryala canariensis</i> ssp. <i>antonii</i>	MA	Toubkal	» <i>Campanula (Podanthum) aurasiaca</i>	DZ	Djebel Chelia (NE-Algeria): Sgag
» <i>Andryala integrifolia</i> ssp. <i>cedretorum</i>	MA	2	» <i>Campanula atlantis</i>	MA	Jbel Mgoun
» <i>Anthemis gharbensis</i>	MA	Maamora	» <i>Campanula atlantis</i> ssp. <i>schotteri</i>	MA	Jbel Mgoun
» <i>Anthericum lilago</i> ssp. <i>algeriense</i>	MA	Parc Tazekka	» <i>Campanula barborensis</i>	DZ	Oued el Kebir Canyon
» <i>Anthyllis vulneraria</i> ssp. <i>ifranensis</i>	MA	Parc d'Ifrane	» <i>Campanula fillicaulis</i> var. <i>pseudo-radiosa</i>	MA	Parc d'Ifrane
» <i>Anthyllis vulneraria</i> ssp. <i>matris-filiae</i>	MA	Jbel Tichoukt Parc d'Ifrane	» <i>Campanula fillicaulis</i> var. <i>genuina</i>	MA	Parc d'Ifrane
» <i>Antirrhinum martenii</i>	MA	Jbel Bouhachem	» <i>Campanula guinochetii</i>	MA	2
» <i>Aphanes maroccana</i>	MA	Parc d'Ifrane	» <i>Campanula sauvagei</i>	MA	Jbel Mgoun
» <i>Arabis erubescens</i>	MA	Toubkal	» <i>Campanula velata</i> ssp. <i>mesatlantica</i>	MA	Parc d'Ifrane
» <i>Arabis hirsuta</i> var. <i>mesatlantica</i>	MA	Jbel Bou Naceur	» <i>Carduncellus cartouxii</i>	MA	Jbel Mgoun
» <i>Arabis verdieri</i>	MA	Jbel Mgoun	» <i>Carduncellus cespitosus</i>	MA, DZ	Parc National du Haut Atlas Oriental
» <i>Arenaria cerastioides</i> ssp. <i>saxigena</i>	MA	Parc d'Ifrane	» <i>Carduus atlantis</i>	MA	2
» <i>Arenaria dyris</i>	MA	Jbel Ayachi, Jbel Maasker	» <i>Carduus martinezii</i>	MA	Parc Tassemtane
» <i>Aristida tunetana</i>	MA	Maamora	» <i>Carduus nutas</i> ssp. <i>scabrisquamus</i>	MA	1
» <i>Artemisia flahaultii</i>	MA	Jbel Bou Naceur	» <i>Carex atlasica</i>	MA	Toubkal
» <i>Artemisia ifranensis</i>	MA	2	» <i>Carex fissirostris</i>	MA	Toubkal
» <i>Asperula litardierei</i>	MA	2	» <i>Carum atlanticum</i>	MA	3
» <i>Asphodelus fistulosus</i> var. <i>atlanticus</i>	MA	Parc Haut Atlas Oriental	» <i>Carum iminouakense</i>	MA	Jbel Mgoun
» <i>Aster pujosii</i>	MA	Jbel Bou Naceur	» <i>Carum jahandiezii</i>	MA	Parc d'Ifrane
» <i>Astragalus depressus</i> ssp. <i>atlantis</i>	MA	Toubkal	» <i>Carum lacuum</i>	MA	Parc Haut Atlas Oriental
» <i>Astragalus depressus</i> ssp. <i>depressus</i>	MA	Parc d'Ifrane	» <i>Carum proliferum</i>	MA	Toubkal
» <i>Astragalus maireanus</i>	MA	Jbel Mgoun	» <i>Celsia zaianensis</i>	MA	Parc d'Ifrane
» <i>Astragalus maurus</i>	MA	Parc Tazekka, Parc d'Ifrane	» <i>Centaurea boissieri</i> ssp. <i>atlantica</i>	MA	Parc d'Ifrane
» <i>Astragalus mesatlanticus</i>	MA	Parc d'Ifrane	» <i>Centaurea litardierei</i>	MA	3
» <i>Astragalus tachdirtensis</i>	MA	Toubkal	» <i>Centaurea maireana</i>	MA	Parc d'Ifrane
» <i>Astragalus turolensis</i> ssp. <i>exsul</i>	MA	Parc d'Ifrane			
» <i>Bartisiella rameauana</i>	MA	2			
» <i>Brassica fruticulosa</i> ssp., <i>radicata</i>	MA, DZ	Beni Snassen			

Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs	Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs
» <i>Centaurea malinvaldiana</i>	MA, DZ	Jbel Krouz	» <i>Gnaphalium genevoisii</i>	MA	2
» <i>Centaurea musimonum</i>	MA, DZ	Jbel Krouz	» <i>Guenthera (Eruca) setulosa</i>	MA, DZ	Ghar-Rouban area/ orient. Tlemcen mts.
» <i>Centaurea resupinata</i> ssp. <i>rifana</i>	MA	Parc d'Ifrane	» <i>Halimium antiatlanticum</i>	MA	Jbel Kest , Anezi, Imzii
» <i>Centaurea sempervirens</i> ssp. <i>mauritanica</i>	MA	Jbel Bouhachem	» <i>Halimium atlanticum</i>	MA	Parc Tazekka
» <i>Centaurea theryi</i>	MA	2	» <i>Helianthemum pergamaceum</i> ssp. <i>camillei</i>	MA	Parc d'Ifrane
» <i>Centaurium barrelieroides</i> ssp. <i>bifrons</i>	MA	Jbel Bouhachem	» <i>Hieracium amplexicaule</i> ssp. <i>Olivicolor</i>	MA	Parc d'Ifrane
» <i>Centaurium erythraea</i> ssp. <i>benardii</i>	MA	Maamora	» <i>Hieracium peyrimhoffii</i> Maire	DZ	Aurès (le Mahmel) (NE-Algeria)
» <i>Chamaemelum flahaultii</i>	MA	Jbel Kest , Anezi, Imzi	» <i>Hieracium phlomoides</i> ssp. <i>mesatlanticum</i>	MA	2
» <i>Cheirolophus sempervirens</i>	MA	Jbel Bouhachem	» <i>Hieracium solida</i> gineum ssp. <i>Jahandiezii</i>	MA	Parc d'Ifrane
» <i>Chrysanthemum holophyllum</i>	MA	Jbel Bouhachem	» <i>Hieracium sonchoides</i> ssp. <i>mairei</i>	MA	Parc d'Ifrane
» <i>Chrysanthemum reboudianum</i> (Pomel) Q. et S.DZ		Chelia, Dj. Bou Taleb (NE-Algeria)	» <i>Hieracium viscosum</i> ssp. <i>africanum</i>	MA	Parc d'Ifrane
» <i>Cicer atlanticum</i>	MA	5	» <i>Hieracium viscosum</i> ssp. <i>mguildanum</i>	MA	Parc d'Ifrane
» <i>Cirsium ducellieri</i>	MA	Parc d'Ifrane	» <i>Hieracium viscosum</i> ssp. <i>tarchanum</i>	MA	Parc d'Ifrane
» <i>Conopodium</i> ssp. <i>Atlantis</i>	MA	Parc Tazekka	» <i>Hypericum metroi</i> (endém. locale)	MA	Parc Tazekka
» <i>Convolvulus dryadum</i> Maire	MA, DZ	Babor mountains (NE-Algeria) & Rif (N-Morocco)	» <i>Hypochaeris saldensis</i>	DZ	Gouraya national v park (NE-Algeria)
» <i>Convolvulus glaouorum</i>	MA	Jbel Mgoun	» <i>Iberis sempervirens</i> var. <i>pseudosaxatilis</i>	MA	Jbel Maasker
» <i>Convolvulus vidalii</i>	MA	Jbel Bouhachem	» <i>Isoetes velata</i> ssp. <i>intermedia</i>	MA, DZ	Parc d'Ifrane Algéro.marocains
» <i>Crepis vesicaria</i> ssp. <i>proleptica</i>	MA	Parc d'Ifrane	» <i>Juncus bufonis</i> ssp. <i>mogadorensis</i>	MA	Aghbar
» <i>Cytisus grandiflorus</i> ssp. <i>barbarus</i>	MA	Parc d'Ifrane	» <i>Koeleria embergeri</i>	MA	Jbel Bou Naceur
» <i>Dianthus gaditanus</i> ssp. <i>atrosanguineus</i>	MA	Jbel Tichoukt	» <i>Kremeriella cordylocarpus</i>	MA, DZ	Beni Snassen
» <i>Digitalis lutea</i> ssp. <i>atlantica</i>	MA	Toubkal	» <i>Lactuca riviersii</i>	MA	2
» <i>Digitalis lutea</i> ssp. <i>cedretorum</i>	MA	Jbel Maasker	» <i>Lavandula atlantica</i>	MA	Aghbar
» <i>Digitalis lutea</i> ssp. <i>transiens</i> var. <i>dyris</i>	MA	Parc Haut Atlas Oriental	» <i>Lavandula pedunculata</i> var. <i>atlantica</i>	MA	Parc d'Ifrane
» <i>Draba oreadum</i> ssp. <i>mariae-aliciae</i>	MA	Jbel Ayachi	» <i>Lavatera vidalii</i>	MA	Jbel Bouhachem
» <i>Echium humile</i> ssp. <i>nanum</i>	MA	Jbel Mgoun	» <i>Lepidium hirtum</i> ssp. <i>atlanticum</i>	MA	Aghbar
» <i>Elizaldia heterostemon</i>	MA	Maamora	» <i>Leucanthemum mesatlanticum</i>	MA	Jbel Bou Naceur
» <i>Epilobium psilotum</i>	MA	Toubkal	» <i>Leuzea fontqueri</i>	MA	2
» <i>Erigeron celerieri</i>	MA	3	» <i>Limonium boitardii</i> Maire	TN	NE de la Tunisie
» <i>Erinus thiabaudii</i>	MA	Jbel Mgoun	» <i>Limonium letourneuxii</i> (Batt.) Greuter & Burdet = "(Coss.) Pons & Quézel"	DZ	Cap Ténès (NW-Algeria)
» <i>Erodium atlanticum</i>	MA	3	» <i>Limonium minutiflorum</i> "auct. alg." [= <i>L. cyrtostachyum</i> (Girard Brullo)]	DZ	Cap Ténès (NW-Algeria)
» <i>Erucastrum littoreum</i> ssp. <i>glabum</i>	MA	Parc d'Ifrane	» <i>Limonium zembrae</i> Pignatti	TN	Données insuf.
» <i>Erucastrum varium</i> ssp. <i>mesatlanticum</i>	MA	Parc d'Ifrane	» <i>Linaria burceziana</i> Maire	DZ	Ghar-Rouban (W-Algeria)
» <i>Erysimum wilczekianum</i>	MA	Parc d'Ifrane	» <i>Linaria heterophylla</i> ssp. <i>galioides</i>	MA	Toubkal
» <i>Euphorbia mazicum</i>	MA	2	» <i>Linaria heterophylla</i> ssp. <i>gigantea</i>	MA	Toubkal
» <i>Fagonia malvana</i>	MA	Jbel Ayachi	» <i>Linum subasperifolium</i> (endém. locale)	MA	Parc Tazekka
» <i>Festuca humbertii</i>	MA	Parc Tazekka	» <i>Lotononis tapetiformis</i>	MA	3
» <i>Festuca maroccana</i>	MA	Toubkal	» <i>Marrubium fontianum</i>	MA	Parc Tazekka
» <i>Festuca maroccana</i> ssp. <i>pozzicola</i>	MA	Aghbar	» <i>Marrubium litardierei</i>	MA	Toubkal
» <i>Festuca sauvagei</i>	MA	Parc d'Ifrane	» <i>Micropyrum mamoraeum</i>	MA	Maamora
» <i>Filago evaciformis</i>	MA	Parc d'Ifrane	» <i>Minuartia mairei</i>	MA	Jbel Bou Naceur
» <i>Fumaria vaillantii</i> ssp. <i>schrammii</i> var. <i>pugsleyana</i>	MA	Parc Haut Atlas Oriental	» <i>Misopates chrysothales</i>	MA	Parc d'I Hoceima
» <i>Galium noli-tangere</i>	MA	2	» <i>Misopates font-queri</i>	MA	Tamga
» <i>Galium numidicum</i> Pomel	DZ	Chelia (NE-Algeria)	» <i>Narcissus cantabricus</i> ssp. <i>kesticus</i>	MA	Jbel Kest , Anezi, Imzi
» <i>Genista numidica</i> ssp. <i>sarotes</i> (Pomel) Batt.	DZ	Zaccar (NW-Algeria)	» <i>Narcissus romieuxii</i> ssp. <i>albidus</i>	MA	Parc d'Ifrane
» <i>Genista segonnei</i>	MA	Jbel Kest , Anezi, Imzi	» <i>Nasturtium microphyllum</i>	MA	Toubkal
» <i>Geranium cinereum</i>	MA	Aghbar			
» <i>Globularia liouvillei</i>	MA	5			

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»Nepeta barbara	MA	Parc Haut Atlas Oriental	»Scabiosa cartenniana Pons & Quével [= <i>Sixalix cartenniana</i> ]	DZ	Cap Ténès (NW-Alg).
»Odontites maroccanus	MA	2	»Scleranthus perennis ssp. atlanticus	MA	Toubkal
»Odontites viscosus ssp. eriopodus	MA, DZ	Parc d'Ifrane Algéro.marocains	»Scrophularia eriocalyx	MA	2
»Odontites vulgaris ssp. mesatlanticus	MA	Parc d'Ifrane	»Scrophularia ramosissima ssp. macrorrhyncha	MA	2
»Onobrychis pallasii var. ayachica	MA	Jbel Ayachi	»Sedum maurum	MA	Parc Tazekka
»Onopordon mesatlanticum	MA	3	»Senecio chalueau	MA	Jbel Ayachi
»Orchis patens var atlantica Desf. [= <i>O. spitzelii</i> ssp. teschneriana B. & H. Baumann]	DZ	Zaccar (Miliana), (NW-Algeria)	»Senecio maroccanus	MA	Toubkal
»Pancratium foetidum var. saldense	DZ	Gouraya national park (NE-Algeria)	»Serapias stenopetala (= <i>S. lingua</i> auct. p.p.)	DZ, TN	El Kala p. & wetlands; Beni M'tir wetlands
»Paronychia arabica	MA	Toubkal	»Silene barbarea	MA	Parc Tazekka
»Paronychia capitata ssp. atlantica	MA	Toubkal	»Silene dissecta	MA	Toubkal
»Paronychia velata	MA	Parc d'Ifrane	»Silene guinetii	MA	3
»Peucedanum officinale ssp. vogelianum	MA	Parc d'Ifrane	»Silene heterodonta ssp. platycalyx	MA	Jbel Bou Ibane
»Phagnalon latifolium	MA	2	»Silene secundiflora ssp. macrotheca	MA	Parc d'Ifrane
»Pistorinia attenuata ssp. mairei	MA	2	»Silene sessionis	DZ	Gouraya national park (NE-Algeria)
»Pitardia nepetoides	MA	Parc d'Ifrane	»Sonchus fragilis	MA	2
»Plantago rhizoxylon	MA	Jbel Mgoun	»Spergularia pycnorrhiza	DZ	Habibas islands (NW-Algeria)
»Plantago subulata ssp. atlantis	MA	Jbel Mgoun	»Stachys circinnata ssp. zaiana	MA	Parc Tazekka
»Polygala munbyana Boiss.	DZ	Djebel Chenoua	»Stachys fontqueri	MA	Jbel Bouhachem
»Potentilla alchemilloides ssp. atlantica	MA	Jbel Mgoun	»Stachys saxicola ssp. maweana	MA	Toubkal
»Potentilla guilliermondii	MA	2	»Taraxacum atlanticum	MA	Parc d'Ifrane
»Potentilla guilliermondii ssp. guilliermondii	MA	Jbel Mgoun	»Taraxacum atlantis-majoris	MA	2
»Prunus avium var. tazeckensis (endém. locale)	MA	Parc Tazekka	»Taraxacum humbertii	MA	3
»Ptilostemon pseudo-hispanicus	MA	Parc Tassemtane	»Taraxacum pycnodes	MA	Toubkal
»Pyrus communis ssp. gharbiana	MA	Parc d'Ifrane	»Teucrium barbarum	MA	Aghbar
»Pyrus communis ssp. mamorensis	MA	Maamora	»Teucrium gaattefossei	MA	Jbel Bou Naceur
»Ranunculus gerniifolius ssp. aurasiacus			»Teucrium grosii	MA	Parc d'I Hoceima
»var. mesatlanticus	MA	Jbel Ayachi	»Teucrium schoenenbergeri Nabli	TN	Est du Jbel Ichkeul
»Ranunculus mgounicus	MA	Jbel Mgoun	»Thymelaea putorioides	MA	Jbel Mgoun
»Ranunculus spicatus ssp. fontqueri	MA	3	»Thymus serpyllum ssp. ayachicus	MA	3
»Reseda alba ssp. trigyna	MA	Parc d'Ifrane	»Thymus serpyllum var. atlanticum	MA	Jbel Tichoukt
»Rhodanthemum briquetii	MA	Tamga	»Trifolium gibbosum	MA	2
»Rhodanthemum laouense	MA	Jbel Bouhachem	»Trifolium miegeanum	MA	Parc d'Ifrane
»Romulea vaillantii	MA, DZ	Parc d'Ifrane Alg. Marocains.	»Trifolium pratensis var. mesatlanticum	MA	Parc d'Ifrane
»Roripella atlantica	MA	Toubkal, Aghbar	»Vicia glauca var. ayachica	MA	2
»Rosa mesatlantica	MA	Parc d'Ifrane	»Vicia onobrychioides ssp. alborosea	MA	Parc d'Ifrane
»Rosmarinus eriocalyx Jordan & Fourr.= <i>R. officinalis</i> L. var. troglodytorum	TN	Massif des Matmata	»Vulpia geniculata ssp. pauana	MA	2
»Rumex tunetanus Barr. et Murb.	TN	Garâa Sejenane			
»Sagina saginoides ssp. nevadensis	MA	Toubkal	<b>Site Restricted Species in North Africa : Magreb + other North African countries and Libya and/or Egypt</b>		
»Salvia interrupta ssp. paui	MA	Jbel Bouhachem	»Allium crameri Asch. & Boiss.	EG	Rare St. Katherine
»Salvia taraxacifolia	MA	Toubkal	»Anarrhinum pubescens Fresen.	EG	Endangered Saint Katherine
»Sarcocapnos crassifolia ssp. atlantis	MA	Jbel Mgoun	»Astragalus fresenii Decne.	EG	End. St. Katherine
»Saxifraga globulifera var. Integrifolia			»Ballota kaiseri Täckh.	EG	End. St. Katherine
»Pons & Quével	DZ	Cap Ténès (NW-Alg.)	»Bufonia multiceps Decne.	EG	End. St. Katherine
»Saxifraga luizetiana	MA	Jbel Bou Naceur	»Colchicum cornigerum (Schweinf. Ex Sickenb.)		
»Saxifraga maireana	MA	Toubkal			
»Saxifraga tricrenata	MA	Parc Tassemtane			



◀ Landscape with Stone pine forest (or Umbrella pine, or European nut pine), *Pinus pinea*. With the clearing away of forests in Lebanon in recent years only 5% of the original forest cover remains. Although protection measures such as the creation of the Al-Shouf Cedars Reserve have been undertaken, the woodlands of Central Mount-Lebanon are threatened by overgrazing, unregulated tourism, and a high occurrence of forest fires. Lebanon

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»Täckh. & Drar	EG	End. St. Katherine	»Veronica kaiseri Täckh.	EG	Probably extinct Saint Katherine
»Euphorbia obovata Decne.	EG	Rare St. Katherine	»Vicia sinaica Boulos	EG	Indeterminate Saint Katherine
»Grimmia anodon Bruch & Schimp. var. sinaica Renauld & Cardot	EG	Endemic mosses Saint Katherine	»Sinapis allionii Jacq.	EG	Endangered Lake Burullus, Lake Mariut
»Hyoscyamus boveanus (Dunal) Asch. & Schweinf	EG	Saint Katherine	»Solanum nigrum var. elbaensis Täckh. & Boulo	EG	Probably extinct Halayeb Triangle
»Lupinus digitatus Forssk	EG	End. Wadi Allaqi	»Sonchus macrocarpus Boulos & C. Jeffrey	EG	Rare Lake Burullus
»Micromeria serbaliana Danin & Hedge	EG	End. St. Katherine	»Bupleurum nanum Poir.	EG, LY	Omayed
»Muscari salah-eidii (Täckh. & Boulos) Hosni	EG	Probably extinct Saint Katherine	»Verbascum letourneuxii Asch. & Schweinf.	LY, EG	Gabel Akhdar and Egypt
»Najas pectinata (Parl.) Magn.	EG	Saint Katherine			
»Origanum syriacum ssp. sinaicum (Boiss.) Greuter & Burdet	EG	Rare St. Katherine			
»Phagnalon nitidum Fresen	EG	Rare St. Katherine			
»Plantago sinaica (Barn.) Decne.	EG	Rare St. Katherine			
»Polygala sinaica var. sinaica Botsch.	EG	Rare St. Katherine			
»Primula boveana Decne. ex Duby	EG	End. St. Katherine			
»Pterocephalus arabicus Boiss.	EG	End. St. Katherine			
»Rorippa integrifolia Boulos	EG	End. St. Katherine			
»Rosa arabica Crép.	EG	End. St. Katherine			
»Scorzonera drarii Täckh	EG	Probably extinct Saint Katherine			
»Silene leucophylla Boiss.	EG	End. St. Katherine			
»Silene odontopetala Fenzl	EG	Saint Katherine			
»Silene oreosinaica Chowdhuri	EG	End. St. Katherine			
»Silene schimperiana Boiss.	EG	End. St. Katherine			
»Tortula kneuckeri Broth. & Geh.	EG	Endemic moss Saint Katherine			

#### Site Restricted Species in East Mediterranean/ Levant

»Acantholimon damassanum - Mobayen	SY	Anti-Lebanon
»Aethionema oppositifolium (Lab.) Boiss.	LB	
»Aethionema stylosum D.C.	LB	
»Agropyron libanoticum Hack.	LB	
»Ajuga chasmophila - Davis	SY	Lower Anti-Lebanon
»Alchemilla diademata Rothm.	LB	W. slopes. Mt. Lebanon 1000-1500m
»Alkanna leiocarpa Rech. fil.	LB	Kesrouan Mtns, 1000-1500m
»Alkanna prasinophylla Rech. fil.	LB	High Lebanon Mtns 1500-2000m (Afqa to Berqacha)

Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs	Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs
» <i>Allium chloranthum</i> Boiss. var <i>montanum</i> Mout.	LB	W. slopes. Mt. Lebanon 1400-2000m	» <i>Astragalus pabotii</i> - Mouët.	SY	Lower Anti-Lebanon (Qtayfeh), 1
» <i>Allium damascenum</i> - Feinbr.	SY	Golan	» <i>Astragalus qatmensis</i> - Thiéb.	SY	Kurd Dag (Qatma), 1
» <i>Allium davisii</i>	PN	Yaseed-Ibzeik	» <i>Astragalus selemiensis</i> - Mout	SY	Salamiye-Al Bil'as, 1
» <i>Allium drusorum</i> - Feinbr.	SY	Jabal al Arab	» <i>Astragalus sofarensis</i> Thiébaud	LB	W. slopes. Mt. Lebanon 1500-2000m
» <i>Allium feinbergii</i> Oppenheimer	LB		» <i>Astragalus trifoliolatus</i> Boiss	LB	E. slopes, Béqaa to Baalbeck, steppic reg.
» <i>Allium kollmannianum</i> Brullo, Pavone & Salmeri	IL		» <i>Atriplex zahlensis</i> Mout.	LB	
» <i>Allium negevense</i> Kollm.	IL		» <i>Ballota seamanica</i> - Rech. fil.	SY	Jabal Semane & Kurd Dag, 1
» <i>Allium opacum</i> - Rech.	SY	Jabal Wastani & Jabal Semane	» <i>Bellevalia douini</i> - Pabot et Mouterde	SY	Qassiun, 1
» <i>Allium pseudophaneranthum</i> -Rech. fil	SY	Lower Anti-Lebanon (Qaryatein)	» <i>Biarum pyrami</i>	PN	2
» <i>Allium qasunense</i> Moutrede.	PN	Faqoua`-Jalaboun	» <i>Brassica assyriaca</i> -Mt	SY	Jabal Abdul Aziz, 1
» <i>Allium rupicolum</i> Boiss ined.	LB		» <i>Bryonia lasiocarpa</i> - Mouterde	SY	Jabal Al-Arab, 1
» <i>Allium sannineum</i> Gombault	LB	W. slopes. Mt. Lebanon 1400-2000m	» <i>Bufonia ramonensis</i> Danin	IL	
» <i>Allium tardiflorum</i> Kollm. & Shmida	IL		» <i>Calamentha incana</i>	PN	2
» <i>Alyssum ssp. inosum</i> -Dudley	SY	Anti-Lebanon (Maalula)	» <i>Carex distans</i> L.	PN	2
» <i>Anemone coronaria</i> - L. var. <i>alba</i> Goaty & Pons	SY	Qassiun	» <i>Carum polyphyllum</i> - Boiss. et Bl.	SY	Homs
» <i>Anthemis brachycarpa</i> Eig	IL		» <i>Centaurea heterocarpa</i> Boiss. et Gaill. ex Boiss.	LB	Sud
» <i>Anthemis didymaea</i> Mouterde	LB	W. slopes. Mt. Lebanon 1500-2000m	» <i>Centaurea mouterdei</i> Wagenitz.	LB	W. slopes. Mt. Lebanon 300-1400m Beqaa, & S. of Rayak.
» <i>Arenaria libanotica</i> Ky	LB	W. slopes. Mt. Lebanon 1500-2000m	» <i>Centaurea reducta</i> - Wagenitz.	SY	Homs, 2
» <i>Asperula libanotica</i> Boiss.	LB		» <i>Centaurea simulans</i> - Wagenitz.	SY	Coastal Mt (Slenfeh), 1.
» <i>Asphodeline brevicaulis</i> (Bertol.) ssp. <i>druzorum</i> Zohary	SY	Jabal al Arab (Kafer-Salkhad), 1	» <i>Centaurea trachonitica</i> - Post	SY	Lajat, 1
» <i>Astragalus angulosus</i> D.C.	LB	W. slopes. Mt. Lebanon 1500-2000m	» <i>Cephalaria cedrorum</i> Mouterde	LB	W. slopes. Mt. Lebanon 1500-2000m
» <i>Astragalus antilibani</i> - Bge	SY	Anti-Lebanon & Al Bil'as, 2	» <i>Cephalaria kesruanica</i> Mouterde	LB	W. slopes. Mt. Lebanon 1500-2000m
» <i>Astragalus cedreti</i> Boiss	LB		» <i>Ceratophyllum demersum</i>	PN	Wad Esha'ir-Wad Qana
» <i>Astragalus darmikii</i> -Mout	SY	Kurd Dag (Kutchuk Darmik), 1	» <i>Chaerophyllum aurantiacum</i> Post	LB	W. slopes. Mt. Lebanon 1500-2000m
» <i>Astragalus ehdenensis</i> Mout.	LB	W. slopes. Mt. Lebanon 1500-2000m	» <i>Cicer bijugum</i> -Rech. fil.	SY	Kurd Dag, 1
» <i>Astragalus eriophylloides</i> - Rech. fil.	SY	Coastal Mts (Slenfeh), 1.	» <i>Cicer incisum</i> (Willd.) K. Maly. var.		
» <i>Astragalus exiguus</i> - Post	SY	Sum. of Anti-Lebanon (Tal'at Musa), 1	» <i>libanoticum</i> (Boiss.) Mout	LB	W. slopes. Mt. Lebanon 1500-2000m
» <i>Astragalus faktorovskyi</i> -Eig.	SY	Low. Anti-Lebanon, 1	» <i>Colchicum libanoticum</i> Ehr.	LB	W. slopes. Mt. Lebanon 1500-2000m
» <i>Astragalus griseo-sericeus</i> - Eig	SY	Jabal Wastani & Jabal Az-Zawiyah, 1	» <i>Consolida incana</i> (E.D. Clarke) Munz	PN	2
» <i>Astragalus kurnet-es-Saudae</i> Eig.	LB	High regions of Mt Lebanon ab. 1500m	» <i>Convolvulus coelsyriacus</i> Boiss.	PN	Wad Esha'ir- Wad Qana
» <i>Astragalus lanatus</i> Labill	LB	100-2000m on Mt Lebanon and Mt Hermon	» <i>Convolvulus tricolor</i> L.	PN	Faqoua`-Jalaboun
» <i>Astragalus lepidanthus</i> Boiss.	LB		» <i>Corydalis solida</i> (L.) Swartz		
» <i>Astragalus louisii</i> -Thiébaud	SY	Kurd Dag (Qatma), 1	»var. <i>brachyloba</i> Boiss.	LB	
			» <i>Corynephorus deschampsiioides</i> Bornm.	LB	
			» <i>Cousinia libanotica</i> D.C.	LB	W. slopes. Mt. Lebanon 500-2000m
			» <i>Crocus aleppicus</i> ssp. "litoral"	IL	
			» <i>Crocus cancellatus</i> var. <i>Hermoneus</i> - Herbert	SY, LB	Hermon

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»Crocus damascenus ssp.nov. not yet desc.	IL		»Kitaibelia balansae - Boiss.	SY	Amanus-Coastal Mts, 1.
»Cyclamen libanoticum Hildebr	LB	Mountains of Kesrouan	»Lathyrus lentiformis Plitm.	IL	
»Cytisus cassius -Boiss.	SY	Bassit, 1	»Leontodon libanoticus Boiss.	LB	W. slopes. Mt.Lebanon 1500m
»Cytisus syriacus Boiss. et Bl.	LB		»Limodorum abortivum (L.)Sw.	PN	Yaseed-Ibzeik
»Daucus aleppicus - Thiéb.	SY	Aleppo	»Linum carnosulum Boiss.	LB	W. slopes. Mt.Lebanon above 1500m
»Delphinium ithaburanse Bioss.	PN	Faqoua`-Jalaboun	»Linum chaborasicum -Mout	SY	Jabal Abdul-Aziz, 1
»Dianthus karami Bl	LB		»Linum toxicum -Boiss.	SY, LB	Hermon summit
»Dorycnium anatolicum Boiss. var. libanoticum (Boiss.) Mout.	LB		»Lycochloa avenacea Sam.	LB	
»Echium pabotii - Mout.	SY	Upper Jezira, 1	»Marrubium hierapolitanum - Moût.	SY	Aleppo (Manbij)
»Erigeron libanoticus Vierh.	LB	W. slopes. Mt.Lebanon 1500m	»Marrubium libanoticum Boiss.,	LB	
»Erophila gilgiana (Muschler) O.E. Scheltz	LB	W. slopes. Mt.Lebanon 1000-2000m	»Matthiola crassifolia Boiss. Et Gaill.	LB	Littoral coast coast up to 2000m
»Erysimum libanoticum Post	LB	W. slopes. Mt.Lebanon above 1500m	»Melissa inodora Bornm.	LB	W. slopes. Mt.Lebanon 1500-2000m
»Erysimum verrucosum Boiss. et Gaill.	LB	Pente de l'Hermon	»Micromenia nummularifolia Boiss	LB	
»Euphorbia petiolata Banks et Sol.	PN	Wad Esha`ir- Wad Qana	»Minuartia libanotica	LB	
»Ferula armandii - Moût.	SY	Jabal Al-Arab, 1	»Myopordon pulchellurn (Winkler et Barbey) Wagenitz	LB	W. slopes. Mt.Lebanon above 2000m
»Ferula hermonis - Boiss.	SY, LB	Hermon	»Nepeta pabotii - Moût.	SY, LB	Anti-Lebanon, 1
»Ferula meironensis sp. nov.	IL		»Odontites lutea (L.) Clairv. var. hispidula Boiss	LB	W. slopes. Mt.Lebanon 300-1400m
»Galium pestalozzae Boiss.	LB	W. slopes. Mt.Lebanon 300-2000m	»Ononis ornithopodioides L.	PN	2
»Galium thiebautii Ehrendorfer	LB	Coast 1500m, Mt Leb. Béqaa, S Rayak & Anti Leb.	»Ononis serrata Forsk	PN	Wad Elbalat, Um Safa, Beit Illo
»Geranium libanoticum Schenk	LB		»Origanum bargyli - Moût.	SY	Berghal-Slenfeh, 1
»Gypsophila mollis (Boiss.) Bornm	LB		»Origanum ehrenbergii Boiss.	LB	coast up to 2000m
»Halimium umbellatum (L.) Spach., var. syriacum (Boiss.) Wilk	LB	W. slopes. Mt.Lebanon 800-2000m	»Origanum ehrenbergii Boiss.		
»Heleochloa acutiglumis Boiss.	LB		»X Origanum syriacum L.	LB	coast up to 150000m
»Helianthemum syriacum (Jacq.) Dum.-courset	PN	Wad Esha`ir- Wad Qana	»Origanum libanoticum Boiss	LB	W. slopes. Mt.Lebanon 300-2000m
»Helianthemum vesicarium Boiss	PN	Yaseed-Ibzeik	»Origanum ramonense Danin	IL	
»Helichrysum virgineum D.C.	LB	Localised 1000 2000m. Mtns of N. Lebanon.	»Ornithogalum libanoticum Boiss et Bal	LB	W. slopes. Mt.Lebanon 1400-2000m
»Hormuzakia negevensis (Danin) Danin & Hilger	IL		»Ornithogalum nutans sp.nova	IL	Israel
»Iris antilibanotica - Dinsm.	SY	Anti-Lebanon (Bloudane), 1	»Orobanche palaestina Reuter.	PN	Yaseed-Ibzeik
»Iris auranitica- Dinsmore	SY	Jabal Al-Arab (Kafer- Mayamas), 1	»Orobanche astragali Mout.	LB	W. slopes. Mt.Lebanon 1800m
»Iris basaltica -Dinsmore	SY	West Homs, 1	»Orobanche hermonis Mouterde	LB	Sommet de l'Hermon
»Iris calcarea- Dinms in sched.	SY	Kurd Dag- Wastani, 2	»Orobanche scultzii	PN	Yaseed-Ibzeik
»Iris cedreti Dinsm.	LB		»Papaver umbonatum Boiss. Diagn	LB	
»Iris damascena - Mt	SY	Qassiun, 1	»Pentapera sicula (Guss.) Klotzsch var. libanotica C et W	LB	W. slopes. Mt.Lebanon 500-2000m
»Iris sofarana Foster f. kasruwana (Dinsm.) Mout.	LB	Kesrouan Mtns 1400-2000m.	»Phyllitis sagitata	PN	Yaseed-Ibzeik
»Iris yebrudi -Dinsm.	SY	Anti-Lebanon Mts (Yebrud), 1.	»Pilgerochloa blanchei (Boiss.) Eig	LB	
			»Polygonum senegalense Meissner	PN	Wad Esha`ir-Wad Qana
			»Potentilla geranioides syriaca	LB	
			»Prangos deserti - Post et Beauv.	SY	Bilas-Shair, 2
			»Ptilosteman diacantha (Labill.) Greuter	LB	
			»Puschkinia scilloides Adams var. libanotica	LB	W. slopes. Mt.Lebanon 1800m



▶ Atlantic cedar (*Cedrus atlantica*) forest. Atlantic cedar is native to the Atlas Mountains of Morocco and Algeria in northern Africa  
Middle Atlas, Morocco

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Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs	Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs
»Ranunculus ficaria L.	PN	Wad Elbalat, Um Safa, Beit Illo	»Senecio delbesianus - Arènes	SY	Upper Jezira, 1
»Ranunculus orbiculatus Blanche	LB		»Senecio exilis Blanche ex Boiss.	LB	W. slopes. Mt. Lebanon above 2000m
»Ranunculus schweinfurthii Boiss	LB		»Serapias vomeracea Briq	PN	Wad Elbalat, Um Safa, Beit Illo
»Rhamnus alaternus L.	PN	Yaseed-Ibzeik	»Silene conoidea L.	LB	
»Rhododendron ponticum L.			»Silene damascena Boiss. et Gaill.	LB	
»var. brachycarpum Boiss.	LB	W. slopes. Mt. Lebanon 800-2000m	»Silene physalodes - Boiss.	SY	Golan, 1
»Romulea nivalis - Boiss et Ky	SY, LB	Lebanon Anti-Lebanon, 1	»Silene reuteriana Boiss	LB	
»Rorippa macrocarpa (Boiss.) Mout	LB	W. slopes. Mt. Lebanon 500-1500m	»Silene schlumbergeri -Boiss.	SY	Anti-Lebanon, 1
»Rosularia kesrouanensis Mout.	LB		»Spartium junceum L	PN	Wad Elbalat, Um Safa, Beit Illo
»Rosularia parvifolia - Frod. et Sam.	SY	Hermon, 1	»Stachys palaestina	PN	Yaseed-Ibzeik
»Rumex angustifolius Campd ssp. libanoticus Rech f	LB		»Stachys ehrenbergii boiss	LB	W. slopes. Mt. Lebanon 1500m
»Rumex rothschildianum Aarons.	IL		»Stachys hydrophila Boiss.	LB	coast to 2000m
»Salsola zenobiae - Mout	SY	Palmyra, 1	»Stachys petrokosmos - Rech. fil.	SY	Amanus (Kassab), 1
»Salvia drusica - Moût.	SY	Jabal Al Arab, 1	»Stellaria cilicica Boiss. et Bal ssp. neglecta	LB	
»Salvia nazalena - Hedge et Mouterde	SY	Lower Anti-Leb. (Qaryatein), 1	»Tanacetum yabrudae -		
»Saponaria bargyliana - Gombault	SY	Slenfeh, 1	»Charpin et Dittrich (Moût)	SY	Lower Anti-Lebanon (Yabrud-Maalula), 1
»Scandix blepharicarpa O. Cohen	IL		»Teucrium antilibanoticum - Moût.	SY	Anti-Lebanon (Tal'at Musa), 1
»Scandix damascena - Bornm.	SY	Qassiun, 1	»Teucrium coniertodes - Boiss. et Bl.	SY	Abu-Rujmain (Jabal Abiad), 1
»Scariola triquetra (Labill.) Sojak	LB	W. slopes. Mt. Lebanon 0-2000m	»Teucrium heterotrichum - Briq. Ex Rech. fil.	SY	Coastal Mts (Bhamra), 1.
»Scorzonera libanotica Boiss.	LB		»Teucrium lamiifolium	PN	Wad Elbalat Um Safa, Beit Illo
»Sedum palaestinum	PN	Yaseed-Ibzeik	»Teucrium montbretii	PN	Yaseed-Ibzeik
»Sedum litoreum Guss.	PN	Yaseed-Ibzeik			
»Sedum louisii -Frôd	SY	Qassiun, Palmyra, 1			



Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs
» <i>Teucrium montbretii</i> Benth.	LB	
» <i>Thesium libanoticum</i> Ehrenb.	LB	W. slopes. Mt. Lebanon 1400m
» <i>Thymus alfredae</i> - Post	SY	Anti-Lebanon (Rankouss, Maalula), 1
» <i>Trifolium sannineum</i> Mout.	LB	
» <i>Trifolium bonnevillei</i> - Moût	SY	Jabal Al-Arab (Qanawat) Lajat (Shahba), 2
» <i>Tulipa lownei</i> Baker	LB	
» <i>Tulipa aucheriana</i> Baker ssp. <i>westii</i> ssp. Nova	LB	
» <i>Valerianella antilibanotica</i> - Rech. f.	SY	Anti-Lebanon (Zabadani), 1
» <i>Valerianella soyeri</i> - Buchinger in Boiss.	SY	Wadi al Qarn, 1
» <i>Veronica caespitosa</i> Boiss. subsp. <i>leiophylla</i> (Boiss) M.A. Fisher	LB	W. slopes. Mt. Lebanon above 2000m
» <i>Vicia basaltica</i> Plitman	IL	
» <i>Vicia canescens</i> Labill.	LB	W. slopes. Mt. Lebanon above 2000m
» <i>Vicia esdraelonensis</i> Warb. & Eig	IL	
» <i>Vicia qatmensis</i> - Gomb.	SY	Kurd Dag (Qatma), 1
» <i>Viola libanotica</i> Boiss.	LB	W. slopes. Mt. Lebanon 1500m
» <i>Ziziphora 'Abd-el-Asisii</i> - Hand.-Mazz.	SY	Jabal Abdul Aziz, 1
» <i>Acantholimon antilibanoticum</i> - Moût.	SY, LB	Anti-Lebanon
» <i>Anchonium billardieri</i> -D.C.	SY, LB	Anti-Lebanon Lebanon Mts.
» <i>Astragalus gaillardotii</i> - Boiss	SY, LB	Hermon
» <i>Astragalus hirsutissimus</i> - D.C.	SY, LB	High Levant Mts.
» <i>Bellevalia hermonis</i> - mt	SY, LB	Hermon. Anti-Lebanon
» <i>Convolvulus libanoticus</i> - Boiss.	SY, LB	Anti-Lebanon Lebanon Mts.
» <i>Gypsophila frankenioides</i> Boiss.		
» <i>Var libanotica</i> Boiss.	SY, LB	Anti-Lebanon Lebanon Mts.
» <i>Iris lortetii</i> W. Barbey	PN, IL	
» <i>Johrenia westii</i> - Post	SY, LB	Upper Orontes valley
» <i>Micromeria libanotica</i> - Boiss.	SY, LB	Anti-Lebanon Lebanon Mts.
» <i>Minuartia innominata</i> -McNeill	SY, LB	Anti-Lebanon Lebanon Mts.
» <i>Minuartia labillardieri</i> - Briquet	SY, LB	Hermon Lebanon Mts.
» <i>Plantago maris-mortui</i> Eig	IL,JO,PN	
» <i>Silene astartes</i> - Blanche	SY, LB	Hermon Lebanon Mts.
» <i>Silene grisea</i> Boiss.	IL, LB, PN	
» <i>Silene oxydonta</i> Barbey	IL, JO, PN	
» <i>Sison exaltatum</i> Boiss.	IL, LB,	
» <i>Thlaspi brevicaulis</i> - Boiss. et Ky	SY, LB	Anti-Lebanon Lebanon Mts.

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Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs
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**Site Restricted Species in East Mediterranean/ Levant+ Egypt**»*Biarum olivieri* Blume EG, PN**Site Restricted Species in East Mediterranean/ Syria+Turkey**

»*Allium calyptratum* - Boiss. SY, TR Amanus  
 »*Allium cassium* - Boiss. SY, TR Summits of  
 Coastal Mts.  
 »*Convolvulus cassius* - Sam. ex Rech. fil. SY, TR? Amanus, 1  
 »*Ferulago amani* - Post SY, TR Kaipok-Dag loc.

**Site Restricted Species with disjunct distributions**»*Silene bocconeii* ssp. *praecox* DZ, IT, FR Edough Peninsula,  
Sardinia, Corsica

Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs	Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs
<b>Part 2: RESTRICTED RANGE SPECIES: Extent of occurrence &lt;5,000km<sup>2</sup> Restricted range species in North Africa/Magreb</b>					
» <i>Abies maroccana</i>	MA	Parc Tassemtane	» <i>Bunium elatum</i> Batt.	DZ	Bibans + Djebel Dréat
» <i>Adenocarpus anagyriifolius</i>	MA	4	» <i>Bupleurum album</i>	MA	4
» <i>Adenocarpus bacquei</i>	MA	Parc Haut Atlas Oriental	» <i>Bupleurum atlanticum</i>	MA, DZ	Parc National du Haut Atlas Oriental
» <i>Aethionema saxatile</i>	MA	Parc d'Ifrane	» <i>Bupleurum atlanticum</i> ssp. <i>aiouense</i>	MA	Jbel Mgoun
» <i>Agropyrum festucoides</i>	MA	3	» <i>Bupleurum atlanticum</i> ssp. <i>atlanticum</i>	MA	Jbel Kest ,Anezi,Imzi
» <i>Agryrolobium zanonii</i> ssp. <i>fallax</i>	MA	Parc d'Ifrane	» <i>Bupleurum benoistii</i>	MA	3
» <i>Ammochloa involuocrata</i>	MA	Maamora	» <i>Bupleurum dumosum</i>	MA	2
» <i>Anabasis prostrata</i>	MA, DZ	Beni Snassen, Parc National d'Al Hoceima	» <i>Bupleurum lateriflorum</i>	MA	3
» <i>Anacyclus atlanticus</i>	MA	2	» <i>Campanula camptoclada</i> Boiss.	IL, LB	Israel, Lebanon
» <i>Anacyclus maroccanus</i>	MA	Toubkal	» <i>Campanula mairei</i>	MA	3
» <i>Anchusa pseudogranatensis</i>	MA	Parc d'Ifrane	» <i>Campanula saxifragoides</i>	MA, DZ	Parc d'Ifrane Algéro. marocains
» <i>Andrachne maroccana</i>	MA	Tamga	» <i>Campanula velata</i> ssp. <i>velata</i>	MA, DZ	Ghar-Rouban area/ orient. Tlemcen mtns
» <i>Anthemis chrysantha</i>	DZ	Habibas islands, Cap Falcon (NW-Algeria)	» <i>Carduncellus atractyloides</i>	MA, DZ	H.A.Oriental, Bou-Naceur, Ayachi, Bou Iblane, Maasker
» <i>Anthriscus sylvestris</i> ssp. <i>mollis</i>	MA, DZ	Parc d'Ifrane	» <i>Carduncellus pinnatus</i> ssp. <i>lucens</i>	MA	Toubkal
» <i>Anthyllis barba-jovis</i> L.	TN, DZ		» <i>Carduncellus pomelianus</i>	MA, DZ	Parc d'Ifrane Algéro. marocains
» <i>Anthyllis vulneraria</i> ssp. <i>rifana</i>	MA	Parc d'Ifrane, Parc Tazekka	» <i>Carduus ballii</i> .	MA	3
» <i>Aquilegia vulgaris</i> ssp. <i>ballii</i>	MA	Toubkal	» <i>Carthamus carthamoides</i>	MA, DZ	Ghar-Rouban area/ orient. Tlemcen mtns
» <i>Arabis coringioides</i>	MA	2	» <i>Catananche caespitose</i> Desf.	MA, DZ	Tlemcen, Bossuet, Atlas saharien
» <i>Arabis hirsuta</i> ssp. <i>tunetana</i> (Murb.) Maire	TN	Dorsale tunisienne	» <i>Catananche montana</i> Coss.	MA, DZ	Djurdjura, Babor, Constantine, Atlas saharien
» <i>Arabis josiae</i>	MA	2	» <i>Centaurea acaulis</i> ssp. <i>Boissieri</i>	MA, DZ	Parc d'Ifrane Algéro. marocains
» <i>Arabis pubescens</i> ssp. <i>decumbens</i>	MA	2	» <i>Centaurea benoistii</i>	MA	2
» <i>Arenaria grandiflora</i> ssp. <i>grandiflora</i>	MA	3	» <i>Centaurea gueryi</i>	MA	Parc Haut Atlas Oriental
» <i>Arenaria mairei</i>	MA	Jbel Mgoun	» <i>Centaurea josiae</i>	MA	3
» <i>Arenaria pungens</i> ssp. <i>boissieri</i>	MA	2	» <i>Centaurea nana</i>	MA, DZ	Parc National d'Ifrane
» <i>Argania spinosa</i>	MA	Jbel Kest ,Anezi,Imzi	» <i>Centaurea riaeana</i>	MA, DZ	Parc d'Ifrane Algéro. marocains
» <i>Argyrocystis battandieri</i>	MA	2	» <i>Centaurea takredensis</i>	MA	Jbel Mgoun
» <i>Argyrolobium zanonii</i> ssp. <i>fallax</i>	MA	Jbel Kest ,Anezi,Imzi	» <i>Centaureum erythraea</i> ssp. <i>apertum</i>	MA, DZ	Parc d'Ifrane Algéro. marocains
» <i>Armeria ebracteata</i>	MA, DZ	Algéro.marocains	» <i>Centranthus angustifolia</i> ssp. <i>maroccanus</i>	MA	Toubkal
» <i>Artemisia alba</i> ssp. <i>chitachensis</i>	MA	2	» <i>Centranthus lecoqii</i> ssp. <i>maroccanus</i>	MA	Jbel Bou Naceur
» <i>Artemisia negrei</i>	MA	4	» <i>Centranthus nevadensis</i> ssp. <i>battandieri</i>	MA, DZ	Ghar-Rouban area/ orient. Tlemcen mtns
» <i>Asphodelus ayardii</i>	MA	2	» <i>Cephalaria mauritanica</i> ssp. <i>eu-mauritanica</i> Maire	MA, DZ, TN	Zaccar, Djurdjura, Akfadou (N-Algeria)
» <i>Asphodelus gracilis</i>	MA	Maamora	» <i>Cephalaria mauritanica</i> ssp. <i>maroccana</i>	MA	Parc d'Ifrane
» <i>Astragalus ibrahimianus</i>	MA	5	» <i>Cerastium atlanticum</i> Durieu	MA, DZ, TN	maghrébine
» <i>Avenula jahandiezii</i>	MA	4	» <i>Ceratocnemum rapistroides</i>	MA	Parc d'Ifrane
» <i>Bellis caerulea</i> ssp. <i>caerulea</i>	MA	8	» <i>Chaerophyllum atlanticum</i>	MA	2
» <i>Bellis prostrata</i> Pomel	TN, DZ		» <i>Chamaemelum scariosum</i>	MA	Tamga
» <i>Borago trabutii</i>	MA	3			
» <i>Brachypodium involuocratum</i>	MA	Toubkal			
» <i>Brassica fruticulosa</i> ssp., <i>mauritanica</i>	MA, DZ	Beni Snassen			
» <i>Brassica repanda</i> ssp. <i>silenifolia</i>	MA	2			
» <i>Bunium alpinum</i> ssp. <i>atlanticum</i>	MA	2			
» <i>Bunium chaberti</i> Batt.	DZ	Djurdjura national park (N-Algeria)			
» <i>Bunium crassifolium</i> (Batt.) Batt.	DZ, TN	Edough peninsula, Jbel Korbous			

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» <i>Cirsium chrysacanthum</i>	MA	5	» <i>Eryngium argyreum</i>	MA	Maamora
» <i>Cirsium dyris</i>	MA	5	» <i>Eryngium atlanticum</i>	MA	Maamora
» <i>Cistus munbyi</i>	MA, DZ	Beni Snassen	» <i>Eryngium maroccanum</i>	MA	Parc d'Ifrane
» <i>Convolvulus gharbensis</i>	MA	Maamora	» <i>Eryngium tricuspdatum</i> ssp., mauritanicum	MA, DZ	Beni Snassen
» <i>Convolvulus mazicum</i>	MA	6	» <i>Eryngium triquetrum</i> ssp. xauense	MA	Parc Tazekka
» <i>Convolvulus pitardii</i>	MA	2	» <i>Eryngium varrifolium</i>	MA	2
» <i>Coris monspeliensis</i> var. maroccana	MA	Jbel Ayachi	» <i>Euphorbia mesatlantica</i>	MA	10
» <i>Coronilla viminalis</i>	MA	2	» <i>Euphorbia resinifera</i>	MA	2
» <i>Crepis hookeriana</i>	MA	4	» <i>Euphorbia rimarum</i>	MA	Parc d'Ifrane
» <i>Crocus nevadensis</i>	MA, DZ	Parc d'Ifrane Algéro. marocains	» <i>Evax crocidion</i>	MA, DZ	Algéro.marocains
» <i>Crocus nevadensis</i>	MA	Toubkal	» <i>Evonymus latifolius</i> var. kabylica	MA, DZ	Parc d'Ifrane Algéro. marocains
» <i>Crocus serotinus</i> ssp. salzmanii	MA	Parc d'Ifrane	» <i>Fedia pallescens</i> ssp. hirsuta	MA	4
» <i>Cupressus atlantica</i>	MA	Aghbar	» <i>Feeria angustifolia</i>	MA	2
» <i>Cyclamen repandum</i> ssp. atlanticum Maire (= var. baborense)	MA, DZ	Babor mountains, Taza national park (NE-Algeria)	» <i>Festuca atlantica</i> ssp. oxyphylla	MA	2
» <i>Cynara baetica</i> ssp. maroccana	MA	2	» <i>Festuca demnatisensis</i>	MA	Parc d'Ifrane
» <i>Cynoglossum pitardianum</i>	MA	Parc d'Ifrane	» <i>Festuca fontqueri</i>	MA	5
» <i>Cynoglossum watieri</i>	MA	3	» <i>Festuca mairei</i>	MA	Toubkal
» <i>Cytisopsis ahmedii</i>	MA	Jbel Krouz	» <i>Festuca rifana</i>	MA	Parc Tassemtane
» <i>Cytisus arboreus</i> ssp. arboreus	MA, DZ	Beni Snassen	» <i>Filago duriaei</i>	MA, DZ	Algéro-Ibéro Marocains
» <i>Cytisus maurus</i>	MA	Parc Tazekka	» <i>Fumaria berberica</i>	MA	Parc d'Ifrane
» <i>Daucus tenuisectus</i>	MA	Parc d'Ifrane	» <i>Fumaria macrosepala</i> ssp. obscura	MA	Parc Tazekka
» <i>Dianthus rupicola</i> Biv. ssp. hermaeensis (Coss.) O. Bolòs & Vigo	TN	Jebel El Haouaria et Ile de Zembra	» <i>Fumaria pugsleyana</i>	MA	Toubkal
» <i>Digitalis atlantica</i>	DZ	Babor moutains, Taza national park	» <i>Galium acuminatum</i>	MA	Toubkal
» <i>Digitalis lutea</i> ssp. transiens	MA	Parc Haut Atlas Oriental, Jbel Mgoun	» <i>Galium bourgaeum</i>	MA, DZ	Ghar-Rouban area Morocco.
» <i>Draba hederifolia</i>	MA	2	» <i>Galium bourgeum</i> ssp. maroccanum	MA	Parc d'Ifrane
» <i>Draba hederifolia</i> ssp. hederifolia	MA	Toubkal	» <i>Galium brunnaeum</i> Munby	MA, DZ, TN	Béjaia, Chenoua, Tlemcen (N-Algeria)
» <i>Draba hederifolia</i> ssp. cossoniana	MA	4	» <i>Galium viscosum</i> ssp. rivanum	MA	Parc Tassemtane
» <i>Draba oreadam</i>	MA	2	» <i>Genista numidica</i> ssp. filiramea	DZ	Djurdjura national park, Akfadou (N-Algeria)
» <i>Draba oreadam</i> ssp. oreadam	MA	Jbel Mgoun	» <i>Genista numidica</i> ssp. numidica	DZ and???	Edough peninsula, Taza national park + Collo peninsula
» <i>Dracaena draco</i> ssp. ajgal	MA	Jbel Kest ,Anezi,Imzi	» <i>Genista scorpius</i>	MA	2
» <i>Dracocephalum renati</i>	MA	4	» <i>Genista scorpius</i> ssp. myriantha	MA	Tamga
» <i>Echium humile</i> ssp. caespitosum	MA	Toubkal	» <i>Genista vepres</i>	DZ and???	Taza national park, etc. ? (NE-Algeria)
» <i>Echium velutinum</i>	MA	Parc Haut Atlas Oriental	» <i>Gentiana atlantica</i>	MA	2
» <i>Echium velutinum</i> ssp. versicolor	MA	Toubkal	» <i>Gentiana penetii</i>	MA	Jbel Mgoun
» <i>Elymus festucoides</i>	MA	2	» <i>Gentiana tornezyana</i>	MA	2
» <i>Elymus marginatum</i> ssp. marginatum	MA	2	» <i>Geranium cataractarum</i> ssp. pitardii	MA	Parc d'Ifrane
» <i>Epimedium perralderianum</i>	DZ	Kefrida, Babors, Beni-Foughal (NE-Algeria)	» <i>Geranium nanum</i>	MA	4
» <i>Erodium battandierianum</i> Rouy Park	DZ	Babor moutains, Taza national park	» <i>Globularia nainii</i>	MA	8
» <i>Eruca loncholoma</i> (Pamel) O.E. Schulz	DZ	Chelia, (NE-Algeria)	» <i>Hedysarum naudinianum</i> Coss	DZ	Bibans, Guergour, Zaccar, Ouarsenis, Boghar
» <i>Erucastrum brevirostre</i>	MA	Parc d'Ifrane	» <i>Hedysarum perralderianum</i> Coss.	DZ	Djebel Chelia, Bellezma + djebel Bou Thaleb
» <i>Erucastrum elatum</i>	MA	2			

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» <i>Helichrysum lacteum</i>	MA, DZ	Parc d'Ifrane Algéro. marocains	» <i>Linaria tristis</i> ssp. <i>lurida</i>	MA	3
» <i>Heliocauta atlantica</i>	MA	2	» <i>Linaria tristis</i> ssp. <i>pectinata</i>	MA	Parc Tazekka
» <i>Heracleum sphondylium</i>	MA	Aghbar	» <i>Linaria ventricosa</i>	MA	3
» <i>Herniaria pujosii</i>	MA, DZ	Parc d'Ifrane Algéro. marocains	» <i>Linaria weilleri</i>	MA	Jbel Kest ,Anezi,Imzi
» <i>Hertia maroccana</i>	MA	2	» <i>Lithodora maroccana</i>	MA	Jbel Bouhachem
» <i>Hieracium amplexicaule</i> ssp. <i>atlanticum</i>	MA, DZ	Parc d'Ifrane Algéro. marocains	» <i>Lotononis maroccana</i>	MA	2
» <i>Hieracium ernestii</i> Maire	DZ	Babor mountains (NE-Algeria)	» <i>Lotus maroccanus</i>	MA	3
» <i>Hieracium faurelianum</i> Maire	DZ	Djebel Chelia, Bellezma national park (NE-Algeria)	» <i>Luzula atlantica</i>	MA	Toubkal
» <i>Hieracium pseudopiosella</i> ssp. <i>subtenuicaule</i>	MA	Parc d'Ifrane	» <i>Marrubium ayardii</i>	MA	4
» <i>Hieracium pseudopiosella</i> ssp. <i>tenuicaule</i>	MA	Parc d'Ifrane	» <i>Marrubium echinatum</i>	MA	Parc Haut Atlas Orient., Parc d'Ifrane
» <i>Hieracium pseudopiosella</i> ssp. <i>tenuicauliforme</i>	MA	Parc d'Ifrane	» <i>Marrubium multibracteatum</i>	MA	5
» <i>Hippocrepis liouvillei</i>	MA	Jbel Bou Naceur	» <i>Matthiola scapifera</i>	MA	3
» <i>Hippocrepis liouvillei</i> ssp. <i>liouvillei</i>	MA	Parc d'Ifrane	» <i>Medicago suffruticosa</i> ssp. <i>maroccana</i>	MA	Parc Haut Atlas Orient., Parc d'Ifrane
» <i>Hippocrepis maura</i>	MA	Maamora	» <i>Mentha gattefossei</i>	MA	2
» <i>Hippocrepis neglecta</i>	MA	Parc d'Ifrane	» <i>Mentha suaveolens</i>	MA	Toubkal
» <i>Hypochoeris angustifolia</i>	MA	3	» <i>Mentha suaveolens</i> ssp. <i>timija</i>	MA	Aghbar
» <i>Hypochoeris leontodoides</i>	MA	Jbel Ayachi	» <i>Mibora maroccana</i>	MA	Maamora
» <i>Inula maletii</i>	MA	Parc d'Ifrane	» <i>Moehringia stellarioides</i>	DZ	Babor moutains, Taza national park+ Collo peninsula
» <i>Isatis djurdjurae</i>	MA, DZ	Djurdjura national park, Babor mnts.	» <i>Myosotis atlantica</i>	MA	4
» <i>Jasione montana</i> ssp. <i>cornuta</i>	MA	Parc d'Ifrane	» <i>Narcissus romieuxii</i> ssp. <i>romieuxii</i>	MA	Parc d'Ifrane
» <i>Jasonia (Chiliadenus) rupestris</i>	MA, DZ	Ghar-Rouban area orient. Tlemcen mnts.	» <i>Narcissus rupicola</i> ssp. <i>watieri</i>	MA	Toubkal
» <i>Juniperus thurifera</i> L. ssp. <i>africana</i> Maire	DZ	Aurès (NE-Algeria)	» <i>Nasturtium africanum</i> ssp. <i>mesatlanticum</i>	MA	Parc d'Ifrane
» <i>Juniperus thurifera</i> ssp. <i>africana</i>	MA, DZ	Parc d'Ifrane Algéro. marocains	» <i>Nepeta atlantica</i>	MA	3
» <i>Lactuca virosa</i>	MA	Aghbar	» <i>Nepeta hispanica</i> ssp. <i>statice</i>	MA	Jbel Maasker, Parc d'Ifrane
» <i>Lactuca virosa</i> ssp. <i>cornigera</i>	MA	Parc d'Ifrane	» <i>Nepeta stachyoides</i>	MA	Aghbar
» <i>Laserpitium emilianum</i>	MA	Parc Haut Atlas Oriental	» <i>Nivellea nivellei</i>	MA	2
» <i>Lavandula stoechas</i> ssp. <i>atlantica</i>	MA	Toubkal	» <i>Odontites powellii</i>	MA	Parc d'Ifrane
» <i>Lavandula tenuisecta</i>	MA	2	» <i>Odontites violacea</i> Pomel	DZ	Djurdjura national park, Babor mnts.
» <i>Lens villosa</i>	MA	Parc d'Ifrane	» <i>Oenanthe pimpinelloides</i> ssp. <i>callosa</i>	MA	Parc Tazekka
» <i>Leontodon pitardii</i>	MA	4	» <i>Onobrychis cadevalli</i>	MA	Parc d'Ifrane
» <i>Leontodon salzmanii</i>	MA	Parc d'Ifrane	» <i>Onobrychis humilis</i>	MA	Toubkal
» <i>Leontodon taraxacoides</i> ssp. <i>mesorrhynchus</i>	MA	Parc d'Ifrane	» <i>Onobrychis humilis</i> ssp. <i>jahandiezii</i>	MA	Parc d'Ifrane
» <i>Leucanthemum mairei</i>	MA	5	» <i>Ononis serotina</i> ssp. <i>eu-serotina</i> Maire	DZ	Zaccar, oued Imbert
» <i>Leuzea berardioides</i>	MA	5	» <i>Ononis atlantica</i>	MA	3
» <i>Limonium mouretii</i>	MA	Parc d'Ifrane	» <i>Ononis maweana</i> var. <i>fontqueri</i>	MA	Maamora
» <i>Linaria amethystea</i> ssp. <i>Broussonetii</i> (Poir.) Malato-Beliz)	MA	Maamora	» <i>Ononis thomsonii</i>	MA	Parc d'Ifrane
» <i>Linaria cossoni</i> Barrate	TN	NE de la Tunisie	» <i>Onopordum dyris</i>	MA	2
» <i>Linaria decipiens</i> Batt.	DZ	Chelia, (NE-Algeria)	» <i>Origanum elongatum</i>	MA	2
» <i>Linaria maroccana</i>	MA	Tamga	» <i>Ormenis scariosa</i>	MA	4
» <i>Linaria multicaulis</i> ssp. <i>pseudosupina</i>	MA	Parc d'Ifrane	» <i>Orobancha chrysacanthi</i>	MA	Toubkal
» <i>Linaria scariosa</i> Desf.	TN, DZ	tuniso-algériennes	» <i>Orobancha hookeriana</i>	MA	Toubkal
» <i>Linaria tristis</i>	MA	Toubkal	» <i>Orobancha leptantha</i> Pomel	MA, DZ	Monts Trara (NW-Algeria)
			» <i>Oropetium africanum</i>	MA	Jbel Kest, Anezi, Imzi
			» <i>Paeonia corallina</i> (mascula) ssp. <i>atlantica</i>	DZ	Akfadou forests, Djurdjura, Babor mnts., Taza, etc.
			» <i>Papaver atlanticum</i>	MA	Toubkal



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Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs	Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs
» <i>Pedicularis numidica</i>	DZ	Taza national park , Collo peninsula, Edough peninsula	» <i>Platycapnos saxicola</i>	MA	Toubkal
» <i>Phagnalon atlanticum</i>	MA	Toubkal	» <i>Poa alpina</i> ssp. <i>atlantica</i>	MA	3
» <i>Phagnalon calycnum</i> ssp. <i>caroli pau</i>	MA	Parc Tazekka	» <i>Polygala balansae</i>	MA	2
» <i>Phagnalon embergeri</i>	MA	3	» <i>Polygala boissieri</i>	MA	Toubkal
» <i>Phagnalon helichrysoides</i>	MA	2	» <i>Polygonum balansae</i> ssp. <i>Rhizoxylon</i>	MA	Jbel Bou Ibane
» <i>Phagnalon helichrysoides</i> ssp. <i>helichrysoides</i>	MA	Jbel Mgoun	» <i>Potentilla maura</i>	MA	Parc Tassemtane
» <i>Phagnalon platyphyllum</i>	MA	Toubkal	» <i>Potentilla tornezyana</i>	MA	2
» <i>Phlomis bovei</i> ssp. <i>maroccana</i>	MA	Parc d'Ifrane	» <i>Primula acaulis</i> ssp. <i>atlantica</i>	MA, DZ	Parc d'Ifrane Algéro. marocains
» <i>Pinus nigra</i> ssp. <i>mauritanica</i>	MA, DZ	Djurdjura national park, Rif mountains, Sierra Nevada ?	» <i>Pterocephalus depressus</i>	MA	Toubkal
» <i>Pinus pinaster</i> ssp. <i>Hamiltoni</i> var. <i>maghrebiana</i>	MA, DZ	Parc d'Ifrane Algéro. marocains	» <i>Ptilostemon dyricola</i>	MA	3
» <i>Pinus pinaster</i> ssp. <i>hamiltoni</i> var. <i>maghrebiana</i>	MA	Parc d'Ifrane	» <i>Ptilostemon rhiphaeus</i>	MA	Parc Tassemtane
» <i>Pistorinia attenuata</i> ssp. <i>attenuata</i>	MA	Tamga	» <i>Pyrus communis</i> ssp. <i>gharbiana</i>	MA, DZ	Parc d'Ifrane Algéro. marocains
» <i>Pitardia caeruleascens</i>	MA	Jbel Bou Naceur	» <i>Raffenaldia platycarpa</i>	MA	2
» <i>Platanthera algeriensis</i>	MA	Toubkal	» <i>Ranunculus aurasiacus</i>	MA, DZ	Parc d'Ifrane Algéro. marocains
			» <i>Ranunculus calandrinoides</i>	MA	Parc d'Ifrane
			» <i>Ranunculus dyris</i>	MA	2
			» <i>Reseda attenuata</i>	MA	Toubkal

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» <i>Reseda nainii</i>	MA	Parc Haut Atlas Oriental	» <i>Silene filipetala</i>	MA	Toubkal
» <i>Retama dasycarpa</i>	MA	2	» <i>Silene glabrescens</i>	MA	Maamora
» <i>Rhamnus lycioides</i> ssp. <i>atlantica</i>	MA	3	» <i>Silene heterodonta</i>	MA	2
» <i>Rhodanthemum catananche</i>	MA	2	» <i>Silene heterodonta</i> ssp. <i>rosella</i>	MA	Parc d'Ifrane
» <i>Rhodanthemum gayanum</i>	MA	Toubkal	» <i>Silene mekinensis</i>	MA	2
» <i>Rhodanthemum gayanum</i> ssp. <i>demnatense</i>	MA	2	» <i>Silene mentagensis</i>	MA	Parc d'Ifrane
» <i>Rhodanthemum maroccanum</i>	MA	Parc d'Ifrane	» <i>Silene mesatlantica</i> Maire	MA	5
» <i>Rhodanthemum pseudo-catananche</i>	MA	Toubkal	» <i>Silene pomelii</i> ssp. <i>adusta</i>	MA	Parc d'Ifrane
» <i>Rhodanthemum redieri</i>	MA	4	» <i>Silene portensis</i>	MA	Parc d'Ifrane
» <i>Rhodanthemum atlanticum</i>	MA	Jbel Mgoun	» <i>Silene reticulata</i> Desf.	TN, DZ	tuniso-algériennes (Tell algérois, Gde Kabylie)
» <i>Romulea battandieri</i> Beguinot	DZ	Djurdjura nat. park	» <i>Silene reverchonii</i> Batt.	DZ	Babor mountains (NE-Algeria)
» <i>Romulea numidica</i>	MA, DZ	Parc d'Ifrane Algéro. marocains	» <i>Silene velutinoides</i> Pomel	DZ	Monts Tlemcen, Ghar- Rouban, Constantine
» <i>Romulea penzigii</i> Beguinot	DZ	Djurdjura nat. park	» <i>Silene virescens</i>	MA	Tamga
» <i>Romulea vaillantii</i> Quézel	DZ	Djebel Chélia	» <i>Silene volubilitana</i>	MA	Jbel Bouhachem
» <i>Rorippa hayanica</i>	MA	Parc d'Ifrane	» <i>Sisymbrium maurum</i>	MA	2
» <i>Rumex atlanticus</i>	MA	4	» <i>Sisymbrium (Scabiosa) cartenniana</i>	DZ	Cap Ténès (NW-Algeria)
» <i>Rumex ginii</i>	MA	2	» <i>Sonchus tenerrimus</i> var. <i>amicus</i>		
» <i>Sagina saginoides</i> ssp. <i>parviflorum</i>	MA	Toubkal	» <i>Faure, Maire &amp; Wilczek</i>	DZ	Habibas islands (NW-Algeria)
» <i>Salix atrocinerea</i> ssp. <i>jahandiezii</i>	MA	Parc d'Ifrane	» <i>Spergularia microsperma</i> ssp. <i>oreophila</i>	MA	2
» <i>Salvia lavandulifolia</i> ssp. <i>mesatlantica</i>	MA	Parc d'Ifrane	» <i>Spergularia pycnorhiza</i> (Maire) P. Monnier	DZ	Habibas islands + Ain Franin (NW-Alg.)
» <i>Sanguisorba minor</i> ssp. <i>maroccana</i>	MA	2	» <i>Spergularia tenuifolia</i> Pomel	DZ	Miliana, Relizane, Tiaret (NW-Algeria)
» <i>Satureja arganietorum</i>	MA	Jbel Kest ,Anezi, Imzi	» <i>Stachys arenaria</i> ssp. <i>divaricatidens</i>	MA	2
» <i>Satureja atlantica</i>	MA	3	» <i>Stachys mialhesi</i> De Noe	DZ	Djebel Chenoua
» <i>Satureja grandiflora</i> ssp. <i>baborensis</i>	MA, DZ	Babor mnts. (NE-Alg.) Rif (N-Morocco)	» <i>Stachys mouretii</i>	MA	Parc d'Ifrane
» <i>Saxifraga numidica</i> Maire	DZ	Babor mountains (NE-Algeria)	» <i>Stachys saxicola</i> ssp. <i>saxicola</i>	MA	Parc d'Ifrane
» <i>Saxifraga pedemontana</i> ssp. <i>demnatensis</i>	MA	4	» <i>Stachys saxicola</i> ssp. <i>villosissima</i>	MA	Parc d'Ifrane
» <i>Scutellaria orientalis</i> ssp. <i>demnatensis</i>	MA	5	» <i>Stipa nitens</i>	MA	7
» <i>Sedum dasyphyllum</i> ssp. <i>oblongifolium</i>	MA	Toubkal	» <i>Teucrium chamaedrys</i> ssp. <i>gracile</i>	MA	3
» <i>Sedum jaccardianum</i>	MA	Jbel Ayachi	» <i>Teucrium collincola</i>	MA	Parc d'Ifrane
» <i>Sedum jahandiezii</i>	MA	Parc d'Ifrane	» <i>Teucrium decipiens</i>	MA	Parc d'Ifrane
» <i>Sedum melanantherum</i>	MA	Toubkal	» <i>Teucrium joannis</i>	MA	Parc d'Ifrane
» <i>Sedum modestum</i>	MA	3	» <i>Teucrium malenconianum</i>	MA	Tamga
» <i>Sedum surculosum</i>	MA	Toubkal	» <i>Teucrium mideltense</i>	MA	Parc Haut Atlas Orient.
» <i>Sedum tuberosum</i> Coss. & Letourn.	TN, DZ	tuniso-algériennes (Algérois, G de Kabylie)	» <i>Teucrium musimonum</i>	MA	6
» <i>Selaginella balansae</i>	MA	Parc d'Ifrane	» <i>Teucrium rotundifolium</i> var. <i>atlanticum</i>	MA	2
» <i>Sempervivum tectorum</i> ssp. <i>atlanticum</i>	MA	Toubkal	» <i>Thymus atlanticus</i>	MA	4
» <i>Senecio gallerandianus</i> Coss. et Dur.	DZ	Djurdjura, Babor, Aures (NE-Algeria)	» <i>Thymus ciliatus</i> ssp. <i>munbyanus</i> var. <i>comosus</i>	MA	Parc d'Ifrane
» <i>Seseli libanotis</i> ssp. <i>atlanticum</i>	MA	3	» <i>Thymus dreataensis</i>	DZ	Babor Mtns + Bibans, Mt Dreat, Mt Dira, Takoucht Belezma
» <i>Sideritis jahandiezii</i>	MA	Parc d'Ifrane	» <i>Thymus maroccanus</i>	MA	Aghbar
» <i>Sideritis ormaroccana</i>	MA	Parc d'Ifrane	» <i>Thymus maroccanus</i> ssp. <i>maroccanus</i>	MA	Parc d'Ifrane
» <i>Sideritis vilosa</i>	MA	Parc d'Ifrane	» <i>Thymus satureioides</i>	MA	2
» <i>Silene ayachica</i>	MA	3	» <i>Tolpis barbata</i>	MA	Aghbar
» <i>Silene barrattei</i> Murb.	TN	Est de la Tunisie (de Bizerte à Gafsa)	» <i>Tolpis barbata</i> ssp. <i>liouvillei</i>	MA	Toubkal
» <i>Silene corrugata</i>	MA	2	» <i>Trifolium humile</i>	MA	5
» <i>Silene cuatrecasasii</i>	MA	3			
» <i>Silene dyris</i>	MA	3			

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» <i>Tripodion kremerianum</i>	MA, DZ	Parc National de Tazekka	» <i>Crocus boulosii</i> Greuter	LY	Jabal Akhdar area only
» <i>Tulipa sylvestris</i>	MA, DZ	Algéro.marocains	» <i>Cyclamen rohlfsianum</i> Ascher.	LY, TN	Jabal Akhdar area only
» <i>Urginea fugax</i> var. <i>major</i>	MA	Maamora	» <i>Desmazeria lorentii</i> H. Scholz	LY, TN	Libya & Tunisia
» <i>Vella mairei</i>	MA	3	» <i>Ebenus armitagei</i> Schweinf. & Taub.	EG, LY	Rare Omayed
» <i>Verbascum calycinum</i>	MA	Toubkal	» <i>Erodium tocranum</i> Guitt. Et Le Houerou .	LY	Jabal Akhdar area only
» <i>Verbascum hookerianum</i>	MA	Parc Haut Atlas Oriental	» <i>Euphorbia pseudo-apis</i> Maire & Weiller	LY	Jabal Akhdar area only
» <i>Verbascum lychnitis</i> var. <i>giganteum</i>	MA	Parc Haut Atlas Oriental	» <i>Frankenia syrtica</i> (Maire & Weiller) Brullo & Furnari	LY	Jabal Akhdar area only
» <i>Veronica chartonii</i>	MA	Jbel Mgoun	» <i>Helianthemum cyrenaicum</i> (Grosser) Brullo & Furnari	LY	Jabal Akhdar area only
» <i>Viola dyris</i>	MA	2	» <i>Herniaria cyrenaica</i> F. Herm.	LY, EG	Libya & Egypt.
» <i>Viola maroccana</i>	MA	3	» <i>Heteromera philaenorum</i> Maire & Weiller	LY	Jabal Akhdar area only
» <i>Viola mumbiana</i> var. <i>rifana</i>	MA	Jbel Bou Naceur	» <i>Hypericum decaisneanum</i> Coss. & Daveau	LY	Jabal Akhdar area only
» <i>Viola saxifraga</i>	MA	4	» <i>Ifloga spicata</i> ssp. <i>elbaensis</i> Chartek	EG	Halayeb Triangle
» <i>Viola subatlantica</i>	MA	Parc d'Ifrane	» <i>Lactuca haimanniana</i> E.A.Durand & Barratte	LY	Jabal Akhdar area only
<b>Restricted range species in North Africa Magreb+ other North African countries or Egypt and/or Libya</b>			» <i>Libyella cyrenaica</i> (E.A.Durand & Barratte) Pamp.	LY	Jabal Akhdar area only
» <i>Anacamptis cyrenaica</i> (E.A.Durand & Barratte) H.Kretzsmar, Eccarius & H.Dietr.	LY	Jabal Akhdar area only	» <i>Limonium cyrenaicum</i> (Rouy) Brullo	LY	Jabal Akhdar area only
» <i>Anthemis cyrenaica</i> Coss	LY	Jabal Akhdar area only	» <i>Limonium subrotundifolium</i> (Bég. & Vacc.) Brullo	LY	Jabal Akhdar area only
» <i>Anthemis kruegeriana</i> Pamp.	LY	Jabal Akhdar area only	» <i>Limonium vaccarii</i> Brullo	LY	Jabal Akhdar area only
» <i>Anthemis microsperma</i> Boiss. & Kotschy	EG	Western Medit coast. dunes, St Katherine	» <i>Medicago cyrenaica</i> Maire & Weiller	LY	Jabal Akhdar area only
» <i>Anthemis taubertii</i> Durand & Barratte	LY	Jabal Akhdar area only	» <i>Muscari stenanthum</i> Freyn .	LY	Jabal Akhdar area only Probably endemic & very rare
» <i>Arbutus pavarii</i> Pamp.	LY	Jabal Akhdar area only	» <i>Nepeta cyrenaica</i> Quézel & Zaffran	LY	Jabal Akhdar area only
» <i>Arbutus pavarii</i> Pamp.	LY, TN	Libya & Tunisia	» <i>Nepeta vivianii</i> (Cosson) Béguinot & Vacc.	LY	Jabal Akhdar area only
» <i>Arum cyrenaicum</i> Hurby	LY - Crete		» <i>Onopordum cyrenaicum</i> Maire & Weiller	LY	Jabal Akhdar area only
» <i>Astragalus camelorum</i> Barbey	EG	Lake Bardawil, Saint Katherine	» <i>Onosma cyrenaica</i> E.A.Durand & Barratte	LY	Jabal Akhdar area only
» <i>Athmanta della-cella</i> Ascherson et Barbey	LY	Jabal Akhdar area only	» <i>Orchis taubertiana</i> B.Baumann & H.Baumann	LY	Jabal Akhdar area only
» <i>Attractylis carduus</i> var. <i>marmarica</i> Täckh. & Boulos	EG	Western Medit. coastal dunes	» <i>Origanum cyrenaicum</i> Beg. Et Vacc. (=O. akhdarensis Letswart & Boulos, <i>Amaracus akhdarensis</i> (letsw. & al) Brullo & Furnari, and <i>Amaracus pampaninii</i> Brullo & Furnari)	LY	Jabal Akhdar area only
» <i>Ballota andreuzziana</i> Pamp	LY	Jabal Akhdar area only	» <i>Pachyctenium mirabilis</i> Maire & Pamp.	LY	Jabal Akhdar area only
» <i>Bellevalia salah-eidii</i> Täckh. & Boulos	EG	Lake Bardawil	» <i>Pallenis cyrenaica</i> Alavi	LY	Jabal Akhdar area only
» <i>Bellevalia sessiliflora</i> (Viv.) Kunth	EG, LY	Sallum Area	» <i>Pancratium arabicum</i> Sickenb.	EG	W Medit. coast. dunes
» <i>Bellevallia Cyrenaica</i> Maire & Weiller )	LY	Jabal Akhdar area only	» <i>Petrohagia cyrenaica</i> (Durand & Barratte) Ball & Heywood	LY	Jabal Akhdar area only
» <i>Bellevallia sessiflora</i> (Viv.) Kunth.	LY, EG	Type only 1938 Libya & Egypt	» <i>Phlomis aurea</i> Decne.	EG	Saint Katherine
» <i>Biscutella didyma</i> var. <i>elbensis</i> (Chartek) Einaggar	EG	Halayeb Triangle	» <i>Picris mauginiana</i> Pam.	LY	Jabal Akhdar area only
» <i>Brassica deserti</i> Danin & Hedge	EG	Saint Katherine	» <i>Plantago cyrenaica</i> Durand & Barratte	LY	Jabal Akhdar area only
» <i>Bromus aegyptiacus</i> Tausch	EG	Lake Manzala, Lake Mariut	» <i>Polygala aschersoniana</i> Chodat	LY	Jabal Akhdar area only
» <i>Bunium fontanesii</i> (Pers.) Maire	MA, TN, LY	du Maroc à la Libye	» <i>Ranunculus cyclocarpus</i> Pamp.	LY	Jabal Akhdar area only
» <i>Carthamus mareoticus</i> Delile	EG, LY	Lake Mariut, Omayed, Sallum Area	» <i>Satureja fortii</i> Pam.	LY	Jabal Akhdar area only
» <i>Centaurea alexandrina</i> Delile	EG, LY	Rare Omayed, W Medit. coastal dunes	» <i>Sedum bracteatum</i> Viv.	LY	Jabal Akhdar area only
» <i>Centaurea cyrenaica</i> Béguinot & Vacc.	LY	Jabal Akhdar area only	» <i>Sedum laconicum</i> Boiss & Heldr	LY	Jabal Akhdar area only
» <i>Convolvulus maireanus</i> Pamp.	LY	Jabal Akhdar area only	» <i>Silene biappendiculata</i> Rohrb.	LY, EG	NE Libya and Egypt
			» <i>Sixalix libyca</i> (Alavi) Greuter & Burdet	LY	Jabal Akhdar area only
			» <i>Stachys rosea</i> (Desf.) Boiss	LY	Jabal Akhdar area only probably endemic
			» <i>Teucrium apollinis</i> Maire & Weiller	LY	Jabal Akhdar area only
			» <i>Teucrium barbeyanum</i> Asch. & Taub.	LY	Jabal Akhdar area only
			» <i>Teucrium daveaeum</i> Coss.	LY	Jabal Akhdar area only
			» <i>Teucrium zanonii</i> Pomel	LY	Jabal Akhdar area only

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»Thesium erythronicum Pamp.	LY	Jabal Akhdar area only	»Bellevialia warburgii Feinbrun	IL	
»Umbilicus mirus (Pamp.) Greuter	LY	Jabal Akhdar area only	»Berberis libanotica - Ehrenb.	SY, LB	Anti-Lebanon- Lebanon Mts. IL
<b>Restricted range species in East Mediterranean /Levant+ Egypt (Sinai)</b>			»Biarum auraniticum - Mt	SY, IL	Hauran (Sanamein)
»Allium papillare Boiss.	IL, EG (Si)	Israel, Egypt (Sinai)	»Centaurea dumulosa - Boiss.	SY, LB	Anti-Lebanon Palmerene
»Allium sinaiticum Boiss.	IL, EG (Si), SA, JO		»Colchicum antilibanoticum Gombo	IL, LB, SY,	
»Allium tel-avivense Eig	IL, EG (Si), LB	Israel coast, S. Lebanon and N. Sinai (Egypt)	»Colchicum feinbruniae K. Pers.	IL, LB, SY,	
»Anthemis eliezrae Eig	IL, EG (Si)		»Colchicum ramonensis sp.nova	IL	
»Anthemis zoharyana Eig	IL, EG (Si), JO		»Colchicum tunicatum Feinbr.	IL, JO,	
»Centaurea procurrans Sieb. ex Spreng.	IL, LB, EG (Si)	Israel coast, S. Lebanon and N. Sinai (Egypt)	»Colchicum tuviae Feinbr.	IL	
»Dianthus sinaicus Boiss.	IL, EG (Si), PN		»Convolvulus palaestinus Boiss.	IL, LB, SY,	
»Hammada negevensis Ijlin & Zohary	IL, EG (Si)		»Corrigiola palaestina Chaudh.	IL, LB	
»Haplophyllum poorei ssp.negevense Zoh. Et Danin	IS, LB, EG (Si)IS		»Cousinia pestalozzae -Boiss.	SY, LB	Anti-Lebanon
»Hypecoum aegyptiacum (Forssk.) Asch. & Schw.	IL, EG (Si)		»Crepis robertioides - Boiss.	SY, LB	High Levant Mts.
»Ifloga rueppellii (Fresen.) Danin	IL, JO, EG (Si)		»Crocus hermoneus ssp. Palaestinus Feinb.&Shmida	IL/JO	
»Iris mariae Barbey	EG (Si) , IL, PN	Israel, Egypt (Sinai)	»Crypsis minuartioides (Bornm.) Mez	IL	
»Kickxia floribunda (Boiss.) Täckholm & Boulos	EG, PN	North Sinai Mountains, Nabq	»Cyperus sharonensis Danin	IL	
»Acantholimon libanoticum - Boiss.	SY, LB	High Levant Mts.	»Draba vesicaria -Desv.	SY, LB	Anti-Lebanon- Lebanon Mts.
»			»Erodium choulletianum	TN, DZ	Djebel Ouahch area
<b>Restricted range species in East Mediterranean/Levant</b>			»Erodium subintegrifolium Eig	IL	
»Allium asclepiadeum Bornm.	IL		»Erodium trichomanifolium - L'Hér.	SY, LB	High Levant Mts.
»Allium makmelianum -Post	SY, LB	Anti-Lebanon -Leb.	»Ferula daninii Zohary	IL	
»Allium phaneranthrum- Boiss. et Hkn	SY, LB, PN	Hermon-Lebanon Mts.	»Ferula orientalis L.	IL/PN	Israel
»Amygdalus agrestis - Boiss.	SY, LB	Anti-Lebanon	»Ferula ovina Zohary	IL	
»Anthemis edumea Eig	JO		»Ferulago frigida - Boiss.	SY, LB	Anti-Lebanon- Lebanon Mts.
»Anthemis lyonnethioides - Boiss.	SY, LB	Anti-Lebanon	»Filago inexpectata Wagenitz	IL, JO, PN	
»Anthemis maris-mortui Eig	IL, PN, JO	Israel, Palestine, Jordan	»Galium philistaeum Boiss.	IL	
»Anthemis samuelssonii - Rech. f.	SY, LB	Homs	»Genista libanotica - Boiss.	SY, LB	High Levant Mts.
»Astragalus aaronii (Eig) Zohary	JO		»Hedysarum coelesyriacum - Sam.	SY, LB.	Anti-Lebanon
»Astragalus argyrothamnos - Boiss.	SY, LB	Anti-Lebanon	»Helianthemum sphaerocalyx Gauba & Janch. ?		Omayed, W Medit. coastal dunes
»Astragalus azraqensis C. C. Towns.	JO		»Heliotropium schweinfurthii - Boiss.	SY, LB	Anti-Lebanon- Lebanon Mts.
»Astragalus baalbekensis - Bornm.	SY, LB	Anti-Lebanon	»Iphiona marismortui Feinbrun	IL, JO, PN	
»Astragalus bhamrensis - Sirj. et Rech	SY, LB	Coastal Mts..	»Iris atrofusca Baker	, JO, PN	
»Astragalus dictyocarpus - Boiss.	SY, LB	High Levant Mts.	»Iris edomensis Sealy	JO	
»Astragalus ehrenbergii- Bunge.	SY, LB	Anti-Lebanon	»Iris hermona Dinsm.	IS, SY	
»Astragalus emarginatus - Labili.	SY, LB	High Levant Mts.	»Iris jordana- Dinsm.	SY, JO, IL?	Jordan valley
»Astragalus moabiticus Post	JO		»Iris mariae W. Barbey	IL	
»Astragalus psilodontius - Boiss.	SY, LB	Lower Anti-Lebanon	»Iris petrana Dinsm.	IL, JO	
»Astragalus transjordanicus Sam.	JO		»Kickxia judaica Danin	IL, JO, PN	
»Ballota antilibanotica - Post.	SY, LB	Anti-Lebanon Mts.	»Kickxia petrana Danin	JO	
			»Lamium ehrenbergii - Boiss. et Reut.	SY, LB	High Levant Mts.
			»Lobularia arabica (Boiss.) Muschl	EG, PN	Rare Omayed
			»Lycium petraeum Feinbrun	JO	
			»Onosma caeruleascens -Boiss.	SY, LB	Anti-Lebanon- Lebanon Mts.
			»Orchis israelitica Baumann & Dafnil	IL, ,LB,	
			»Origanum dayi Post	IL	
			»Origanum petraeum Danin	JO	



Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs	Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs
»Ornithogalum fuscescens	IL, PN, SY?				Safa, Beit Illo
»Papaver carmeli Feinbrun	IL		»Alcea leiocarpa - Sam. ex Rech. fi.)	SY	Kurd Dag
»Papaver libanoticum -Boiss.	SY, LB	High Levant Mts.	»Allium chrysantherum - Boiss. Et Reuter	SY	Upper Jezira
»Petrorhagia zoharyana Liston	IL		»Amygdalus korschinskii	PN	Yaseed-Ibzeik
»Poterium compactum - Boiss.	SY, LB	High Levant Mts.	»Anchusa tiberiadis - Post	SY, IL?	Aleppo (Jabal Semane) -Tiberias
»Ranunculus myosuroides - Boiss.	SY, LB	Anti-Lebanon- Lebanon Mts.	»Anthemis hebronica Boiss. & Kotschy	IL, JO, LB	
»Rheum palaestinum Feinbrun	IL,JO,		»Astragalus dorcoceras - Bunge	SY	Aleppo, Upper Jezira, 1
»Rindera schlumbergeri - Boiss. (Gürke)	SY, LB	Anti-Lebanon	»Astragalus duplostrigosus - Post et Beauv.	SY	Palmyra, Al Bil'as, 4
»Rubia danaensis Danin	JO		»Astragalus galilaeus - Freyn et Bornm	SY, IL, PN?	Yarmuk Valley, 1
»Salvia eigii Zohary	IL		»Astragalus stramineus - Boiss. et Ky	SY	Anti-Lebanon (Zabadani-Maalula), 1
»Satureja mabateorum Danin & Hedge	JO		»Astragalus tadmorensis - Eig et Sam.	SY	Palmyra, 3
»Satureja thymbrifolia Hedge & Feinbrun	IL		»Atractylis comosa	PN	2
»Satureja thymbrifolia Hedge & Feinbrun	IL,JO,		»Bellevalia palmyrensis - Feinbrun	SY	Syrian Steppe, 2
»Scorzonera libanotica - Boiss.	SY, LB	High Levant Mts.	»Bupleurum brevicaule	PN	Yaseed-Ibzeik
»Scrophularia nabataeorum Eig	JO		»Callitriche sp. nova. (Mout)	SY	Golan-Jabal Al-Arab, 2
»Sedum palaestinum Boiss.	IL,LB,PN		»Campanula stellaris Boiss.	IL, LB	Israel, Lebanon
»Silene danaensis Danin	JO		»Centaurea longispina - Post	SY	Anti-Lebanon, 1
»Silene palaestina Boiss.	IL		»Cicer pinnatifidum Jaub. Et Spach	PN	Yaseed-Ibzeik
»Silene palaestina Boiss.	IL,LB,PN		»Consolida deserti-syriaci - (Zoh) Munz.	SY, JO?	Hauran
»Silene physalodes Boiss.	IL,LB,		»Consolida gombaultii -(Thié) Munz	SY	Jabal Al-Arab, 2
»Sonchus suberosus Zohary & P.H.Davis	IL,JO,PN	Paleoendemic: related to a Canary Sonchus group.	»Crocus dispathaceus - Bowles	SY	Aleppo region, 1
»Stachys paneiana -Moût.	IL, PN, SY		»Draba oxycarpa - Boiss.	SY, LB	Anti-Lebanon- Hermon
»Stachys zoharyana Eig	IL		»Echinops descendens - Hand.-Mazz.	SY	Upper Jezira, 2
»Sternbergia pulchella Boiss.& Bl.	,LB,SY,		»Euphorbia antilibanotica - Mout	SY	Anti-Lebanon
»Tanacetum densum - Labili. (Schultz Bip.)	SY, LB	Hermon- Anti- Lebanon	»Euphorbia caudiculosa - Boiss.	SY, LB	Hermon summit
»Tanacetum negevensis Shmida	IL		»Euphorbia physocaulos - Moût.	SY	Jabal Al-Arab -Lajat, 2
»Teucrium socinianum - Boiss.	SY, LB	Anti-Lebanon	»Euphorbia postii - Boiss.	SY	Ghab, 1
»Tracheliopsis antilibanotica - P.H. Davis	SY, LB	Anti-lebanon	»Euphorbia promecocarpa - P.H. Davis	SY	Anti-Lebanon, 1
»Trichodesma boissieri Post	IL,JO,PN		»Ferulago auranitica - Post	SY	Jabal Al-Arab -Hauran, 1
»Trifolium billardieri Spreng.	IL,LB,		»Fibigia heterophylla -Rech.	SY	Al Bil'as- Al Sha'ir
»Trifolium farayense - Moût.	SY, LB	Anti-Lebanon- Lebanon Mts.	»Gagea procera	SY, PN?, IL?	Jabal Al-Arab
»Trifolium israeliticum D. Zohary & Katzn.	IL		»Galium judaicum	PN	Yaseed-Ibzeik
»Trifolium modestum - Boiss.	SY, LB	High Levant Mts.	»Gypsophila mollis - (Boiss) Bornm.	SY, LB	Anti-Lebanon- Lebanon Mts, 1
»Trifolium prophetarum Hossain	IL		»Gypsophila polygonoides Willd. Ssp. ansariensis Rech.	SY, LB	Coastal Mts.
»Trifolium salmoneum - Moût.	IL, SY	Golan- Jabal al Arab, 2	»Gypsophila polygonoides Willd. Ssp. Barradensis boiss.	SY	Qassiun- Rakhle, 2
»Trigonella lilacina Boiss	PN,IL, LB		»Haplophyllum chaborasium- Boiss. Et Hausskn.	SY	Upper Jezira, 2
»Tulipa aucheriana - Baker ssp. westii	SY, LB	Anti-Lebanon	»Helichrysum pygmaeum - Post	SY	Anti-Lebanon, 1
»Tulipa lownei - Baker	SY, LB	Anti-Lebanon	»Iberis odorata	PN	Yaseed-Ibzeik
»Verbascum antilibanoticum - Hub,- Mor.	SY, LB	Anti-lebanon	»Iris bostrensis- Moût	SY	Hauran, Jabal Al- Arab, 2
»Verbascum jordanicum Murb.	IL,JO,PN		»Iris fumosa- Bois et Hkn.	SY	East Hama, 1
»Verbascum petrae Davis & Hub.-Mor.	JO		»Iris melanosticta -Bornm.	SY	Hauran, Jabal Al- Arab, 2
»Vicia hulensis Plitm.	IL		»Iris nusairiensis- Mt	SY	Coastal Mts, 4.
»Ajuga rechingeri - Bilik	SY	Mountains of the Syrian Steppe			
»Alcea acaulis	PN	Wad Elbalat, Um Safa, Beit Illo			
»Alcea degitata	PN	Wad Elbalat,Um			

Species name and authority (where provided)	COUNTRY	Notes on range & No. of IPAs
»Iris palaestina (Bak.) Boiss	PN	Yaseed-Ibzeik
»Isoetes libani - Musselman	SY, LB	Akkar-Homs
»Lamium adoxifolium - Handel- Mazzetti.	SY	Aleppo, 1
»Lathyrus basalticus- Rech. fil.	SY, LB	west Homs
»Lathyrus pygmaeus - Gombault	SY	Palmyra, 1
»Lathyrus stenolobus - Boiss.	SY	Bassit, 2
»Lythrum junceum	PN	2
»Minuartia parvulorum -Mout et Sam.	SY	Anti- Lebanon, 2
»Muscari dinsmorei - Rech.	SY	Tell Abiad- Upper Jezira, 1
»Onobrychis gaillardotii - Boiss.	SY	Qassiun-Damascus, 1
»Onosma cassia - Boiss.	SY	Amanus (Bassit), 2
»Ophrys holosericea (Burm.f.)Greut.	PN	2
»Ophrys sintenisii Fleischm. et Bornm	PN	2
»Phagnalon linifolium - Post	SY, LB	Anti-Lebanon, 1
»Phlomis bailanica - Vierh.	SY	Coastal Mts, 2.
»Postia lanuginosa - DC. (Boiss.)	SY, LB	Qalamun
»Postia tnicrocephala - Boiss.	SY	Lower Anti-Lebanon, 1
»Prangos hermonis - Boiss.	SY	Hermon-Jabal al- Arab, 2
»Pulicaria laniceps - Bornm.	SY	Upper Jezira
»Rosularia lineata -Boiss.	SY	Lajat, 1
»Salsola azaurena - Mout	SY	Bishri- Deirezzor, 2
»Salsola heliaramiae - Mout	SY	Palmyra
»Salsola postii - Eig	SY	Palmyra, 1
»Salvia hierosolymitana	IL, PN, SY	
»Suaeda carnosissima -Post	SY	Hijaneh-Qaryetin, 2
»Teucrium haradjianii - Briq. ex Rech. fil.	SY	Kurd Dag, Al Wastani, Jabal Semane, 2
»Trifolium alsadami - Post	SY, LB	Jabal Al-Arab
»Trigonella berythea Boiss. et Bl.	PN	2
»Vicia dionysiensis - Moût	SY	Jabal Al-Arab, Homs, 2
»Vicia hyaeniscyamus -Moût	SY, LB	West Homs

### Restricted range species in Syria/Turkey

»Alkanna confusa - Sam. ex Rech. fil.	SY, TR	Amanus- Coast. Mts.
»Alyssum cassium -Boiss.	SY, TR	Amanus- Coast. Mts.
»Alyssum crenulatum - Boiss.	SY, TR	Amanus
»Anthemis halophila - Boiss. et Bal.	SY, TR	Antioch region
»Asphodelus baytopae E. Tuzlaci(1983)	SY, TR,	
»Astragalus antiochianus - Post	SY, TR	Antioch region
»Astragalus dipodurus - Bunge	SY, TR	Gaziantep-Kurd Dag
»Astragalus oxyphyllus - Boiss.	SY, TR	Gaziantep-Kurd Dag
»Centaurea arifolia -Boiss.	SY, TR	Amanus
»Centaurea cassia - Boiss.	SY, TR	Amanus- Coast. Mts.
»Centaurea ptosimopappa - Hayek	SY, TR	Amanus
»Cirsium amani - Post	SY, TR	Amanus-Kurd Dag
»Euphorbia haussknechtii - Boiss.	SY, TR	Upper Jezira
»Ferulago cassia - Boiss.	SY, TR	Amanus- Coast. Mts
»Johrenia porteri - Post.	SY, TR	Amanus

»Onobrychis aurantiaca - Boiss.	SY, TR	Antakya region
»Psoralea jaubertiana - Fenzl	SY, TR	Southern Turkey
»Salvia aramiensis - Rech. fil.	SY, TR	Amanus
»Salvia cassia - Sam. ex Rech.	SY, TR	Amanus
»Silene amana - Boiss.	SY, TR	Amanus
»Silene cassia - Boiss.	SY, TR	Amanus
»Silene confertiflora - Chowdhuri	SY, TR	Amanus
»Silene intricata - Post.	SY, TR	Amanus
»Stachys diversifolia - Boiss.	SY, TR	Amanus
»Trifolium cassium - Boiss.	SY, TR	Amanus
»Trifolium dichroanthoides - Rech.	SY, TR?	Amanus- Coast. Mts. (Slenfeh).
»Tunica syriaca -Boiss.	SY, TR	Antioch region
»Verbascum scaposum - Boiss.	SY, TR	Amanus
»Allium bassitense -Thiéb.	SY, TR?	Bassit

### Restricted range species with disjunct populations

»Fumaria bicolor	IT, DZ	East of Bou Ismail (NW-Algerian coast)
»Crepis aculeata (DC.) Boiss.	IL, LB, CY,	
»Allium lehmanni Lojác.	TN, IT	
»Bellevalia dubia (Guss.) Rchb.	TN, IT	



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