

VEGETATION THE MEDITERRANEAN FORESTS OF COASTAL MOUNTAINS

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Syrian Forests

Syria, with a total surface of 185 000 km² and located in the eastern side of the Mediterranean, is among the first areas of the world where man started to practice agriculture and to actively use and pressure natural forest resources. Key aspects of Syria are the harsh and unpredictable climate, the difficult socio-economic conditions and the long-lasting manipulation of trees, forests and landscapes, since ancient times, which has led to a deforestation, degradation and over-exploitation of its forests due to intensive use of wood for timber and firewood, overgrazing, as well as repeated forest fires. These problems dramatically increased during the last century when the forest surface was reduced from an initial amount of 2 million hectares in 1911 to 750 thousand hectares in 1947 and only to 450 thousand hectares at the present time. Syrian forests are also characterized by a remarkable set of features that make them naturally and aesthetically unique and very attractive, for instance, plant species richness is considered to be around 3600 species, representing an important biodiversity resource and genetic pool in the Mediterranean region.

The use of forests in Syria has traditionally been multi-objective in most cases. Forests have been used for hunting, as source of firewood and construction materials and for collecting various non-wood forests products such as resin, honey, mushrooms and berries. Syrian forests also play an important role in soil protection, water regulation and providing various amenities. However, in most of the cases forests do not have a management plan and in the best case the methods used for forest management planning have traditionally dealt only with timber production and computationally simple problems. Examples of these methods are the various forest regulation methods, or cutting budget formulas, which are still used in many other Mediterranean countries. Syrian forests are also characterised by the diversity of forestry systems using silvicultural methods ranging from clear-fellings to selective cuttings depending on the situation, species and objectives. Since natural regeneration is generally adopted in almost all these forests, careful management schemes of stand structures need to be identified for many forest types.

Natural Forest Resources

The main natural forests in the coastal mountains are the following:

Coniferous Forests

- **Forest of *Pinus brutia***

These forests occupy about 145.000 ha, concentrated particularly in the Baer-Bassit region of the Coastal area. They are found in the humid, subhumid and semi-arid bioclimatic zones. The stands are quite varied as to age, structure and stand conditions. Few stands are of excellent form and growth and should be used for seed collection.

Pinus brutia is accompanied by many trees and shrubs, according to local ecological conditions such as :

Quercus pseudocerris , *Q. infectoria* , *Q. calliprinos* , *Pistacia palaestina* , *Styrax officinalis* etc..

These pine forests are very important in Syria for their economic, environmental, social and touristic values. They are found essentially in the humid, subhumid and semi-arid bioclimatic zones.

- **Forests of *Abies cilicica***

These forests are confined to the cool perhumid bioclimatic zone and occupy a restricted area in the higher elevations (1300 - 1500 m) of the Coastal mountains, particularly in the western slope of Nabi Matta region. They are very degraded and need urgent protection. They represent an important special type of forest ecosystem from the floristic and environmental points of view, despite the very restricted area they occupy.

Abies cilicica is accompanied by many other trees and shrubs such as : *Quercus cerris*, *Q. infectoria*, *Q. libani* , *Carpinus orientalis* , *Ostrya carpinifolia* , *Acer hermonerum*, *Sorbus torminalis* , *S. flabellifolia* , *Ulmus montana* , *Cerasus mahaleb* , *Fraxinus ornus* etc...

- **Forests of *Cedrus libani***

These forests are confined to the cool humid bioclimatic zone on the eastern slope of the Coastal mountain between 1100 and 1300 m in the Nabi Matta region. *Cedrus libani* is accompanied by many shrubs and trees such as :

Quercus cerris , *Q. infectoria* , *Sorbus torminalis* , *S. flabellifolia* , *Fraxinus ornus* , *Carpinus orientalis* , *Ostrya carpinifolia* , *Juniperus drupacea* , *Acer hermoneum* etc..

The Cedar forests are degraded and needs to be urgently protected. They represent an important special type of forest ecosystem from the floristic and environmental points of view, despite the very restricted area they occupy.

- **Forests of *Cupressus sempervirens***

They occupy scattered small areas in Massiaf, Qadmous, Jaoubet Berghal etc.. in comparison with the large areas they occupied in the past. *Cupressus sempervirens* is accompanied by :

Quercus calliprinos , *Pistacia palaestina* , *Styrax officinalis* etc... They are very degraded and need protection.

- **Forests of *Pinus halepensis***

They are represented by scattered stands such as in Qadmous and Safita. There stands are very degraded and Aleppo pine is accompanied by many species of the maquis; they need to be protected.

Broad leaved Forests

- **Forests of *Quercus calliprinos***

They occupy a large area in comparison with the other natural forests in Syria and exist in the lower humid, subhumid and semi-arid bioclimatic zones. They are in the form of “ maquis” and in a different phases of degradation.

Quercus calliprinos is accompanied by many woody species such as : *Pistacia palaestina* , *Phillyrea latifolia* , *Arbutus andrachne* , *Styrax officinalis* , *Rhus cotinus* , etc..

These forests are shrinking due to illegal deforestation by rural people for orchard plantations.

- **Forests of *Quercus cerris* sp. *Pseudocerris***

These forests occupy the lower perhumid, subhumid and higher subhumid bioclimatic zones, in the Coastal and Akrad Mountains. They constitute beautiful stands in Froulok (Baer-Bassit) and Slenfeh (Djebel Alaouite). Froulok forest represents a special type of humid forest at about 500 m of altitude, as a relique forest ecosystem which should be protected urgently. This forest is under high pressure by the tourists.

Quercus cerris is accompanied by many woody species such : *Quercus infectoria* , *Carpinus orientalis* , *Ostrya carpinifolia* , *Cercis siliquastrum* , *Fraxinus ornus* etc...

- **Forest of *Quercus infectoria***

They used to cover a large area in the medium altitude of the Coastal mountains (700-1000 m) in particular, corresponding to the humid bioclimatique zone. The remnant stands are scattered and are in the form of maquis, more or less degraded. These forests have been replaced by orchards (cherry tree, Apple tree) in the majority of their natural range.

Quercus infectoria is accompanied by a number of woody species such : *Quercus calliprinos* , *Pistacia palaestina* , *Styrax officinalis* , *Rhus cotinus* , *Juniperus oxycedrus* etc..

- **Forest of *Castanea sativa***

It is found in Syria in Wadi An Naddara, on basaltic soils and in the subhumid bioclimatic zone and is accompanied by *Corylus ovellana*. This forest covers few hectares only where *Castanea* is regenerating naturally. *Castanea sativa* is an important agroforestry tree in the subhumide zone and on basaltic soils.

2.3. Riverside Forests

These forests occupy a narrow strip along the rivers in the coastal and interior zones and are constituted of the following trees :

Platanus orientalis , *Alnus orientalis* , *Salix alba* , *Tamarix* sp. (in the coastal zone) and *Populus euphratica* , *Tamarix* sp. (along the Euphrates). These forests are shrinking, in particular those of *Populus euphratica* and have lost their environmental and economic value. They should be rehabilitated.

Scientific name	Species in Cedar and Fir forest Author	Family
<i>Abies cilicica</i>	Ant. & Theodor Kotschy	<i>Pinaceae</i>
<i>Acer hermoneum</i>	J.Bornmuller Et G. Schweinfurth.	<i>Aceraceae</i>
<i>Acer hyrcanum</i>	Fisch. & Mey.	<i>Aceraceae</i>
<i>Acer syriacum</i>	Edmond Boissier. Et C. Gaillardot.	<i>Aceraceae</i>
<i>Allium cassium</i>	Edmond Boissier.	<i>Liliaceae</i>
<i>Allium chloranthum</i>	Edmond Boissier.	<i>Liliaceae</i>
<i>Allium rotundum</i>	Liné	<i>Liliaceae</i>
<i>Althaea cannabiana</i>	Liné	<i>Malvaceae</i>
<i>Althaea acaulis</i>	(Cavan.) Alef.	<i>Malvaceae</i>
<i>Alyssum argenteum</i>	Ung.	<i>Cruciferae</i>
<i>Anthemis tinctoria</i>	Liné	<i>Asteraceae</i>
<i>Anthriscus lamprocarpa</i>	Edmond Boissier.	<i>Umbelliferae</i>
<i>Arenaria cassia</i>	Edmond Boissier.	<i>Caryophyllaceae</i>
<i>Aristolochia altissima</i>	Desf.	<i>Aristolochiaceae</i>
<i>Aristolochia scabridula</i>	Edmond Boissier.	<i>Aristolochiaceae</i>
<i>Arum dioscoridis</i>	Sibth. & Sm.	<i>Araceae</i>
<i>Asperugo procumbens</i>	Liné	<i>Rubiaceae</i>
<i>Asperulla arvensis</i>	Liné	<i>Rubiaceae</i>
<i>Asphodeline lutea</i>	(Liné) Reichenb.	<i>Liliaceae</i>
<i>Asphodelus microcarpus</i>	Salz. & Viv	<i>Liliaceae</i>
<i>Asplenium trichomanes</i>	Liné	<i>Aspleniaceae</i>
<i>Astragalus drusorum</i>	Edmond Boissier.	<i>Papilionaceae</i>
<i>Bellis perennis</i>	Liné	<i>Asteraceae</i>
<i>Bromus rigidus</i>	Roth.	<i>Graminae</i>
<i>Bromus sterilis</i>	Liné	<i>Graminae</i>
<i>Bromus tectorum</i>	Liné	<i>Graminae</i>
<i>Calamintha clinopodium</i>	Bentham.	<i>Lamiaceae</i>
<i>Calendula officinalis</i>	Liné	<i>Asteraceae</i>
<i>Carpinus orientalis</i>	Miller	<i>Betulaceae</i>
<i>Cedrus libani</i>	A. Rich	<i>Pinaceae</i>
<i>Centaurea cassia</i>	Edmond Boissier.	<i>Asteraceae</i>
<i>Centaurea iberica</i>	Trev.	<i>Asteraceae</i>
<i>Cephalanthera longifolia</i>	(Huds.) Fritsch.	<i>Orchidaceae</i>
<i>Cephalanthera rubra</i>	(Liné) L. C. Rich.	<i>Orchidaceae</i>
<i>Cerasus mahaleb</i>	(L.) Mill.	<i>Rosaceae</i>
<i>Cercis siliquastrum</i>	Liné	<i>Cesalpinaceae</i>
<i>Chrysanthemum coronarium</i>	Liné	<i>Asteraceae</i>
<i>Cistus salviifolius</i>	Liné	<i>Cistaceae</i>
<i>Cistus villosus</i>	Liné	<i>Cistaceae</i>
<i>Cnidium orientale</i>	Edmond Boissier.	<i>Umbelliferae</i>
<i>Colchicum libanoticum</i>	Ehrenberg.	<i>Liliaceae</i>
<i>Convolvulus libanoticus</i>	Edmond Boissier.	<i>Convolvulaceae</i>
<i>Cornus australis</i>	C.A.Mey.	<i>Cornaceae</i>
<i>Cornus mas</i>	Liné	<i>Cornaceae</i>
<i>Cotoneaster nummulariifolia</i>	Fisch.Et Mey.	<i>Rosaceae</i>

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<i>Crataegus monogyna</i>	Willd.	<i>Rosaceae</i>
<i>Crepis reuteriana</i>	Edmond Boissier.	<i>Asteraceae</i>
<i>Crepis sancta</i>		<i>Asteraceae</i>
<i>Crocus kotschyanus</i>	C. Koch.	<i>Iridaceae</i>
<i>Crucianella ciliata</i>	Lam.	<i>Rubiaceae</i>
<i>Cyclamen coum</i>	Miller	<i>Primulaceae</i>
<i>Cynoglossum nebrodense</i>	Guss.	<i>Boraginaceae</i>
<i>Cytisus drepanolobus</i>	Edmond Boissier.	<i>papilionaceae</i>
<i>Dactylis glomerata</i>	Liné	<i>Graminae</i>
<i>Daphne libanotica</i>	Mout.	<i>Thymelaceae</i>
<i>Dianthus multipunctatus</i>	(Ser.) N. Comb.	<i>Caryophyllaceae</i>
<i>Dianthus orientalis</i>	Adams.	<i>Caryophyllaceae</i>
<i>Dianthus strictus</i>	Banks. Et Sol.	<i>Caryophyllaceae</i>
<i>Doronicum caucasicum</i>	Bied.	<i>Asteraceae</i>
<i>Dryopteris libanotica</i>	(Ros.) A. Christ.	<i>Aspidiaceae</i>
<i>Epipactis latifolia</i>	Liné All.	<i>Orchidaceae</i>
<i>Erica verticillata</i>	Forssk.	<i>Ericaceae</i>
<i>Euphorbia apios</i>	Liné	<i>Euphorbiaceae</i>
<i>Euphorbia herniariifolia</i>	Willd.	<i>Euphorbiaceae</i>
<i>Euphorbia thamnoides</i>	Edmond Boissier.	<i>Euphorbiaceae</i>
<i>Ferulago autumnalis</i>	Jean- Marie Thiebaaut.	<i>Umbelliferae</i>
<i>Ferulago cassia</i>	Edmond Boissier.	<i>Umbelliferae</i>
<i>Festuca laevis</i>	(Hack.) Nym.	<i>Graminae</i>
<i>Fibigia clypeata</i>	Liné Medic.	<i>Cruciferae</i>
<i>Ficaria ficarioides</i>	Bory & Chaub.	<i>Ranunculaceae</i>
<i>Frankenia hispida</i>	D.	<i>Frankeniaceae</i>
<i>Fraxinus ornus</i>	Liné	<i>Oleaceae</i>
<i>Fritillaria alfredae</i>	Post.	<i>Liliaceae</i>
<i>Fritillaria elwesii</i>	Edmond Boissier.	<i>Liliaceae</i>
<i>Fritillaria libanotica</i>	(Edmond Boissier.) Baker	<i>Liliaceae</i>
<i>Fungi sp.</i>		
<i>Gagea reticulata</i>	(Pall.) Schult.	<i>Liliaceae</i>
<i>Galium aparine</i>	Liné	<i>Rubiaceae</i>
<i>Galium aureum</i>	Vis.	<i>Rubiaceae</i>
<i>Galium verum</i>	Liné	<i>Rubiaceae</i>
<i>Geranium libani</i>	P. H. Davis	<i>Geraniaceae</i>
<i>Geranium lucidum</i>	Liné	<i>Geraniaceae</i>
<i>Geranium tuberosum</i>	Liné	<i>Geraniaceae</i>
<i>Geum urbanum</i>	Liné	<i>Rosaceae</i>
<i>Hedera helix</i>	Liné	<i>Araliaceae</i>
<i>Helleborus vesicarius</i>	Rierre Martin Remi Aucher Eloy.	<i>Ranunculaceae</i>
<i>Hypericum lydiium</i>	Edmond Boissier.	<i>Guttiferae</i>
<i>Iris nusairiensis</i>	Mout.	<i>Iridaceae</i>
<i>Juniperus drupacea</i>	J. Houton De La Billardiere.	<i>Cupresuceae</i>
<i>Juniperus oxycedrus</i>	Liné	<i>Cupresuceae</i>
<i>Lactuca orientalis</i>	Edmond Boissier.	<i>Asteraceae</i>

Scientific name	Species in Cedar and Fir forest Author	Family
<i>Lamium truncatum</i>	Edmond Boissier.	<i>Lamiaceae</i>
<i>Lathyrus aphaca</i>	Liné	<i>Papilionaceae</i>
<i>Lathyrus digitatus</i>	(Bied.) Fiori.	<i>Papilionaceae</i>
<i>Lathyrus inermis</i>	Rochel.	<i>Papilionaceae</i>
<i>Laurus nobilis</i>	Liné	<i>Lauraceae</i>
<i>Lecoquia cretica</i>	(Lam.) D. C.	<i>Umbelliferae</i>
<i>Limonium angustifolium</i>	(Tausch) Degen.	<i>Plumbaginaceae</i>
<i>Lolium rigidum</i>	Gaud.	<i>Graminae</i>
<i>Lonicera nummularifolia</i>	Jaub. & Spach.	<i>Caprifoliaceae</i>
<i>Luzula forsteri</i>	(Sm.) D. C.	<i>Juncaceae</i>
<i>Malus trilobata</i>	C. K. Schneider	<i>Rosaceae</i>
<i>Marrubium libanoticum</i>	Edmond Boissier.	<i>Labiatae</i>
<i>Medicago sativa</i>	Liné	<i>Papilionaceae</i>
<i>Melica uniflora</i>	Retz.	<i>Graminae</i>
<i>Mercurialis ovata</i>	Sternb. & Hoppe.	<i>Euphorbiaceae</i>
<i>Orchis laxiflora</i>	Lam.	<i>Orchidaceae</i>
<i>Origanum syriacum</i>	Liné	<i>Lamiaceae</i>
<i>Oryzopsis caeruleascenc</i>	(Desf.) Richt.	<i>Graminae</i>
<i>Ostrya carpinifolia</i>	Scop.	<i>Betulaceae</i>
<i>Paeonia corallina</i>	Retz.	<i>Paeoniaceae</i>
<i>Papaver syriacum</i>	Edmond Boissier. Et Isidore Blanche.	<i>Papaveraceae</i>
<i>Phalaris tuberosa</i>	Liné	<i>Graminae</i>
<i>Phlomis chrysophylla</i>	Edmond Boissier.	<i>Lamiaceae</i>
<i>Physospermum aquilegifolium</i>	All.	<i>Umbelliferae</i>
<i>Pimpinella anthriscoides</i>	Edmond Boissier.	<i>Umbelliferae</i>
<i>Pirus syriaca</i>	Edmond Boissier.	<i>Rosaceae</i>
<i>Pistacia palaestina</i>	Edmond Boissier.	<i>Anacardiaceae</i>
<i>Plantago psyllium</i>	Liné	<i>Plantaginaceae</i>
<i>Poa pratensis</i>	Liné	<i>Graminae</i>
<i>Poa bulbosa</i>	Liné	<i>Graminae</i>
<i>Potentilla micrantha</i>	Ramond.	<i>Rosaceae</i>
<i>Primula vulgaris</i>	Huds.	<i>Primulaceae</i>
<i>Prunus mahaleb</i>	Liné	<i>Rosaceae</i>
<i>Prunus ursina</i>	Theodor Kotschy.	<i>Rosaceae</i>
<i>Pteridium aquilinum</i>	(Liné) Kuhn.	<i>Pteridiaceae</i>
<i>Pyrethrum cilicium</i>	Edmond Boissier.	<i>Asteraceae</i>
<i>Quercus calliprinos</i>	Webb.	<i>Fagaceae</i>
<i>Quercus cedrorum</i>	Theodor Kotschy.	<i>Fagaceae</i>
<i>Quercus cerris</i>	Edmond Boissier.	<i>Fagaceae</i>
<i>Quercus infectoria</i>	Oliv.	<i>Fagaceae</i>
<i>Quercus libani</i>	Oliv.	<i>Fagaceae</i>
<i>Ranunculus damascenus</i>	Edmond Boissier & C. Gaillardot.	<i>Ranunculaceae</i>
<i>Ranunculus marginatus</i>	D'urv.	<i>Ranunculaceae</i>
<i>Ranunculus paludosus</i>	Poir.	<i>Ranunculaceae</i>
<i>Rhamnus cathartica</i>	Liné	<i>Rhamnaceae</i>

Scientific name	Species in Cedar and Fir forest Author	Family
<i>Rhus coriaria</i>	Liné	<i>Anacardiaceae</i>
<i>Rhus cotinus</i>	Liné	<i>Anacardiaceae</i>
<i>Rosa glutinosa</i>	Sibth.	<i>Rosaceae</i>
<i>Rosa sicula</i>	Tratt.	<i>Rosaceae</i>
<i>Rosularia libanotica</i>	(Liné) Gunnar Samuelsson.	<i>Crassulaceae</i>
<i>Rubia aucheri</i>	Edmond Boissier.	<i>Rubiaceae</i>
<i>Rubus sanctus</i>	Schreb.	<i>Rosaceae</i>
<i>Rubus tomentosus</i>	Borckh.	<i>Rosaceae</i>
<i>Rumex pulcher</i>	Liné	<i>Polygonaceae</i>
<i>Salvia grandiflora</i>	Etling.	<i>Lamiaceae</i>
<i>Salvia viridis</i>	Liné	<i>Lamiaceae</i>
<i>Sambucus ebulus</i>	Liné	<i>Caprifoliaceae</i>
<i>Saponaria bargylana</i>	Gombault.	<i>Caryophyllaceae</i>
<i>Saxifraga scotophila</i>	Edmond Boissier.	<i>Saxifragaceae</i>
<i>Scabiosa palaestina</i>	Liné	<i>Dipsaceae</i>
<i>Scleranthus verticillatus</i>	Tausch.	<i>Caryophyllaceae</i>
<i>Scrophularia nusairiensis</i>	Edmond Boissier. Et Heldr. Post.	<i>Scrophulariaceae</i>
<i>Scutellaria diffusa</i>	Benth.	<i>Lamiaceae</i>
<i>Sedum stedelii</i>	Boiss.	<i>Crassulaceae</i>
<i>sideritis nusairiensis</i>	George E. Post.	<i>Lamiaceae</i>
<i>Silene amana</i>	Edmond Boissier.	<i>Caryophyllaceae</i>
<i>Silene italica</i>	Liné Pers.	<i>Caryophyllaceae</i>
<i>Sorbus aria</i>	Crantz.	<i>Rosaceae</i>
<i>Sorbus torminalis</i>	(Liné) Crantz.	<i>Rosaceae</i>
<i>Stachys libanotica</i>	Benth.	<i>Lamiaceae</i>
<i>Stachys rupestris</i>	Montb.& Rierre Martin Remi Aucher Eloy.	<i>Lamiaceae</i>
<i>Stellaria media</i>	(Liné) Vill.	<i>Caryophyllaceae</i>
<i>Styrax officinalis</i>	Liné	<i>Styracaceae</i>
<i>Tamus communis</i>	Liné	<i>Dioscoreaceae</i>
<i>Teucrium chamaedrys</i>	Liné	<i>Lamiaceae</i>
<i>Teucrium divaricatum</i>	Sieb. Et Heidr.	<i>Lamiaceae</i>
<i>Teucrium polium</i>	Liné	<i>Lamiaceae</i>
<i>Thesium bergeri</i>	Zuccar.	<i>Santalaceae</i>
<i>Thlaspi annum</i>	C. Koch.	<i>Cruciferae</i>
<i>Thlaspi microstylum</i>	Edmond Boissier.	<i>Cruciferae</i>
<i>Thymus syriacus</i>	Edmond Boissier.	<i>Lamiaceae</i>
<i>Trifolium campestre</i>	Schreb.	<i>Papilionaceae</i>
<i>Trifolium dichroanthoides</i>	Edmond Boissier.	<i>Papilionaceae</i>
<i>Trifolium physodes</i>	Stev.	<i>Papilionaceae</i>
<i>Ulmus montana</i>	Willd.	<i>Ulmaceae</i>
<i>Umbilicus erectus</i>	D.C.	<i>Crassulaceae</i>
<i>Umbilicus lutea</i>	D.C.	<i>Crassulaceae</i>
<i>Verbascum caesareum</i>	Edmond Boissier.	<i>Scrophulariaceae</i>
<i>Verbascum cassium</i>	Nahal	<i>Scrophulariaceae</i>
<i>Veronica reuterana</i>	Edmond Boissier.	<i>Scrophulariaceae</i>
<i>Veronica Syriaca</i>	Roem. Et Sch.	<i>Scrophulariaceae</i>