

Note on the vegetation of the mounts of tlemcen (Western Algeria): Floristic and phytoecological aspects

Brahim Babali*, Abderrahmane Hasnaoui, Nadjat Medjati, Mohamed Bouazza

Laboratory of Ecology and Management of the Natural Ecosystems, Department of Ecology and Environment, Aboubakr Belkaid University, Tlemcen, Algeria; *Corresponding Author: miharb_babali@hotmail.fr

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ABSTRACT

Of the four national hunting reserves in Algeria, the Mounts of Tlemcen Moutas reserve <http://reservebio-tlm.com>, characterized by a large area, reliefs and a specific climate, implies significant floristic and faunistic richness. Currently, the coexistence of species, such as *Quercus faginea* subsp. *tlemcenensis* (DC.) M., *Lonicera implexa* L., *Ruscus aculeatus* L., indicates a forest dominant ecological atmosphere, although the region has experienced repeated fires during the 90's. In this research, a phytoecological and syntaxonomical analysis is obvious. More than 300 species have been inventoried and indexed in more than 70 families and this shows the importance of phyto-diversity of the studied region. In the analysis of the phyto-ecological parameters, we could notice a regression of the vegetal cover in its diversity.

Keywords: Biodiversity; Floristic inventory; Phytoecological; Anthropozoological action; Climate; Moutas; Tlemcen

1. INTRODUCTION

The currently developed methods of biodiversity extinction have large uncertainties but all converge on acceleration whatever would be the economic models. To assess the loss of biodiversity, we worked on the disappearance and fragmentation of plant life media (inventory of natural habitats).

The reserve is particularly sensitive in terms of plant diversity, it underwent in the past human pressures and significant fires. The ecological landscape includes different habitats moving to a scrub, with considerable variations.

The knowledge of this dynamic and this floristic inventory is an important research path for us. Analyses of biodiversity lead in particular to show that the maximum biodiversity is not in the primitive forest *sensu stricto*, but in the moderately man altered spaces [1].

We will discuss this problem here from floristic inventory formed by tree structures and their stages of degradation as it is at this level that they can be analyzed.

The vegetation of the national parks and natural reserves in the Mediterranean basin have been studied by many authors like Gruber and Sandoz [2]; Véla *et al.* [3]; Hill and Véla [4]; Ibn Tattouand & Fennane [5]... and other works in Tlemcen region like those of Benabadji *et al.* [6]; Mesli *et al.* [7]; Letreuch-Belarouci *et al.* [8]; Medjahdi *et al.* [9] and Bouazza *et al.* [10].

2. METHODOLOGY

Location and structure of Tlemcen hunting reserve:

The study area is located in the western part of North-west Algeria at about 46 km as the crow flies from the sea and 26 km south-west of the city of Tlemcen. The reserve, part of Hafir forest, occupies the highest and most wooded area of the Mounts of Tlemcen. It is located about 34°41' to 34°49' north and 01°25' to 01°35' west (**Figure 1**).

It occupies an area of 2156 hain a 15 km perimeter; it is characterized by typically mountainous reliefs of the Tamaksalet massif with a remarkable difference in altitude. The altitude is between the extreme points from Ras Torriche 1303 m and the region of Sidi Messaoud at 1017 m.

It is geographically limited:

- To the east by the town of Aïn Ghoraba;
- In the north-east by the municipality of Sabra;
- To the west and northwest by the municipality of Bouhlou;

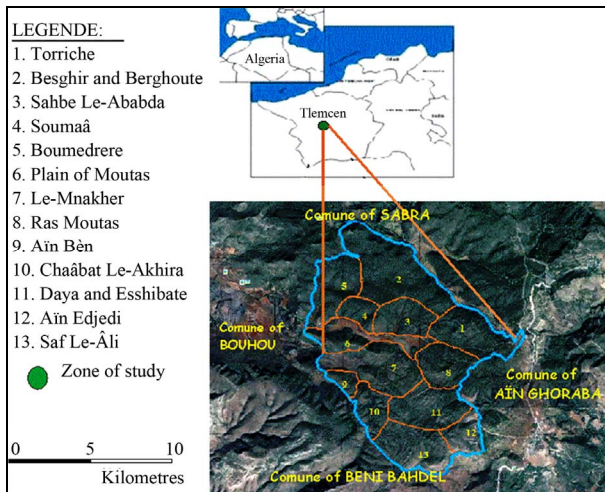


Figure 1. Location map.

- In the south and southwest by the city of Beni Bahdel.

It receives about 500 mm annual rainfall and shows average temperatures between 6.4°C (January) and 26.4°C (July and August). It is classified in the cool winter's sub-humid bioclimatic level with a dry season (5 months) which lasts from June to October.

The soils are varied depending on the topography of the region. On the tops, they are not very deep where at times the bedrock levels. Sometimes deep towards very deep on all along the principal river basins of the hydrographic network.

In the reserve, the main rock source is sedimentary: calcareous sandstone, sandy limestones, dolomites and marl [11].

The complete list was made from the following works:

Moutas Herbarium which is made up to now more than 220 species recorded by researchers from the laboratory of plant/botanical ecology from the University of Tlemcen,

Field work during 2010, 2011 and 2012, we have completed 70 surveys using conventional techniques and methods of ecology (inventory, minimum area, transect, flora network...). The method of Braun-Blanquet [12], which is expressed by analytical characteristics: abundance, dominance and sociability on a scale of 1 to 5 to help us to do a thorough analysis of the vegetation.

The basic work used for the identification of taxa collected in the field is from the studies done by Quézel & Santa [13]; Battandier & Trabut [14]; Valdés et al. [15]; Blanca et al. [16]; Maire [17] and Dobignard [18].

Scientific Name: the word list adopted is that of: *Index synonymique et bibliographique de la flore d'Afrique du Nord* [18] and synonyms from: *Nouvelle flore d'Algérie et des régions désertiques méridionales* [13].

3. RESULTS AND DISCUSSIONS

Ecological zoning of the main forest groupings.

3.1. The Oak Forests

Four major species of the genus *Quercus* were found in the reserve: *Quercus ilex* L., *Quercus suber* L., *Quercus coccifera* L. and *Quercus faginea* subsp. *tlemcenensis* (DC.) Maire and Weiller (= *Quercus faginea* subsp. *Broteroi* (Coutinho) A. Camus).

3.1.1. Evergreen Oak Forest

Dominates almost all of the reserve and is characterized by the evergreen oak presence (*Quercus ilex* subsp. *ballota* (Desf.) Samp) within a 942.4 hectares area.

The major issues, well developed and characterized by a large trunk, are located at the edges of cultivated lands within the reserve where the soil is deep and very rich in organic matter. These characters change as the altitude increases, the soil becomes shallower and bedrock appears at the surface. In addition, North exposures have a significant contribution to water compensation, allowing the taxa development in integrated settlements linked to *Quercetia ilicis* [6,19].

The distribution of Kermes oak (*Quercus coccifera* subsp. *coccifera* L.) is very limited, and in the extreme west and north-west of the reserve close to Tamaksalet (Bouhroul municipality) and some species are scattered throughout the center of the reserve at Ras Mnakher, Mnakher and Souamaa. These areas are a warmer (xeric).

3.1.2. Zeen Oak Forest

The zeen oak (*Quercus faginea* Lamk) is a deciduous oak of meso- and supra-Mediterranean types [20-22], endemic to the western Mediterranean (Iberian Peninsula, Morocco, Algeria and Tunisia) [23]. It would be represented in the Moutas by a sub-species: *Quercus faginea* subsp. *tlemcenensis* (DC.) M. (Figure 2)

This oak occupies 1/5th of the reserve with an area of 428 ha. It is found mainly in the southern and south-



Figure 2. *Quercus faginea* subsp. *tlemcenensis* formations at Torriche (Moutas). Photo. Babali B. September 2011.

western part of the reserve at Torriche, Ras Moutas, Mnakher, Chaâbat La'akhra and Aïn Ben. It is also found in the extreme north at Besghirand Boumedrer.

The Tlemcen zeen oak, ranging in size between 5 and 7 m, prefers deep soils and limestone-rich substrate with fresh degraded materials and rare silica. This species exists and dominates the valleys and hollows of the reserve. We can consider that this species benefits from the water compensation, despite drought and this can be explained by compensation edaphic-climatic phenomena [24]. It is practically non-existent or so on the summit where the soil depth is less thick, and even if it does, it is most unusual and with a dwarf size that barely exceeds 2 m.

Among the accompanying taxa are: *Cytisus arboreus* subsp. *Baeticus* (Webb) Maire *Cytisus villosus* Pourret, *Hedera algeriensis* Hibberd, *Ruscus aculeatus* L., *Smilax aspera* L., *Viburnum tinus* L., *Lonicera implexa* L., *Pistacia terebinthus* L., *Asplenium ceterach* L., *Umbilicus rupestris* (Salisb.) Dandy, *Phillyrea latifolia* L. *Ampelodesmos mauritanicus* (Poiret) Durand & Schinz...

3.1.3. Cork Oak Forests

Represented by the cork oak relics: *Quercus suber* L. (Figure 3), in a very limited area, which does not exceed 20 ha, they are frequently found in Saf-el-Ali, Aïn Djedi and other relics in Torriche, Boumedrer and Ras Moutas south side and finally a few stalks at Mnakher. Their growth is generally less strong after fire. These species are typical of low-intensity fire regimes, but common in the study area [25-27].

The vegetation associated with these cork oak is: *Lavandula stoechas* L., *Anagallis arvensis* L., *Erica arborea* L., *Arbutus unedo* L., *Stauracanthus boivinii* (Webb) Samp *Ampelodesmos mauritanicus* (Poiret) Durand & Schinz, *Asparagus acutifolius* L., *Daphne gnidium* L., *Cytisus villosus* Pourret, *Cistus clusii* Dunal., *Cistus creticus* L., *Cistus salvifolius* L., *Cistus ladanifer* subsp.



Figure 3. Relic of cork oak. Sahb El Ababda (Moutas). Photo. Babali B. October 2010.

mauritanicus Pau & Sennen. These plants prefer siliceous substrates.

3.2. Conifers

They are softwood thermophilic with an extremely wide ecological spectrum. We have: Thuja: *Tetraclinis articulata* (Vahl) Masters (Figure 4).

Endemic to North Africa [28,29] it colonizes areas with low rainfall (300 - 500 mm) [30]. This species is slightly represented in the Moutas reserve. It occupies, especially the northwest portion of the reserve: southwestern slopes and the southern slopes of Boumedrer, Ras Mnakher toward Bouhlou, Aïn Ben Soumaâ and Safel-Ali. It is associated with *Pistacia lentiscus* L., *Chamaerops humilis* var. *argentea* Andrew *Globularia alypum* L., *Macrochloa tenacissima* L. (Kunth), *Phyllerya angustifolia* L., *Asparagus albus* L.

The Juniper: *Juniperus oxycedrus* Subsp. *Oxycedrus*

It is widespread in the reserve with scattered blankets. This indicates the presence of degradation oak stands.

• Other conifers are represented in the form of plantations in the rest area Torriche and near the forest house Boumedrer as Aleppo pine *Pinus halepensis* Miller, stone pine (*Pinus pinea* L.) cedar (*Cedrus atlantica* (Endl.) Carrière) and cypress (*Cupressus sempervirens* L.)

3.3. Riverine

The reserve is surrounded by natural sources: Aïn-Boumedrer the largest and most common, AïnE-Djedi, Aïn Moutas and Aïn El-Ben. The vegetation, adjacent to these springs and streams, is riparian representing vegetation structure at least partly azonal [31], or indicators of wetlands such as *Rubus ulmifolius* Schott, *Dittrichia viscosa* (L.) Greuter, *Typha latifolia* L., *Carex hispi-*



Figure 4. Degraded forest *Tetraclinis articulata* based at Tameksalet-Moutas (south side). Photo. Babali B., October 2012.

da Willd., *Populus alba* L., *Salix pedicellata* Desf., *Juncus maritimus* Lam., *Hypericum perforatum* L., *Mentha rotundifolia* L., *Ficus carica* L., *Calamintha nepeta* (L.) Savi, *Potentilla reptans* L., *Zannichellia peltata* Bertol., *Groenlandia densa* (L.) Fourr., *Apium nodiflorum* (L.) Lag, *Arundo donax* L., *Dactylorhiza durandii* (Boiss. & Reuter) M. Lainz, *Ranunculus ficaria* L., *Ranunculus aquatilis* L., *Ranunculus spicatus* Desf. *Sonchus maritimus* L., *Nerium oleander* L. *Trachelium caeruleum* L., *Jasminum fruticans* L., *Vitis vinifera* subsp. *sylvestris* (D.C. Gmelin) Hegi. *Rorippa nasturtium-aquaticum* (L.) Hayek (= *Nasturtium officinale* R. Br.).

Riparian forests are dominant in this area; unfortunately the foresters do not take this fact into account in their statistics.

3.4. The Scrub

Over a large area of 680 ha, the scrubs are characterized and dominated by more xeric coppices depleted in forest and pre-forest species that occupy the land like the chamaephytes or nanaophanerophytes which prefer gradients and hot spots (southern slopes) belonging to *Pistacio-Rhamnetalia Alaterni* represented by *Chamaerops humilis* var. *argentea* Andrew *Ampelodesmos mauritanicus* (Poiret) Durand & Schinz, *Pistacia terebinthus* L., *Thymus munbyanus* Boiss. & Reuter, *Fumana thymifolia* (L.) Webb, *Calicotome intermedia* (Salzm.) C. Presl, *Rhamnus lycioides* L.

Other taxa grow in an expansionary way after the fire e.g., *Cistus ladanifer* L., *Cistus creticus* L. and *Cistus salvifolius* L. and taxa characterized by their high regeneration such as thuja and evergreen oak that can participate in the formation of scrub landscapes [20].

3.5. Lawns (Figure 5)

“in the short-cycle crops adapted to use a fleeting resource, tolerance and/or need of light (light-demanding species) make them exclusive or preferential plants of-



Figure 5. Annual plant lawn with *Anemone coronaria* before Moutas plain crops. Photo. Babali B., March 2011.

ligotrophic dry grasslands or rocks exposed to wind and temperature extremes.” [32].

They are spread over about 106 hectares and dominated by annual species (Therophytes) caused by high anthropozoological action and further degradation (fire).

This group belongs to the *Thero-Brachypodieta* in general, is on calcareous substrata; characterized by *Rhaponticum coniferum* (L.) Greuter, *Bombycilaena discolor* (Pers.) Lainz, *Reichardia tingitana* (L.) Roth, *Scorzonera laciniata* L., *Trifolium stellatum* L., *Ajuga iva* var. *pseudoiva* subsp. *Pseudoiva* (DC.) Briq., *Teucrium polium* L., *Ophrys lutea* subsp. *lutea* (Cav.) Gouan, *Carex halleriana* Asso., *Rumex bucephalophorus* L., *Briza maxima* L. *Vulpia ciliate* Dumort...

List of vascular taxa listed by family in Tlemcen hunting reserve.

The list includes 322 species belonging to 72 families: Compositae (Asteraceae), Leguminosae (Fabaceae), Labiatae (Lamiaceae), Gramineae (Poaceae) and Orchidaceae (see palnches 1 - 2 in the annex).

➤ ALLIACEAE

Allium Cupani Raf.

Allium roseum L.

➤ AMARYLLIDACEAE

Acis autumnalis (L.) Herb

=*Leucojum autumnale* L.

Narcissus cantabricus DC.

Narcissus serotinus L.

Narcissus tazetta L.

Narcissus tazetta subsp. *pachybolbus* (Dur.) Baker

Pancratium foetidum var. *oranense* Pomel

➤ ANACARDIACEAE

Pistacia lentiscus L.

Pistacia Terebinthus L.

➤ APOCÉNACEAE

Nerium oleander L.

➤ ARACEAE

Arisarum simorrhinum Durieu

=*Arisarum vulgare* subsp. *simorrhinum* (dur.) M.et W.

Biarum Bovei subsp. *dispar* (Schott.) Engler

➤ ARALIACEAE

Hedera helix L.

➤ ARECACEAE = PALMACEAE

Chamaerops humilis subsp. *Argentea* André.

➤ ARISTOLOCHIACEAE

Aristolochia baetica L.

Aristolochia paucinervis Pomel

=*Aristolochia longa* subsp. *paucinervis* (Pomel) Batt.

➤ ASPARAGACEAE

Anthericum liliago L. subsp. *algeriense*

Aphyllanthes monspeliensis L.

Asparagus acutifolius L.

Asparagus albus L.

➤ ASPHODELACEAE

- Asphodelus ramosus* L.
= *Asphodelus microcarpus* Salzm et Viv
- ASPLENIACEAE
Ceterach officinarum Lamk.
= *Asplenium ceterach* L.
- BORAGINACEAE
Anchusa italica Retz.
= *Anchusa azurea* Mill.
Borago officinalis L.
Cerintho gymnandra Gasparr.
= *Cerintho major* subsp. *gymnandra* (Aspar.)M.
Cynoglossum cheirifolium L.
Echium vulgare L.
Neotostema apulum (L.) I.M. Johnston
= *Lithospermum apulum* (L.) Vahl.
- CAMPANULACEAE
Campanula dichotoma L.
Campanula rapunculus L.
Trachelium caeruleum L.
- CAPRIPHOLIACEAE
Lonicera implexa L.
Viburnum tinus subsp. *tinus* L.
- CARYOPHYLLACEAE
Dianthus cintranus Boiss. & Reuter
= *Dianthus gaditanus* Boiss.
Dianthus serrulatus subsp. *macranthus* Maire
Paronychia argentea Lam.
Silene vulgaris (Moench) Garcke
= *Silene inflata* (Salisb.) Sm.
Silene latifolia subsp. *latifolia* Poiret
Silene ramosissima Desf.
Stellaria media (L.) Vill.
- CISTACEAE
Cistus clusii Dunal.
Cistus creticus L.
= *Cistus villosus* L.
Cistus ladanifer subsp. *mauritanus* Pau & Sennen
= *Cistus ladaniferus* L.
Cistus salvifolius L.
Fumana thymifolia (L.) Webb
Halimium umbellatum (L.) Spach
Helianthemum cinereum (Cav.) Pers.
Helianthemum helianthemoides (Desf.) Grosser
Helianthemum salicifolium (L.) Miller
- COLCHICACEAE
Colchicum lusitanum Brot.
= *Colchicum autumnale* L.
Merendera filifolia Camb.
- COMPOSITAE = ASTERACEAE
Anacyclus pyrethrum (L.) Link
Atractylis cancellata L.
Bellis sylvestris Cirillo
Bombycilaena discolor (Pers.) Laínz
= *Micropus bombycinus* subsp. *discolor* Lag.
- Calendula arvensis* L.
Calendula suffruticosa Vahl
Carlina gummifera (L.) Less.
Catananche caerulea L.
Centaurea pullata L.
Cichorium intybus L.
Cirsium echinatum (Desf.) DC.
Dittrichia viscosa (L.) Greuter
= *Inula viscosa* (L.) Ait.
Echinops strigosus L.
Filago fuscescens Pomel
Glebionis segetum (L.) Fourr.
= *Chrysanthemum segetum* L.
Helichrysum stoechas (L.) Moench
= *Helichrysum stoechas* (L.) DC.
Inula montana L.
Mauranthemum paludosum (Poiret) Vogt & Oberprieler
= *Leucanthemum paludosum* (Poiret) non Bar.
Pallenis maritima (L.) Greuter
= *Asteriscus maritimus* (L.) Less.
Pallenis spinosa (L.) Cass.
Phagnalon saxatile (L.) Cass.
Phagnalon sordidum (L.) Reichenb.
Reichardia tingitana (L.) Roth
Rhaponticum acaule (L.) DC.
Rhaponticum coniferum (L.) Greuter
= *Leuzea conifera* (L.) DC.
Scolymus grandiflorus Desf.
Scolymus hispanicus L.
Scorzonera laciniata L.
Scorzonera undulata Vahl.
Senecio vulgaris L.
Sonchus asper (L.) Hill
Sonchus maritimus L.
Stachelina dubia L.
Taraxacum obovatum (Willd.) DC.
- CONVULVULACEAE
Convolvulus althaeoides L.
Convolvulus arvensis L.
Convolvulus cantabrica L.
Convolvulus humilis Jacq.
Convolvulus tricolor L.
- CRASSULACEAE
Pistorinia breviflora subsp. *intermedia* (Boiss. & Reuter) Greuter & Burdet
= *Cotyledon breviflora* (Boiss.) M.
Sedum sediforme (Jacq.) Pau
Sedum album L.
Umbilicus rupestris (Salisb.) Dandy
= *Cotyledon umbilicus-veneris* subsp. *Pendulina* (DC.) Batt.
- CRUCIFERAE = BRASSICACEAE
Alyssum simplex Rudolphi

- Biscutella didyma* L.
Erysimum grandiflorum Desf.
 = *Erysimum bocconeii* (all.) Pers.
Lepidium hirtum (L.) Sm.
Lobularia maritima (L.) Desv.
Nasturtium officinale R. Br.
 = *Rorippa nasturtium-aquaticum* (L.) Hayek
Raphanus raphanistrum L.
Sinapis alba L.
Sinapis arvensis L.
- CUPRISSACEAE
Juniperus oxycedrus L. subsp. *oxycedrus*
Tetraclinis articulata (Vahl) Masters
Cupressus sempervirens L.
- CYPERACEAE
Carex halleriana Asso
Carex hispida Willd.
- DIOSCOREACEAE
Diocorea communis (L.) Caddick & Wilkin
 = *Tamus communis* L.
- DIPSACACEAE
Cephalaria leucantha (L.) Roemer & Schultes
Lomelosia stellata (L.) Raf.
 = *Scabiosa stellata* L.
Sixalix atropurpurea (L.) Greuter & Burdet
 = *Scabiosa atropurpurea* L.
- ERICACEAE
Arbutus unedo L.
Erica arborea L.
Erica multiflora L.
- EUPHORBIACEAE
Euphorbia helioscopia L.
Euphorbia nigrænsis All.
Euphorbia squamigera Lois.
- FAGACEAE
Quercus coccifera L. subsp. *coccifera*
Quercus faginea subsp. *tlemcenensis* (DC.) Maire et Weiller
 = *Quercus faginea* subsp. *broteroi* (Coutinho) A. Camus
Quercus Ilex subsp. *Ballota* (Desf.) A. DC.
Quercus suber L.
- GENTIANACEAE
Centaurium erythraea Raf.
 = *Centaurium umbellatum* (Gibb.) Beck.
- GÉRANIACEAE
Erodium moschatum (L.) L'Hér.
Geranium malviflorum Boiss. & Reute
- GRAMINEAE = GRAMINACEAE = POACEES
Aegilops geniculata Roth
Aegilops triuncialis L.
Ampelodesmos mauritanicus (Poiret) Durand & Schinz
 = *Ampelodesma mauritanica* (Poiret) Dur.et Sch.
- Anisantha madritensis* (L.) Nevski
 = *Bromus matritensis* L.
Anisantha rubens (L.) Nevski
 = *Bromus rubens* L.
Arundo donax L.
Avena sativa L.
Avena sterilis L.
Brachypodium sylvaticum (Huds.) P. B.
Briza maxima L.
Bromus hordeaceus L.
Cynosurus echinatus L.
Festuca coerulea Desf.
Hordeum murinum L.
Lagurus ovatus L.
Macrochloa tenacissima (L.) Kunth
 = *Stipa tenacissima* L.
Vulpia ciliata Dumort.
- HYACINTHACEAE
Drimia maritima (L.) Speta
 = *Urginea maritima* var. *pancratium* (Steinh.) Baker.
Drimia undulata Jacq.
 = *Urginea undulata* (Desf.) Steinh. subsp. *typica* M.
Leopoldia comosa (L.) Parl.
 = *Muscari comosum* (L.) Mill.
Muscari neglectum Guss.
Oncostema peruviana (L.) Speta
 = *Scilla peruviana* L.
Ornithogalum algeriense Jord. & Fourr
 = *Ornithogalum umbellatum* L.
Ornithogalum narbonense L.
 = *Ornithogalum pyramidalisauct.* non L.
Prospero autumnalis (L.) Speta
 = *Scilla autumnalis* L.
Prospero obtusifolium (Poiret) Speta
 = *Scilla obtusifolia* Poiret
Uropetalum serotinum (L.) Ker Gawl.
 = *Dipcadi serotinum* (L.) Medik.
- HYPERICACEAE
Hypericum perforatum L.
Hypericum tomentosum subsp. *tomentosum* L.
- IRIDACEAE
Gladiolus italicus Mill
 = *Gladiolus segetum* Ker.-Gawl.
Iris planifolia (Mill.) Dur. et Sch.
Iris xiphium L.
Moraea sisyrrinchium (L.) Ker Gawl.
 = *Gynandris sisyrrinchium* (L.) Parl.
Romulea bulbocodium (L.) Seb.et Maur.
- JUNCACEAE
Juncus maritimus Lamk.
- LABIATAE = LAMIACEAE
Ajuga chamaepitys (L.) Schreber
 = *Ajuga chamaepitis* Schreb.
Ajuga iva subsp. *iva* (L.) Schreber

Ajuga iva subsp. *pseudoiva* (DC.) Briq. var. *pseudo-iva*

Ballota hirsuta Benth

Calamintha nepeta (L.) Savi

= *Satureja calamintha* subsp. *Nepeta* correct

Lamium amplexicaule L.

Lavandula stoechas L. subsp. *stoechas*

Marrubium vulgare L.

Mentha rotundifolia L.

Nepeta multibracteata Desf.

Nepeta tuberosa subsp. *reticulata* (Desf.) Maire

Origanum vulgare subsp. *Glandulosum* (Desf.) Iest-waart

= *Origanum glandulosum* Desf.

Phlomis crinita subsp. *Mauritanica* (Munby) Murb.

= *Phlomis crinita* cav.

Phlomis herba-venti L.

Rosmarinus eriocalyx Jord. & Fourr.

= *Rosmarinus tourneforti* de Noé

Salvia verbenaca L.

Stachys ocymastrum (L.) Briq.

Teucrium fruticans L.

Teucrium polium L.

Teucrium pseudochamaepitys L.

Thymus munbyanus subsp. *coloratus* (Boiss. & Reuter) Greuter & Burdet

= *Thymus ciliatus* subsp. *coloratus* (B. & R.) Batt.

➤ LEGUMINOSAE = FABACEAE

Anthyllis polycephala Desf.

Anthyllis vulneraria L.

Argyrobolium zanonii (L.) Link

= *Lotophyllus argenteus* L.

Astragalus caprinus subsp. *caprinus*.

= *Astragalus caprinus* subsp. *Lanigerus* (Desf.) M

Astragalus epiglottis L.

Bituminaria bituminosa (L.) Stirton

= *Psoralea bituminosa* L.

Calicotome intermedia (Salzm.) C. Presl

= *Calicotome villosa* subsp. *Intermedia* (Salzm.) M.

Ceratonia siliqua L. (Césalpiniaées)

Coronilla scorpioides (L.) W.D.J. Koch *Cytisus*

arboreus subsp. *baeticus* (Webb) Maire

Cytisus villosus Pourret

= *Cytisus triflorus* L'Herit

Erophaca baetica (L.) Boiss.

= *Astragalus lusitanicus* Lamk.

Genista ramosissima (Desf.) Poiret

= *Genista cinerea* subsp. *ramosissima* (Desf.) Maire

Genista tricuspidata subsp. *Duriaei* (Spach.) Batt.

Lathyrus latifolius L.

Lotus hispidus DC.

Medicago italica subsp. *Tornata* (L.) Emb. et Maire

Medicago polymorpha L.

= *Medicago hispida* Gaertn.

Ononis biflora Desf.

Ononis pubescens L.

Ononis spinosa L.

Scorpiurus muricatus L.

Stauracanthus boivinii (Webb) Samp

= *Ulex Boivinii* Webb var. *webbianus* (Cosson) Maire

Trifolium angustifolium L.

Trifolium stellatum L.

Trifolium tomentosum L.

Vicia onobrychioides L.

Vicia sativa L.

➤ LILIACEAE

Fritillaria lusitanica subsp. *Oranensis* (Pomel)

Valdés

= *Fritillaria messanensis* Raf. var. *atlantica* M.

Gagea Durieui Pari.

Gagea granatelli subsp. *chaberti* Terracc.

Tulipa sylvestris subsp. *australis* (Link.) Pamp.

➤ LINACEAE

Linum suffruticosum L.

Linum tenue Desf.

Linum usitatissimum L.

➤ MALVACEAE

Lavatera trimestris L.

Malope malachoides L.

Malva sylvestris L.

➤ MORACEAE

Fucus carica L.

➤ MYRSINACEAE = PRIMULACEES

Anagallis arvensis L.

Anagallis Anagallis monelli L.

➤ OLEACEAE

Jasminum fruticans L.

Olea europea L. subsp. *europaea*

= *Olea europea* var. *oleaster*

Phillyrea angustifolia subsp. *angustifolia* M.

Phillyrea latifolia L.

= *Phillyrea angustifolia* subsp. *latifolia* (L.) M.

➤ ORCHIDACEAE

Aceras pyramidalis (L.) Reichenb

= *Anacamptis pyramidalis* (L.) L.C. Rich.

Anacamptis coriophora subsp. *fragrans* (Poll.) Bateman, Pridgeon & Chase

= *Orchis coriophora* subsp. *Fragrans* (Poll.) G. Camus

Anacamptis morio subsp. *tlemcenensis* (Batt.) E.G. Camus

Anacamptis papilionacea (L.) Bateman, Pridgeon & Chase

= *Orchis papilionacea* L.

Dactylorhiza durandii (Boiss. & Reuter) M. Lainz

= *Orchis elata* subsp. *Durandoi* (B. et R.)

Himantoglossum hircinum (L.) Sprengel

= *Himantoglossum hircinum* (L.) Spreng.

Himantoglossum robertianum (Loisel.) Delforge

- = *Himantoglossum longibracteatum* (Biv.) Sch.
***Ophrys atlantica* Munby**
***Ophrys lutea* subsp. *Lutea* (Cav.) Gouan**
***Ophrys speculum* L.**
***Ophrys sphegifera* Willd.**
 = *Ophrys scolopax* Cav. subsp. *Apiformis*
***Ophrys subfusca* (Reichenb. fil.) Haussknecht**
 = *Ophrys lutea* subsp. *Subfusca* (Rchb.) Batt.
Ophrys thenthredimifera* Willd. subsp. *Ficalhoana
Ophrys thenthredimifera* Willd. subsp. *Thenthredimifera
- Orchis anthropophora* (L.) All.**
 = *Aceras anthropophorum* (L.) Ait.
***Orchis italica* Poiret**
***Orchis obliensis* Reuter.**
 = *Orchis maculata* subsp. *Obliensis* (Reut.) Asch. et Gr.
- OROBANCHACEAE
***Bartsia trixago* L.**
 = *Bellardia trixago* (L.) All. (Scrophiliacées)
***Odontites purpureus* subsp. *purpureus* (Desf.) G. Don fil.**
 = *Odontites bolligeri* E.Rico, L. Delgado & Herrero in Rico et al. [33]
 = *Odontites purpurea* subsp. *purpurea* (Scrophiliacées)
***Orobanche ramosa* L.**
***Orobanche variegata* Wallr**
***Parentucellia latifolia* (L.) Caruel** (Scrophiliacées)
- PAPAVERACEAE
***Fumaria capreolata* L.** (Fumariacées)
***Fumaria officinalis* L.** (Fumariacées)
***Papaver hybridum* L.**
***Papaver rhoeas* L.**
***Roemeria hybrida* (L.) DC.**
- PINACEAE
***Cedrus atlantica* (Endl.) Carrière**
 = *Cedrus libanotica* Link
***Pinus halepensis* Mill.**
***Pinus pinea* L.**
- PLANTAGINACEAE
***Anarrhinum fruticosum* subsp. *fruticosum* Maire** (Scrophiliacées)
***Antirrhinum majus* L.** (Scrophiliacées)
***Globularia alypum* subsp. *alypum* L.** (Globulariacées)
***Linaria arvensis* L. Desf.** (Scrophiliacées)
***Linaria triphylla* (L.) Miller** (Scrophiliacées)
***Linaria tristis* (L.) Miller** (Scrophiliacées)
***Plantago mauritanica* Boiss. et Reut.**
***Plantago lagopus* L.**
***Plantago serraria* L.**
- POLYGALACEAE
***Polygala monspeliaca* L.**
- POLYGONACEAE
***Rumex bucephalophorus* L.**
- POTAMOGETONACEAE
***Groenlandia densa* (L.) Fourr.**
 = *Potamogeton densus* L.
- RAFFLESIAACEAE
***Cytinus hypocistis* subsp. *clusii* Nyman**
 = *Cytinus hypocistis* subsp. *kermesianus* (Guss.) Wettst.
- Cytinus hypocistis* subsp. *hypocistis* L.**
 = *Cytinus hypocistis* subsp. *ochraceus* (Guss.) Wettst.
- RENONCULACEAE
***Adonis aestivalis* L.**
***Anemone coronaria* L. var. *cyanea* (Risso) Ardoino**
***Anemone palmata* L.**
***Clematis cirrhosa* L.**
***Clematis flammula* L. var. *parviflora* Pomel**
***Delphinium balansae* Boiss. et Reut.**
***Ranunculus arvensis* L.**
***Ranunculus ficaria* subsp. *ficariiformis* Rouy & Fouc.**
***Ranunculus gramineus* L.**
***Ranunculus macrophyllus* Desf.**
***Ranunculus millefoliatus* Vahl**
***Ranunculus paludosus* Poiret**
***Ranunculus spicatus* Desf.**
***Ranunculus aquatilis* L.**
- RESEDACEAE
***Reseda alba* subsp. *alba* L.**
 = *Reseda alba* subsp. *eu-alba* L.
***Reseda luteola* L.**
***Reseda Phyteuma* subsp. *collina* (Gay) Batt.**
- RHAMNACEAE
Rhamnus alaternus* L. subsp. *alaternus
***Rhamnus lycioides* subsp. *oleoides* (L.) Jahand. & Maire**
- ROSACEAE
***Crataegus monogyna* Jacq.**
 = *Crataegus Oxyacantha* subsp. *monogyna* (Jacq.) Rouy et Camus
***Potentilla reptans* L.**
***Rosa canina* L.**
***Rubus ulmifolius* Schott**
***Sanguisorba minor* Scop.**
- RUBIACEAE
***Rubia peregrina* subsp. *Peregrina* L.**
- RUSCACEAE
***Ruscus aculeatus* L.**
- RUTACEAE
***Ruta angustifolia* Pers.**
 = *Ruta chalepensis* subsp. *angustifolia* (Pers.) P. Cout
- SALICACEAE
***Populus alba* L.**
***Salix pedicellata* Desf.**
- SANTALACEAE

- Osyris quadripartita* Decne
- SAXIFRAGACEAE
 - Saxifraga globulifera* Desf.
 - = *Saxifraga globulifera* Desf.
 - SCROPHILIACEAE
 - Scrofularia laevigata* Vahl
 - Scrophularia canina* L.
 - Verbascum blattaria* L.
 - SINOPTERIDACEAE
 - Cheilanthes acrostica* (Balb.) Tod.
 - SMILACACEAE
 - Smilax aspera* L. var. *Altissima* Moris & De Not.
 - Smilax aspera* L. var. *genuina* L.
 - THYMELAEACEAE
 - Daphne gnidium* L.
 - THYPHACEAE
 - Typha angustifolia* L.
 - UMBELLIFERAE = APIACEAE
 - Ammoides pusilla* (Brot.) Breistr.
 - = *A. verticillata* (Desf.) Briq.
 - Apium nodiflorum* (L.) Lag
 - = *Helosciadium nodiflorum* Lag.
 - Bupleurum rigidum* L.
 - Daucus carota* L.
 - Eryngium tricuspdatum* L.
 - Eryngium triquetrum* Vahl
 - Ferula communis* L.
 - Thapsia garganica* L.
 - VALÉRIANACEAE
 - Fedia cornucopiae* (L.) Gaertn
 - Valeriana tuberosa* L.
 - Valerianella discoidea* (L.) Loisel.
 - = *Valerianella coronata* subsp. *discoidea* Lois.
 - VERBENACEAE
 - Verbena officinalis* L.
 - VITACEAE = AMPELIDACEA
 - Vitis vinifera* subsp. *sylvestris* (C.C. Gmelin) Hegi
 - ZANNICHELLIACEAE
 - Zannichellia peltata* Bertol.

4. CONCLUSION AND PERSPECTIVES

One can not speak of plant diversity, of the Moutasreserve, without taking the relative change in the climate of the western part of Algeria into consideration. That's how the phylogenetic potential began a regressive evolution. This latter is accentuated by an increasingly strong anthropo zoological pressure. These ecosystems are fragile and complex and must be tackled in a comprehensive manner. There are many achievements in phytoecology and plant systematics, but little information/data is available regarding in particular the western part of Algeri-a endemic species.

Faced with this alternative we insist on developing/expanding plants (aromatic/medicinal and others)

since the hunting reserve has a wealth of landscapes and acts as a refuge for sensitive and/or endangered species as *Origanum*, *Ammoides* e.g.

Today, we are moving towards a bank of botanical data to monitor this floristic cover which is close to the ecological break (environmental stress).

For about 30 years we have gone through this area, the changes are significant and we see before our eyes that the regressive evolution has begun. This observation is linked to southern species which are moving to north of Tlemcen Mounts.

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Appendix

Planche 1. Board color (phot. B. Babali).



Anacamptis morio subsp. *tlemcenensis*
(Batt.) E.G. Camus



Fritillaria lusitanica subsp. *Oranensis*
(Pomel) Valdés



Biarum Bovei subsp. *dispar* (Schott.) Engler



Ophrys atlantica Munby



Iris xiphium L.



Carex hispida Willd.



Briza maxima L.



Pancratium foetidum var. *oranense* Pomel



Drimia undulata Jacq.

Planche 2. Board color (phot. B. Babali).



Ajuga iva subsp. *pseudoiva* (DC.) Briq.



Anthyllis polycephala Desf.



Euphorbia nicaeensis All.



Cistus ladanifer subsp. *Mauritanus*
Pau & Sennen



Cytinus hypocistis subsp. *clusii*
Nyman + *Cistus villosus* Pourret



Nepeta tuberosa subsp. *reticulata* (Desf.)
Maire



Odontites purpureus subsp. *purpureus* (Desf.) G. Don fil.



Quercus faginea subsp. *ilemcenensis*
(OC.) Maire et Weiller



Stauracanthus boivinii
(Webb) Samp