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INVENTORY OF LICHENS OF THE MOUNTAINOUS MASSIF OF MEGRESS (SETIF, ALGERIA)

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Abstract

An inventory of the lichen flora of the mountainous massif of Megress (Setif region), was carried out. This inventory is a lichen database that comes to enrich the Algerian lichen flora. Fifty-two lichen species belonging to 16 families and 23 genera were identified in the Massif. The most represented families are (*Teloschistaceae* > *Physciaceae* > *Cladoniaceae* > *Lecanoraceae*). It should be noted that the type of crustacean thallus is the most dominant.

Keywords: Inventory, Lichenoflore, Massif Megress, Algeria.

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Introduction

Although the lichenological studies in Algeria have started there more than a century, this science continues to be marginalized. The Studies of lichens in Algeria have started with a naturalist's explorations, who take samples of lichen species during explorations, which will be identified by Nylander (Nylander, 1857). Several botanists have worked in this direction, and have marked the history of Algerian lichenology (Boutabia, 2000).

In Algeria, the lichen flora remains poorly understood at present, the research on the Algerian flora is relatively few returned to the study of lichens (Semadi, 1989; Djebar et Fradjia, 1992; Boutabia, 2000; Rehali, 2003; Mosbah, 2007; Rebbas *et al.*, 2011; Ait Hammou *et al.*, 2011, 2014).

This work is a contribution to the enrichment of the Algerian lichen flora, and to establish a checklist of Mediterranean lichen species.

MATERIAL AND METHODS

Study site

The mountains of Megress are located in the northern part of Setif region, with an altitude of 1730 m. This mountain belongs to the Constantine sector and North African Mediterranean area (Quézel, 1978). The massif is limited to the north by the town of Tizi N'bechar, west by the municipality of Ain Roua, south by the town of Ain Arnet and west by the municipality of El Ouricia (Figure 1).

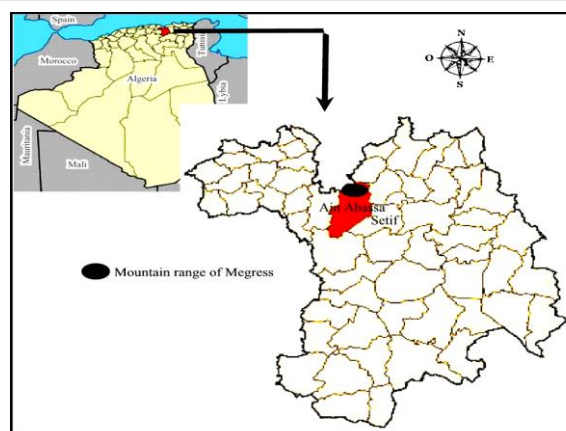


Figure 1: Location of the mountains of Megress

It is a natural site of 1500 hectares, constituting the foothills before the chain of Babors, with the advantage of a natural environment deserted of any construction. Its vegetation is characterized by a remarkable biodiversity and heterogeneous offering two types of environment (land and water). It is characterized by a semi-arid continental climate with hot summers and cold winters. Generally, this mountainous region is the wettest receiving 700 mm of precipitation per year, the amount decreases to approximately 400 mm on average, to the south, on the high plains.

Methodology

Several Outputs on field were carried out in October 2014 - April 2015, towards the mountain range Megress which is an environment favourable for the development and spread of lichens. The lichen levy is conditioned not only by environmental factors (homogeneity of vegetation and abundance of phorophytes), but also by physical factors (topography and accessibility). A systematic sampling of lichens is carried on various media (bark, rock and soil). Harvesting of lichen presents no difficulty, almost all lichens are easily harvested except crustaceans which we used a knife. The thallus or, failing that, a representative fragment with the peripheral part and the central part are removed.

To avoid the destruction of thallus and the risk of contamination, the samples were placed in paper bags and labeled with the type of phorophyte (Brodo *et al.*, 2001; Hale *et al.*, 1987).

Lichen samples determination technique

The determination of lichen samples was carried at the Laboratory of Valorisation of Biological Natural Resource (VRBN), University Ferhat Abbas Setif 1. The taxonomic identification of lichen was made on the basis of the flora of Ozenda and Clauzade, (1970) and the guides of lichens (Jahns, 2011; Tiévant, 2001; Van Haluwyn *et al.*, 2013a,b).

For the determination of lichens, a pocket magnifier is used and a binocular magnifier to see the general physiognomic appearance, then by consulting the various flora, the species or the genus are noted, and there, if there are difficulties that are expressed by ambiguities between two kinds or two species, we proceed to the use of chemical reagents. The main chemical reagents used in the determination of lichens are:

Chlore (Cl)	concentrated chlorine bleach
Potassium (K)	Solution 10 %
Paraphenylene-diamine (P)	Alcoolic solution at 2%.
Nitric Acid (N)	Solution 50%
Chlorhydric Acid (HCl)	Solution 10%
Lugol (I)	Solution 2%

The color reactions are performed by depositing directly of the reagent on the thallus and of course the medulla is previously laid bare by scratching or scraping the upper cortex, if there is no reaction, we note a sign "-"; if the reaction is positive, a sign "+" is noted.

Results and Discussion

52 lichens are inventoried, belonging to 16 families (Table 1) with the dominance of the family *Teloschistaceae* which includes two genera and 10 species followed by the family of *Physciaceae*, *Cladoniaceae* and *Lecanoraceae* respectively seven, six and five species.

By against the families of *Lecideaceae* and *Lichinaceae* are less represented with each species (Figure 2). The physiognomic types are represented with a clear dominance of the thalli crustaceans alone constitute 50% of the lichen flora identified (Figure 3).

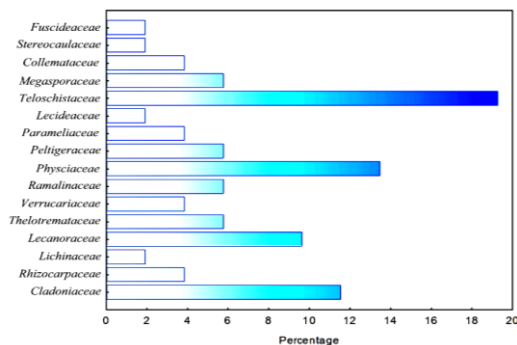


Figure 2: Lichen families in the Megress region

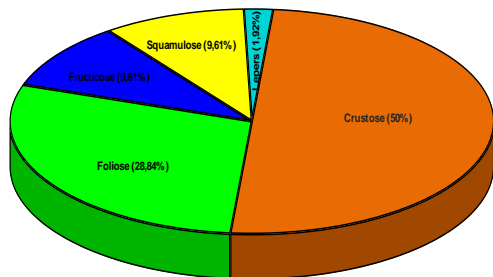


Figure 3: Physiognomic types of lichens in Megress region

For cons, the least represented category is the leper with 1.92% of all species recorded. The Saxicolous lichens, are the most dominant with a percentage of 50%, while the epiphytes and the soil borne are less dominant with a number less than 25% (Figure 4).

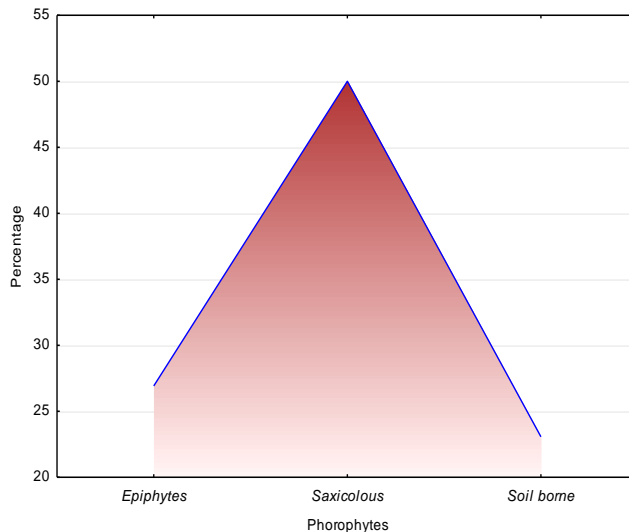


Figure 4: Lichen species according to the phorophytes in Megress

In the list of lichens inventoried in the mountain range of Megress, eleven lichens are on the list of protected species in Algeria (Executive Decree, 2012): *Flavoparmelia caperata* (L.) Hale., *Anaptychia ciliaris* (L.) Körb., *Peltigera praetextata* (Flörke ex Sommerf.) Zopf., *Parmelia tiliacea* (Hoffm.) Hale., *Cladonia convoluta* (Lam.) Anders., *Cladonia fimbriata* (L.) Fr., *Cladonia rangiformis* Hoffm., *Cladonia foliacea* (Huds.) Willd., *Physcia leptalea* (Ach.) DC., *Physcia aipolia* (Ehrh. ex Humb.), *Ramalina farinacea* (L.) Ach.

The species *Heterodermia leucomela* found with a significant presence in Megress is considered extinct in Germany and threatened in Italy and in Great Britain, while *Parmelina tiliacea*, *Physcia aipolia* and *P. stellaris* are considered endangered according to the Red List (Scheidegger *et al.*, 2002). It is interesting to inventory all lichens of Algeria and to establish a distribution map of these lichens, and the realization of a catalog of lichen flora of Algeria.

Conclusion

The mountain of Megres, has a high lichen diversity and deserves a very thorough investigation. 16 families bringing together 52 species have been identified in this massif. The large number of lichen taxa, is represented mainly by the family of *Teloschistaceae*, encompassing the genus *Xanthoria*.

The lichens physiognomical diversity provides information on the diversification of ecological factors in this massif. The crustaceans dominate these types physiognomic, followed by foliaceous, of fruticose, squamulose and lepers. This inventory is a contribution to lichenologic research and the enrichment of the Algerian lichen flora.

Table 1: Lichens Inventory of Megres region

*	Species	Family	Type of thallus	Phorophyte	Chemical reactions	Apothecia			
1	<i>Aspicilia desertorum</i> (Kremp.) Mereschk.	<i>Megasporaceae</i>	Crustose	Ground	I+	0.2-0.7 mm Ø, black, concave, rarely flat, with a white bloom			
2	<i>Aspicilia calcarea</i> (L.) Mudd.			Rocks	K-, P-	0.2-1 mm Ø, ± immersed, rounded or angular, black disc			
3	<i>Aspicilia cheresina</i> Müll. Arg					K-	0.2-1 mm Ø, normally isolated, black disc, rather irregular contour		
4	<i>Caloplaca luteoalba</i> (Turner) Th. Fr.	K+				0.3-0.5 mm Ø, encumbered, dark orange, concave, convex at maturity			
5	<i>Caloplaca biatorina</i> (A. Massal.) J. Steiner	<i>Teloschistaceae</i>		Trunks	K+	Ø > 0.5 mm, the same color as the thallus			
6	<i>Caloplaca californica</i> Zahlbr				K+	0.3 - 0.5 mm Ø, numerous, concave, orange			
7	<i>Caloplaca cerina</i> Th. Fr.			K-	Ø ≤ 2 mm, sessile, disc yellow-orange, ± plan, persistent				
8	<i>Caloplaca bolacina</i> (Tuck.) H. Magn.			Rocks	K+	0.4-1.8 mm Ø, orange disk, convex			
9	<i>Caloplaca aurantia</i> (Pers.) Steiner				K+	1-1.5 mm Ø, orange brown disc, yellow-orange edge			
10	<i>Xanthoria elegans</i> Th. Fr.			<i>Thelotremaaceae</i>	Rocks	K+	0.5-2 mm Ø, sessile, flat discs		
11	<i>Caloplaca erythrocarpa</i> (Pers.) Zwackh.		K-			0.5-1.5 mm Ø, numerous, one or more per areolas, red with a brighter edge.			
12	<i>Diploschistes muscorum</i> (Scop.) R. Sant.		K+, P-, C+			1-2 mm Ø, dark gray disc, concave			
13	<i>Diploschistes actinostomus</i> Zahlbr		K-, C+, P-, I+			0.2-0.6 mm Ø, pressed into the thallus, punctiforme disk, edge porpre			
14	<i>Diploschistes scriposus</i> (Schreber) Norman		K+, C+, P-			2-3 mm Ø, concave, disc pressed into the apothecium, dark gray, ± pruinose.			
15	<i>Fuscidea kochiana</i> (Hepp) V. Wirth et Vězda	<i>Fuscideaceae</i>	Trunks			P-, K-	3 mm Ø, sessile, blackish disk, irregularly shaped		
16	<i>Lecanora atra</i> (Huds.) Ach					-	Disk glossy black, white edge		
17	<i>Lecanora gangaleoides</i> Nyl.					C-, K+, P±	0.5-1.5 mm Ø, black disc, without pruinose, convex		
18	<i>Lecanora muralis</i> (Schreb.) Rabenh.					K-, C-, P±	0.5-1.5 mm Ø, numerous, at the thallus center.		
19	<i>Lecanora chlorotera</i> Nyl.					K+, P-	0.5-1 mm Ø, numerous, a brownish disk, not pruinose		
20	<i>Lecanora dispersa</i> (Pers.) Sommerf.			R-	0.2-1 mm Ø, sessile, greenish disk, edge thallin thick				
21	<i>Rhizocarpon geographicum</i> (L.) DC			<i>Rhizocarpaceae</i>	Rocks	P+, K-, C-, I+	0.3 à 15 mm Ø, black, rounded or angular, flat to slightly convex		
22	<i>Buellia dispersa</i> A. Massal.					K-	0.3-0.4 mm Ø, slightly prominent, disc flat and marginate		
23	<i>Anema nodulosum</i> (Nyl.) Forssell					-	> 0.5 mm Ø, submerged in the lobes, red brown disk		
24	<i>Dermatocarpon intestiniforme</i> (Körber) Hasse					K+, C+, P+	Not observed		
25	<i>Verrucaria nigrescens</i> Pers.	R-	0.2-0.3 mm Ø, perithecia						
26	<i>Lecidella elaeochroma</i> (Ach.) M. Choisy	<i>Lecideaceae</i>	Trunks			-	0.3-1 mm Ø, disk dark brown to black, convex, ± persistent.		
27	<i>Flavoparmelia caperata</i> (L.) Hale					C-, P+, K±	Not observed		
28	<i>Cladonia convolute</i> (Lam.) Anders					-	Often absent, reduced size, irregular, caliciform		
29	<i>Rhizocarpon oeredi</i> (Weber) Körb.					K-, I+	0.3-0.7 mm Ø, black, vermiculated or pleated, most often at the center thallus.		
30	<i>Peltigera malacea</i> (Ach.) Funck					<i>Peltigeraceae</i>	Ground	R-	Rarely present, blackish brown disk
31	<i>Peltigera rufescens</i> (Weiss) Humb.			-	Frequent, in the lobe tips, straightened, red brown, to thalline margin finely crenate.				
32	<i>Peltigera praetextata</i> (Flörke ex Sommerf.) Zopf			R-	Not observed				
33	<i>Collema auriforme</i> (With.) Coppins et Laundon			<i>Collemaaceae</i>	Rocks			-	0.3 à 3 mm Ø, rare, ± immersed in the thallus often reddish brown, edge thallin
34	<i>Collema crispum</i> (Huds.) Weber							-	1-2 mm Ø, flat disc, margin sometimes carrying small globules
35	<i>Parmelia tiliacea</i> (Hoffm.) Hale							<i>Parmeliaceae</i>	Trunks
36	<i>Physcia aipolia</i> (Ehrh. ex Humb.)	K+	2.5 mm Ø, disc brown-black, often convex and topped with a white pruinose.						
37	<i>Physcia leptalea</i> (Ach.) DC.	K+	3 mm Ø, numerous, shortly stipitate, gray-blue disc, slightly pruinose						
38	<i>Physcia stellaris</i> (L.) Nyl.	K+	Abundant, variable size, often undulated, often pruinose discs.						

39	<i>Physconia muscigena</i> (Ach.) Poelt			Ground	-	5mm Ø, often provided with of marginal lobules
40	<i>Xanthoria polycarpa</i> (Hoffm.) Rieber	Teloschistaceae		Trunks	K-	0.5-3.5 mm Ø, disk orangey with a yellow ledge; often deformed by mutual compression
41	<i>Xanthoria parietina</i> (L.) Th. Fr.				K+	4 mm Ø, yellow ledge, numerous to the center of thallus, disc orange, sessile
42	<i>Ramalina siliquosa</i> (Huds.) A.L. Sm.	Ramalinaceae	Fruticose	Rocks	R-, P+	Numerous; often grouped and forming irregular nodules.
43	<i>Ramalina farinacea</i> (Hoffm.) Fürnrohr				P-, K-	very rare
44	<i>Ramalina polymorpha</i> (Lilj.) Ach.				K-, C-, P-	Not observed
45	<i>Heterodermia leucomela</i> (L.) Poelt	Phyciaceae		Trunks	K+, P+	Not observed
46	<i>Anaptychia ciliaris</i> (L.) Körb.				R-	5 mm Ø, numerous, stipitate, blue-black disc, often pruinose.
47	<i>Cladonia foliacea</i> (Huds.) Willd.	Cladoniaceae	Squamulose	Ground	K+, C-	Podétions very rarely; small, worn by the squamules, wears on the margin of small apothecia
48	<i>Cladonia symphicarpa</i> (Flörke) Fr.				-	Dark brown, in clusters or isolated. atop of the podétions
49	<i>Cladonia fimbriata</i> (L.) Fr.				P+, K-, C-	Podétions sometimes with small apothecia or the brown pycnidia on the edge of scyphes
50	<i>Cladonia pocillum</i> (Ach.) O.-J. Rich.				C-, P+	3 mm Ø, fairly common on the podetion, brown ascospores
51	<i>Cladonia rangiformis</i> Hoffm.				P-, K+, C-	Apothecia and pycnidia rare, brown.
52	<i>Lepraria neglecta</i> (Nyl.) Lettau	Stereocaulaceae	Lepers	Rocks	C+, K-, C+	0.2 mm Ø, coarse, often pruinose.

*= The numbers refer to the images; Ø = in diameter

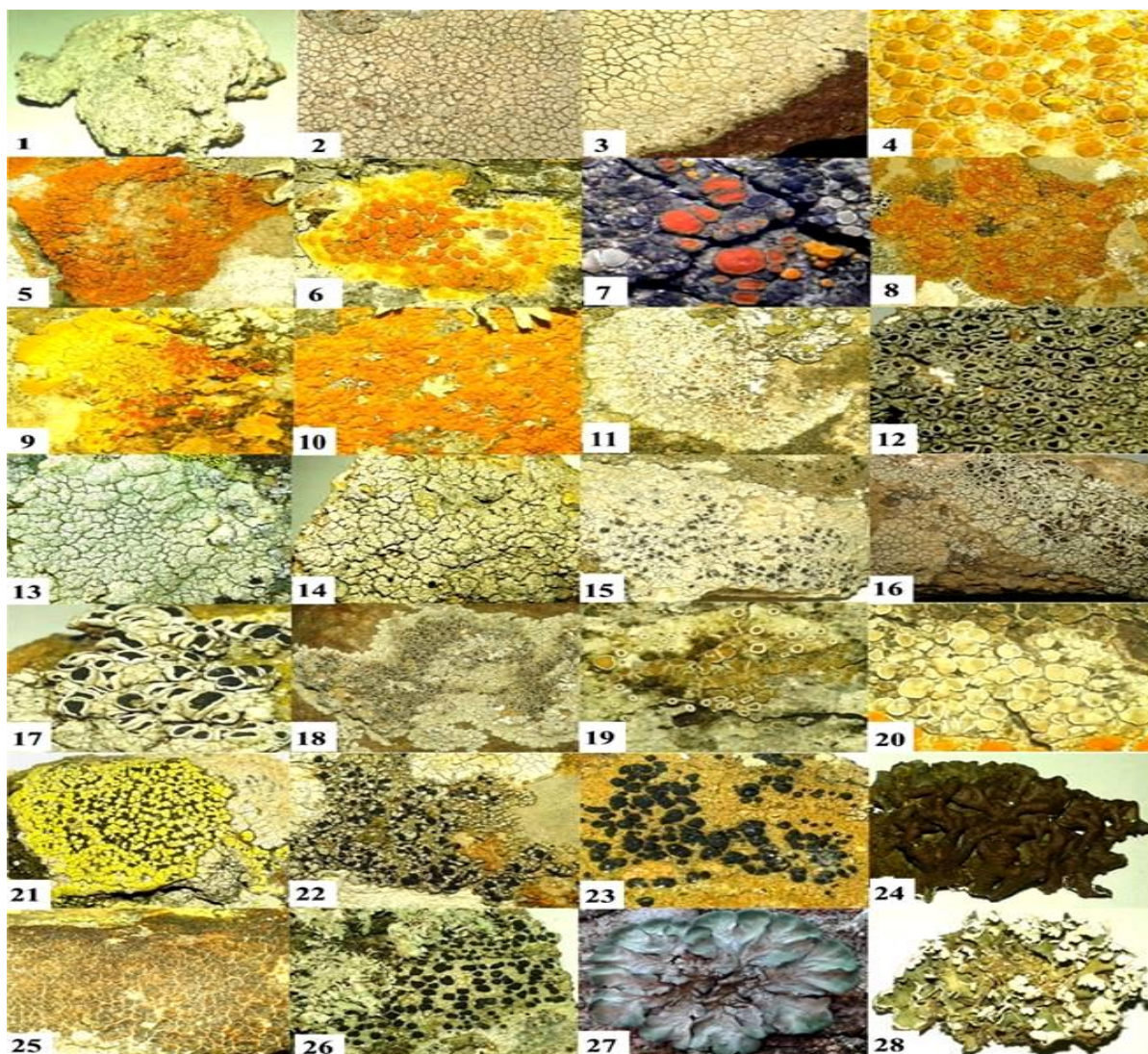




Figure 5: Lichens of the mountain massif of Megress (Setif)

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