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Diversity of Lichens Flora in Oran Area (North - Western Algeria)

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ABSTRACT

This paper presents a taxonomic study of lichen flora of Oran city which is located in semi arid Mediterranean bioclimatic. In order to Complete and update our national lichen inventory, all lichens found on the coast of Oran (around 40 km) were collected under a systematic sampling. The latter was performed both inside and outside the city, above sea level up to a maximum altitude of about 600 m high. The lichen flora was studied on 176 phorophytes and making systematic surveys on 1m high for two faces of the substrate: North and North east. However, 34 stitches explored were based on the presence of trees and their accessibility. The determination of species was based on the morphological characteristics of the sample such as the growth forms, thallus size, color, presence or absence of soredia, isidia, rhizines and apothecia using usually applied lichénologie reagent. A section or the reproductive organ is sometimes necessary to determinate the characteristics of spora. The number of lichen species identified was 63 epiphytic lichens and 5 terricolous ones. These can be divided into 29 genera, 12 families and 6 orders. Among those listed taxa, the family of Physciaceae and Lecanoraceae contain more species over others with 12 species for each one. From the physiognomic spectrum of lichens collected in the study area, physiognomic types of lichens show a clear predominance of crustose species with 45 species, followed by 11 foliose species and 8 species fruticolous whereas only 3 species were composites. However, there was only *Lepraria incana* in the leprose lichens. Lichens have different tolerances and preferences for substrates. In all explored meshes, the distribution of lichens was irregular and depends on the nature of the substrate and the extension of urbanization which increases air pollution from houses and road traffic as they reduce lichen cover and cause its extinction.

KEYWORDS: Lichens, Systematic, Semi-arid, Oran, North-Western Algeria.

INTRODUCTION

The Mediterranean region is one of the areas of the world where biodiversity is great. The researchers worked on the flora and fauna of the basin by identifying all living individuals and in different environment. The lichenology was one of the areas that remained more or less unknown compared to other fields of botany.

Lichens are widely distributed in all the geographical region of the world. The word 'Lichen' has a Greek origin, which denotes that superficial growth on the bark of olive trees 'Theophrastus' the father of botany, introduced the term Lichen. Lichen is a symbiotic association between two different organisms; one is the alga (Photobiont) another is fungus (Mycobiont). The relationship of these two symbionts where in the components benefited through not necessarily to an equal degree. The dual nature of lichens first time discover by the Schwender (1869) [1].

According to the conducted literature searches, a total 20,000 lichen species are reported from the world. It was found that in Italy about 2345 lichen species were identified by Nimis [2], around 3015 species in Spain reported by Llimona and Hladun [3] and 3435 species of lichens were inventoried in France by Roux [4]. Comparing these results to those obtained from researches made in the North African countries, the studies

revealed 1094 lichen species estimated by Egea in Morocco [5], 415 species collected by Seaward in Tunisia [6] and 943 species counted by Rahali in Algeria [7].

It is more than a century where the study of lichens began in Algeria, but only in the form of explorations of naturalists who were collecting lichen species in their path and then identified by foreign specialists among them Nylander [8, 9].

Mohamed Rahali [6], one of the Algerian pioneers of lichenologic studies, collected and updated more than 943 species of lichens in Algeria including 72 endemic cited in various research publications. He nevertheless pointed out that many unknown areas remained unexplored.

In the last decades, new young researchers worked on lichens studies and updated the list of lichens in Algeria. Among them, it can be cited: Boutabia [10, 11] Bendaikha [12], Mosbah [13] Ait Hammou [14, 15, 16], Rebbas [17], Fadel [18], Slimani [19], Ali Ahmed Serradj [20] and Ain el Hamer [21].

Nylander [7] and other foreign researchers were examined the collection and inventory of lichens from the west Algerian and particularly in the region of Oran. Among these researchers , we quote : Flagey [22] Durieu de Maisonneuve [23] Maheu [24] Bouly de Lesdain [25,26,27,28] and Faurel *et al.* [29,30 , 31, 32, 33] . Nowadays, no recent publication has been conducted in this region

In this present paper, an inventory of lichen species collected at the Oran coast has been established. It aims to collect lichens of Western regions of the country, to identify their taxonomy and then update the list of lichens of Algeria and finally to promote exchanges and cooperation between Algerian and foreign lichenologists.

General characterization of the site:

Geographical location of the region:

The study area is a rectangle of 40 km long by 37 km wide, located in the NW of Algeria. It is bounded between longitude 0 ° 27 ' 0 ° 54' west and latitude 35 ° 33 ' and 35 ° 55' North. This area includes the coast, plains and mountainous areas of the region of Oran (Fig. 1).

Regional climate:

The region of Oran is part of semi arid Mediterranean bioclimate with a dry season of six months (April to the month of October) and average annual precipitation about 340 mm. The Average temperatures range from 11 ° C to 26 ° C. Strong winds blow from the W and WSW with maximum speed of 17 m / s.

Presentation floristic cortege in our area:

Among the tree species of the coastline *Quercus suber* and *Tetraclinis articulata*. We have some green spaces occupied by *Cupressus sempervirens* and *Olea europea* that arise at cemeteries, along roads and isolated. Exotic vegetation is represented by many species of trees and ornamental shrubs of various origins such as *Ficus retusa* , *Pittosporum tobira* and *Schinus molle* planted in parks, public gardens , cemeteries and roadside.

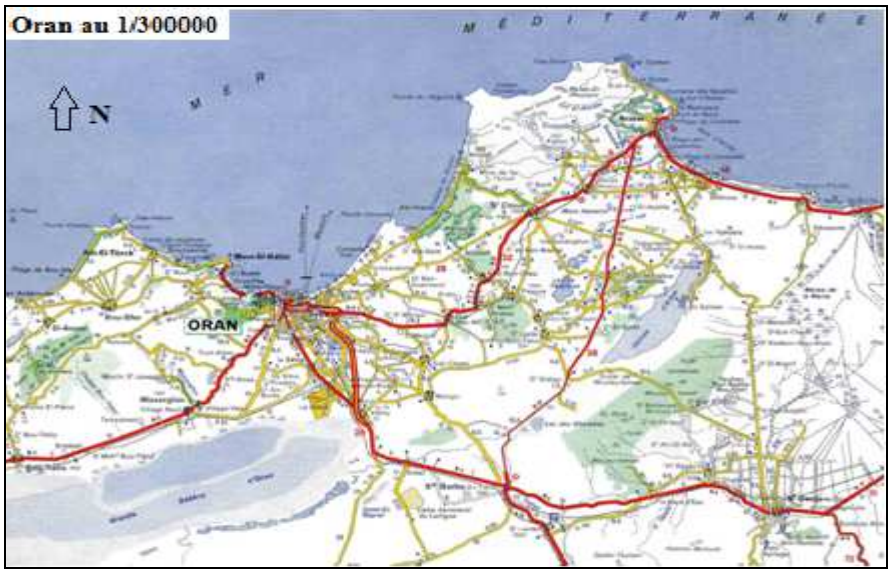

Fig. 1: location of study area (North –western Algeria)

MATERIALS AND METHODS

Choice of sites:

All lichens found on the coast of Oran (around 40 km) were collected from a systematic sampling. In addition, the latter was performed either inside or outside the city, from sea level up to a maximum altitude of about 600 m high (Montagne des lions 611m).

We surveyed 52 sites, some are difficult or lacking access phorophytes such as sebkha area Hassamnia zone and point of Canastel and that have not been explored (Fig. 2, Tab. 1).

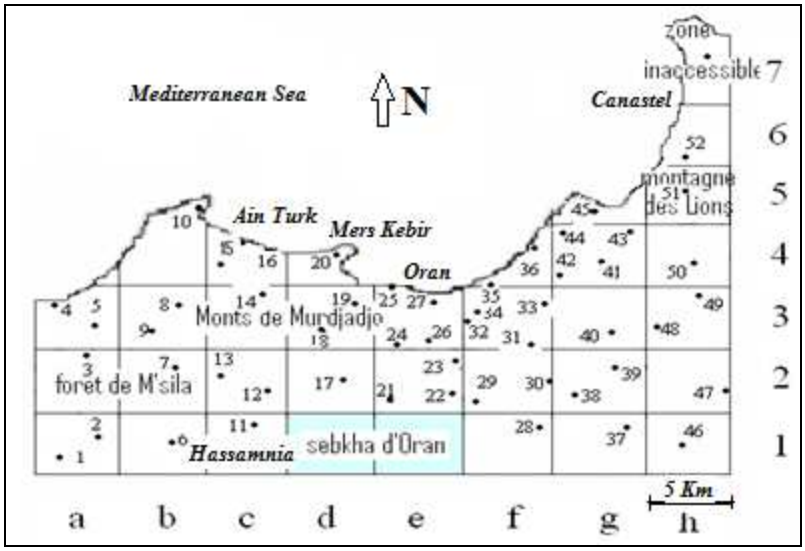

Fig. 2: Location of sampling sites

Choice of phorophytes:

In this area, 176 surveys of phorophytes are carried out by following a systematic grid, 34 stitches were explored. In each mesh, we examined from 1 to 10 of different trees phorophytes present in the site.

Systematic sampling:

The qualitative and quantitative assessments of the forest lichen flora have an important role for their spatial distribution. We carried a systematic sampling by identifying all epiphytic lichens of gardens and natural wood. The surveys were conducted on the north and north east faces of the trunk from a meter from the ground in order to avoid the eutrophication caused by animal feces.

Technique for the determination of lichens:

In order to determine the gathered lichen specimens, we have used the following sources, using for the chemical characters the usual reagents P, K, I and C:

- Les lichens, étude biologique et flore illustrée [34],
- Likenoj de occidenta europo, illustrita déterminlibro [35], translation [36]
- Guide des lichens, [37],
- Guide des lichens, [38],
- Guide des lichens de France: Lichens des arbres, Van Haluwyn *et al*. [39],
- Die Flechten. Baden – Wurttembergs. Tome *I et II* Ed. [40]

Table 1: prospected sites corresponding to the map mesh numbers

Mesh	sites	Prospected sites
A1	1	Boutlelis
A1	2	El Haoussine
A2	3	Foret de M'sila 1
A3	4	Les Andalouses
A3	5	El Ançor
B1	6	Bouyakor
B2	7	Foret de M'sila 2
B3	8	Bousfer
B3	9	Murdjadjo1
B4	10	Cap Falcon
C1	11	Misserghine
C2	12	Ravin de la Vierge

C2	13	Beni Issi
C3	14	Murdjadjo 2
C4	15	Ain Turk (CREPS)
C4	16	Ain Turk (Trouville)
D2	17	Pont Albin (Rte N°2 de Misserghine)
D3	18	Murdjadjo 3
D3	19	Ste Clotilde
D4	20	Mers El Kebir
E2	21	Cimetière Ain Beida
E2	22	Université d'Oran 1Ahmed Benahmed
E2	23	Cimetière Manssia
E3	24	Jardin El Othmania Ex St Hubert
E3	25	Santa Cruz
E3	26	Jardin Cité Hayet
E3	27	Jardin El Boustène Bd Khemisti
F1	28	Karma
F2	29	Université d'Oran 2
F2	30	Nadjma
F3	31	Cimetière petit lac
F3	32	Hai Ibn sina Ex Victor Hugo
F3	33	USTO et alentours
F3	34	Hai Makkari (Ex St Eugène)
F3	35	Hai Seddikia (Ex Gambetta)
F4	36	Canastel
G1	37	Braya
G2	38	Les trois puits
G2	39	Sidi Chami
G3	40	Sidi Maarouf
G4	41	Sidi Bachir
G4	42	Bir Djir
G4	43	Douar Bel Gaid
G5	44	Route vers Bel Gaid
H1	45	Pointe de Canastel
H2	46	Hassamnia
H3	47	Route vers Sidi Chami
H3	48	Hassi Bounif
H4	49	Hassi Ameur
H5	50	Hassi Ben Okba
H6	51	Montagne des Lions
H6	52	Kristel

Results:

Inventory of lichens:

We surveyed now 68 lichens species and ten species have not yet been identified. We quote the species collected and identified below.

1. ***Anaptychia ciliaris*** (L.)Koerb.
2. ***Arthonia albopulverea*** Nyl.
3. ***Arthonia galactites*** (DC) Duf.
4. ***Arthonia impolita*** (Hoffm) Borner
5. ***Arthonia cinnabarina*** (DC.) Wallr.
6. ***Arthonia melanophtalma*** Dufour
7. ***Bacidia subchlorotica*** (Nyl) Flag.
8. ***Buellia punctata*** (Hoffm) A.Massal.
9. ***Calicium viride*** Pers.
10. ***Caloplaca cerina*** (Hedw.) Th.Fr.
11. ***Caloplaca ferruginea*** (Huds) Th.Fr.
12. ***Caloplaca holocarpa*** (Ach.) Th.Fr.
13. ***Caloplaca pyracea*** (Ach) Th.Fr.
14. ***Cladonia convoluta*** (Lamkey) Anders.
15. ***Cladonia Fimbriata*** (L.)Fr.
16. ***Cladonia foliacea*** (Huds.) Willd.
17. ***Diploicia canescens*** (Dick)A. Massal
18. ***Dirina ceratoniae*** (Ach) Fr.
19. ***Enterographa crassa*** (DC) Fee.
20. ***Evernia prunastri*** (L.)Ach.
21. ***Graphis elegans*** (Sm.)Ach.
22. ***Graphis scripta*** (L.)Ach.

23. ***Hyperphyscia adglutinata*** (Flrke) H.Mayhofer et Poelt
24. ***Lecanactis patellarioides*** (Nyl) Vain
25. ***Lecanora argentata*** (Ach) Malme
26. ***Lecanora chlarotera*** Nyl.
27. ***Lecanora chlarotera ssp chlarotera f. Crassula*** (H.Magn.) Poelt.
28. ***Lecanora chlarotera ssp meridionalis*** (H.Magn.)
29. ***Lecanora conizaoides*** Nyl. Ex Cromb.
30. ***Lecanora dispersa*** (Pers.)Sommerf.
31. ***Lecanora hagenii*** (Ach) Ach.
32. ***Lecanora pulicaris*** (Pers.)Ach.
33. ***Lecanora sienae*** B.de Lesd.
34. ***Lecanora strobilina*** (Spreng.)Kieff.
35. ***Lecidella elaechroma*** (Ach.)M. Choisy
36. ***Lecidella euphorea*** (Flrke)Hertel
37. ***Lepraria incana*** (L.)Ach.
38. ***Lobaria amplissima*** (scop.) Forsell.
39. ***Opegrapha atra*** Pers.
40. ***Opegrapha lichenoides*** Pers.
41. ***Opegrapha varia*** Pers.
42. ***Opegrapha vermicillifera*** (Kunze)J.R.Laundon
43. ***Parmelia caperata*** (L.)Ach.
44. ***Parmeliopsis ambigua*** (Wulfen) Nyl.
45. ***Pertusaria albescens*** (Huds)M.Choisy et Werner
46. ***Pertusaria amara*** (Ach.) Nyl.
47. ***Pertusaria heterochroa***.(Mull.arg.)Erichsen.
48. ***Pertusaria hemispherica*** (Floerke.)Erichs.
49. ***Pertusaria hymenea*** (Ach.)Schaer.
50. ***Pertusaria pertusa*** Auct.
51. ***Physcia adscendens*** (Fr.)H.Olivier
52. ***Physcia aipolia*** (Humb.)Funrh.
53. ***Physcia biziana*** (A.Massal.)Zahlbr.
54. ***Physcia semipinnata*** (Gmel.)Moberg.
55. ***Physcia tenella*** (Scop.)DC.
56. ***Ramalina farinacea*** (L.)Ach.
57. ***Ramalina fraxinea*** (L.) Ach.
58. ***Ramalina lacera*** (With.)Laundon
59. ***Ramalina panizzei*** De Not
60. ***Ramalina pollinaria*** (Westr.)Ach.
61. ***Rinodina exigua*** (Ach.)Gray.
62. ***Rinodina sophodes*** (Ach.)A. Massal.
63. ***Roccella Phycopsis*** (Ach.)Ach.
64. ***Roccella Vicentina*** (Vain.) Follmann.
65. ***Schismatomma picconianum*** (Bagl.)Steiner
66. ***Teloschistes chrysophthalmus*** (L.)Th.Fr.
67. ***Xanthoria parietina*** (L.)Th.Fr.
68. ***Xanthoria polycarpa*** (Hoffm.)Riebier.

Systematic spectrum :

According to the classification of lichens [4, 41], we identified 29 genera of lichens, 12 families and 6 orders 63 epiphytic species and 5 terricolous species (3 genera of *Cladonia* and 2 genera of *Roccella*) were inventoried (Fig. 3).

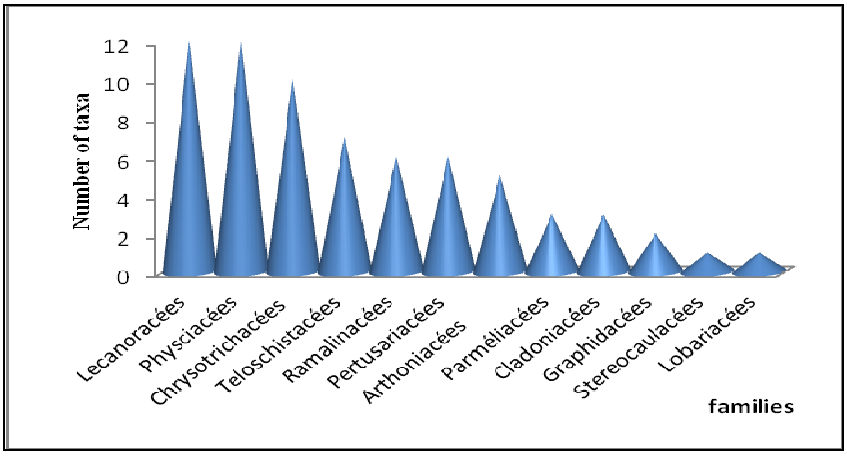

Fig. 3: Systematic spectrum of lichen taxa observed in Oran

Lichens inventoried in Oran fall into two classes: the Arthoniomycetes and Lecanoromycetes. The Arthoniomycetes contain one order is that of Arthoniales wich containing two families: Arthoniaceae and Chrysotrichaceae. The Lecanoromycetes class is divided into two classes: Lecanoromecetidae and Ostropomycetidae.

The first class includes three Orders: the Lecanorales, Peltigerales and Teloschistales. The Lecanorales have five families: Parmeliaceae, Ramalinaceae Lecanoraceae, Stereocalulaceae, and finally, we have the family of the Cladoniaceae: it contains three taxa among the terricolous species which we have listed.

Regarding the order of Peltigerales, we were able to collect only one species as *Lobaria amplissima* .

The last order of the sub -class of Lecanoromecetidae is that of Teloschistales which it constitutes two families: Teloschistaceae and Physciaceae.

Both orders of Ostropales and Pertusariales belong to the subclass of Ostropomycetidae which very few lichens were collected.

Physionomic spectrum:

We were able to identify the lichens harvested ranked according to their physiognomic type of each species. Among these, there are crustose lichens (*Arthonia, Caloplaca* ...), foliose (*Physcia , Xanthoria* , ...), fruticolous (*Ramalina , Roccella* , ...), compound species such as genus of *Cladonia* and one species of leprose lichen namely: *Lepraria incana*.

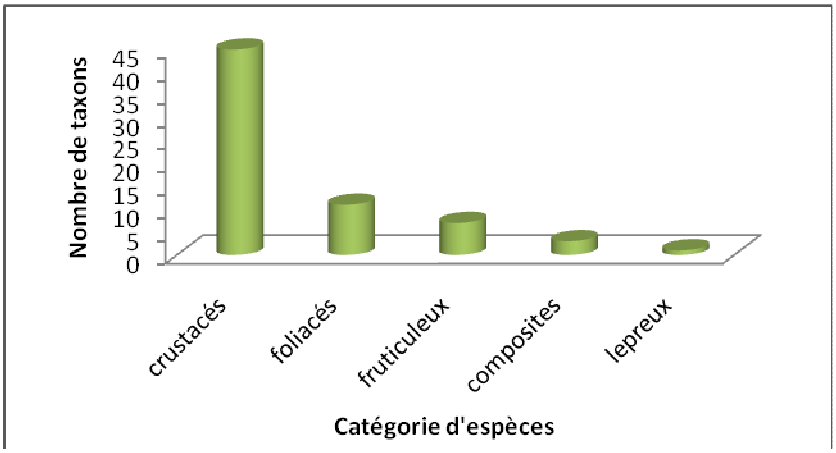

Fig. 4: Physiognomic spectrum of lichen taxa in Oran

We have compiled a physiognomic spectrum of lichen species in the region of Oran (Fig. 4) in which there is an importante dominance of crustose lichens with 45 species (67%) compared to the other types of thalles. The foliose thallus is represented with 16% (11 species), 10% for fruticose (8 species) and 4% for composite species (3 species). 1% for listed species (*Lepraria incana*) among leprose thallus (1 species).

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From this diversity of lichens flora, we have compiled a map showing the quantitative distribution of lichens (Fig. 5). This reveals a high frequency of lichens in some stitches. This is because certain meshes contain a more or less dense vegetative cover. Which indicates a significant richness of lichens.

We noticed variability in the nature of the lichen species and in the degree of overlap depending on the nature of phorophyte, and this at a same cell and sometimes in the same station.

Indeed, some species are rare or absent in certain meshes : e1, e2, e3 , f1, f2, f3 g1, g2 , g3 and g5 (Fig. 5) such that *Anaptychia ciliaris, Bacidia subchlorotica, Caloplaca ferruginea, Enterographa crassa, Graphis elegans Graphis scripta, Hyperphyscia adglutinata, Parmelia caperata, Physcia aipolia, Physcia adsendens, Physcia tenella, Teloschistes chrysophthalmus, Roccella phycopsis, Roccella vicentina* and the genus of *Cladonia.* These are located at forests levels (Murdjadjo and Montagne des Lions) dominating the following meshes: a1, a2, a3, b1, b2, b3, c1, c2, c3 , d3 and h5 .

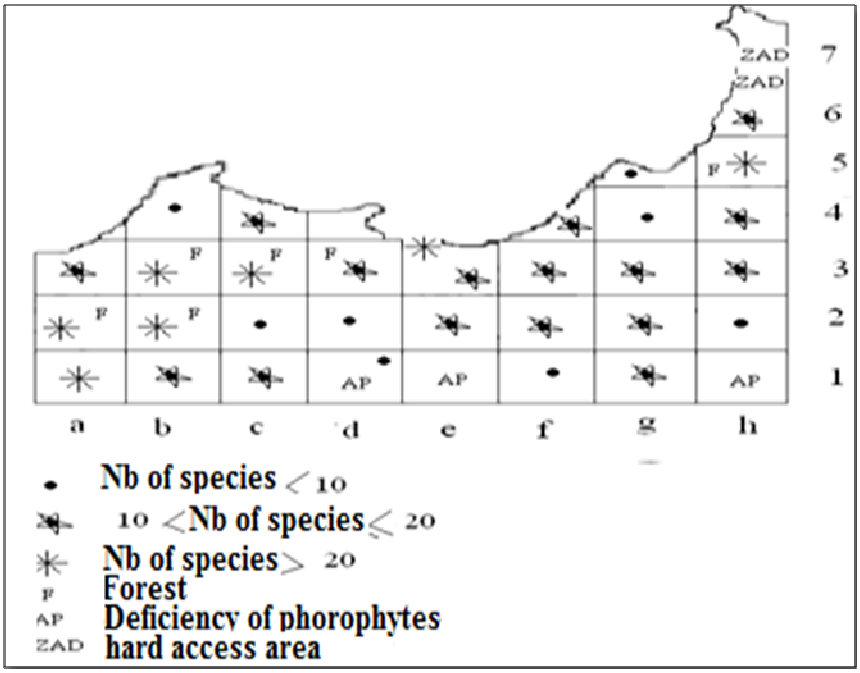

Fig. 5: Quantitative distribution of lichens in prospected sites

We explain this repartition of lichens either by stational and ecological requirements of the species (high altitude, dense humidity), or by the air quality. Other species against, are in the two areas, such as *Lecanora sienae, Lecanora Chlarotera , Caloplaca pyracea, Caloplaca cerina, Dirina ceratoniae, Diploicia canescens et Lecanactis patellarioides.* In our study area, epiphytic lichens exist on several phorophytes where they are widely represented. This is the *Quercus suber, Quercus coccifera*, *Olea europea*, *Pinus halepensis*, *Cupressus sempervirens* and *Ficus carica* that are localized particulary in urban areas, along the roads, in isolation (eg in Santa Cruz and Mers El Kebir) and at the forest of M'sila. Among these trees, *Quercus suber* and *Ficus carica* are those which preserve a wide variety of lichens.

Discussion:

According to the new classification of lichens, 68 lichens species were surveyed in the studied region. We have been able to collect 29 genera, 12 families and 6 orders of lichens. Among the taxa listed, we have Lecanoraceae and Physciaceae which include more species compared to the other families and they contain 12 species for each one. The analysis of each mesh revealed the presence of a greater or lesser number of *Lecanora* genus, This is due to different types of substrate surveyed. We note that the order of Lecanorales consists the most number of taxa compared to other orders, It is a dominant order and it compound 5 families: Lecanoraceae, Ramalinaceae, Cladoniaceae, Parmeliaceae and Stereocaulaceae. Those are divided into 25 genera of lichens.

This result is similar to the observations of Miadlikowska *et al.* [42] and Ait Hammou [16] which indicates that the order of Lecanorales represents an important number of species in the world of lichens. According to Kirk *et al.* [43], the family of Lecanoraceae contains between 766 and one thousand of species of which more than 70 % in the single genus *Lecanora*.

The family of Physciaceae includes 7 differents genera grouping 5 species of *Physcia* that are nitrophilous species, situate in forests (Foret M'sila of Oran) and Mountains (Murdjadjo and mountain des lions). The same observation was made by Fos *et al.* [44], Van Haluwyn *et al.* [45] and El Mokni *et al.* [46] In Boutabia *et al.*

[11], which indicates that most species of this genus requires very specific climatic conditions , particularly abundant hygrometry and high exposure to sunlight . This confirms our results in meshes which containing the forests and mountains.

The crustose species are dominant in all the meshes of the study area. Both researchers Deruelle and Lallemant [47] reported that these species are more penetrating inside the cities and are more resistant to urban influence.

The order physiognomic type is similar to the order physiognomic type of Semadi [48], Djellil [49], Ait Hammou [16] and Boutabia *et al.* [11] whether in urban or in the wild environment, respectively.

The growth of epiphytic lichens requires the existence of favorable support for their development. Indeed, the distribution of epiphytic lichens is influenced by three main factors according to the finding of several authors [48, 12, 18] : it depends of the nature of substratum, environmental conditions and air pollution.

The substrate has an impact on the establishment and distribution of lichens [11]. Therefore, some crustose lichens growing in the crevice of the cortex, and others are developing at the surface; foliose and fruticolous lichens prefer to be on the surface of the cortex. These results corroborate those of Rose [50], Oran and Öztürk [51] and Boutabia *et al.*[11].

Our observation is consistent also with that of Barkman [52], Destinay [53] and Semadi [48] who noted that the cortex located on the opposite side of the rain and into the crevices is softer than the face exposed to the prevailing winds. Unlike the *Eucalyptus tree*, the *Olea* tree is a better phorophyte as adults than the young, this is of course related to the texture of the cortex. Bricaud [54] reports that the nature of phorophyte decisive for the distribution of lichens and their structuring phytosociological groups that composes.

Some lichens prefer smooth cortex of trunks (the case of *Eucalyptus* sp.), or rough cortex (eg *Fraxinus excelsior*) or the trunks of the old trees [48]. We met lichen species very limited these tiny thalle is located inside the crevices that are very pronounced especially in *Olea europea*, *Olea oleaster* and *Ficus retusa* at the Mers Kebir area in front of brick factory, and the edge of the roadway in the city.

The lichen corticolous species do not occur identically on all tree species. Indeed, the cortex pH plays an important role in the wealth of lichen stands. Many species colonize cortex acids such as *lepraria incana, Lecanora pulicaris, Opegrapha* ... Other species prefer basic pH cortex, such as *Physcia, Lecanora hagenii, Lecidella* ... [55]. Although the resinous trees such as *Pinus halepensis* and *Cupressus sempervirens* are deemed as phorophytes with acids cortex, there was quite a few lichens. Most of these species are crustose such as *Arthonia, Lecanora, Caloplaca* .... The rhytidome of *Pinus halepensis* is very acidic pH [56], are only supported by specific species because of their resins [57] and rhytidome is poorer than that of *Quercus pubescent* [56].

According to Kirschbaum and Wirth [54], there are species that prefer subneutres cortex such as *Lecanora chlarotera, Anaptychia ciliaris*... Indeed, the cortex of different trees have different physicochemical characteristics (pH) corresponding to the ecological requirements of specific species of lichens [40]. The cortex of *Quercus suber* is very favorable for growth of lichens [57, 49, 11]. We noted a significant development of all types of lichens on trees of *Quercus suber* non bare cortex.

The depth of the bark crevices is an important factor in the distribution of corticolous species [58, 59] in [11]. We found that the bark texture of old *Quercus suber* subjects is thick and spongy, while that of younger individuals is rough and fissured. Consequently, some crustose lichens grow in cracks of the bark, and others grow on the surface; foliose and fruticolous lichens prefer to be on the surface of the bark. These findings corroborate with those of Rose [49] and Oran and Öztürk [51].

Destinay [53] attributes the differences of flora in relief, the hardness, the water retention capacity and the condensation power of the steam in the cortex. Almborn [60] takes into account the amount of light transmitted through the top of the tree, as well as the relief and the acidity of the cortex. It is well known that factors such as bark texture, water holding capacity, and bark pH influence on the distribution of lichens on trees [61]. Similarly, the humidity of trees has an impact on the diversity and distribution of corticulous lichens communities [62].

We noticed that some species are absent in the city such as *Ramalina lacera, Anaptychia ciliaris, Parmelia caperata, Loboraia amplissima…* Some authors deduct the disappearance of lichens in cities is due to the changes in environmental conditions, in particularly at low humidity, high temperatures, microtopography [63], as well as their sensitivity to air pollution [64].

unlike higher plants: a) lichens have no cuticle (protective layer) and pollutants can readily penetrate to the fungal and algal cells; b) The uptake of substances occurs mainly from the atmosphere; c) lichens have an increased metabolic rate, especially when moist; d) lichens continue to metabolize at low temperatures and are susceptible to damage during the winter months; e) lichens grow slowly and injuries cannot be quickly restored [65].

Many lichen species in the region of Oran colonizing forests, green spaces and public parks could disappear with time. As the species *Catillaria algerica* reported on *Pinus* by Bouly de Lesdain [26] and the species *Lecanora chlarona* quoted by Szatala [66], we did not find it in the mountains of Murdjadjo. Several parameters can be the cause of this lichen poverty over time and space. Among which we can mention the fires that

damaged the old trees over urbanization, Air pollution generated by several sources that may affect lichen habitat: home, road traffic and factories.

In fact, Johansson *et al.* [67] mentions that older trees should be richer in lichens and contain a large number of species than on the young trees. This is consistent with Scheidegger and Clerc [68], which highlighted the importance of old trees for the conservation of epiphytic lichens on the Swiss Red List.

Among lichens inventoried in Oran, we have 16 species that are endangered in Algeria, and is included in the list of protected plant species according to the decree excutif corresponding to 12 January 2012 Algerian official journal. They are : *Anaptychia ciliaris* (L.)Koerb. Foli, *Evernia prunastri* (L.)Ach. *Cladonia convoluta* (Lamkey) Anders., *Cladonia Fimbriata* (L.)Fr., *Cladonia foliacea* (Huds.) Willd., *Diploicia canescens* (Dick)A. Massal, *Lobaria amplissima* (scop.) Forsell., *Parmelia caperata* (L.)Ach., *Physcia adscendens(Fr.)H.Olivier,Physcia aipolia (Humb.)Funrh.,Physcia biziana*(A.Massal.)Zahlbr., *Physcia semipinnata* (Gmel.)Moberg., *Physcia tenella*(Scop.)DC., *Ramalina lacera* (With.)Laundon, *Ramalina panizzei* De Not., *Ramalina pollinaria* (Westr.)Ach.

Conclusion:

The lack of publications in this field in Algeria pushed us to inventory the lichens of our region in order to improve our knowledge of the lichen flora of our country. Indeed, the identification of 63 species of epiphytic lichens and 05 terricolous lichens in the region of Oran is a small contribution but updated in addition to the work of our predecessors in Algeria, it can be integrated in the "checklist" of Algeria and the Mediterranean region.

However in this inventory, more than 176 different tree species phorophytes were used in the identification of the lichen flora over 12 years.

According to the new classification of lichens we were able to collect 29 genera of lichens, 12 families and 6 orders. Among the listed taxa we have the family of Physciaceae and Lecanoraceae that contain more species over others which are 12 in number.

From the physiognomic spectrum of lichens collected from the study area, physiognomic types of lichens show a clear predominance of crustose species with 45 species followed by 11 foliose species and 8 species fruticolous whereas only 3 species were composites. However, there was a single species of leprose.

Some lichens prefer smooth cortex of trunks (the case of *Eucalyptus* sp.), or rough cortex (eg *Fraxinus excelsior*) or the trunks of the old trees. We met lichen species very limited these tiny thalle is located inside the crevices that are very pronounced especially in *Olea europea*, *Olea oleaster* and *Ficus retusa* at the Mers el Kebir area in front of brick factory, and the edge of the roadway in the city.

The distribution of lichens flora depends on the nature of substratum, environmental conditions and the extension of urbanization which increases air pollution from domestic heating and road traffic which they reduce the lichen covered and leads to its extinction.

Unlike higher plants, lichens are more sensitive to air pollution, even if this pollution is low. In the entire world and particularly in Algeria, studies have been using lichens as bio-indicators of air pollution.

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