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EPIPHYTIC LICHENS FROM IBERIAN PARAMERAE. I. JAVALAMBRE MOUNTAINS (TERUEL, SPAIN)

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Keywords: Epiphytic lichens, Chorology, Teruel, Spain, Iberian Paramerae.

Summary: A preliminary list of 61 epiphytic lichens from the Javalambre mountains (Teruel, Spain) is presented. The following phorophytes were sampled *Pinus sylvestris, P. nigra, Juniperus sabina, J. phoenicea, J. communis* subsp. *hemisphaerica*, and *J. thurifera*, in the *Sabino-Pineto sylvestris* and *Junipereto hemisphaerico-thuriferae* communities. 35 taxa are new to the Teruel country. *Aspicilia mutabilis* (Ach.) Körber, *Banhegya setispora* Zeller & Toth, *Caloplaca stillicidiorum* (Vahl) Lynge, *Caloplaca ulcerosa* Coppins & P. James, *Catinaria montana* (Nyl.) Vainio, *Letharia vulpina* (L.) Hue and *Thelenella modesta* (Nyl.) Nyl. are among the more significative species from the phytogeographical point of view.

Resumen: Se presenta un avance del catálogo de líquenes epifitos sobre *Pinus sylvestris, P. nigra, Juniperus sabina, J. phoenicea, J. communis* subsp. *hemisphaerica*, y *J. thurifera* en comunidades de dos series de vegetación basófilas: la oromediterránea maestrazgo-conquense de la sabina rastrera *(Sabino-Pineto sylvestris)* y la supramediterránea maestrazgo-ibérico-alcarreña de la sabina albar (*Junipereto hemisphaerico-thuriferae*) de la sierra de Javalambre (Teruel, España). De los 61 táxones liquénicos catalogados 35 representan nuevas citas para la provincia de Teruel. *Aspicilia mutabilis* (Ach.) Körber, *Banhegya setispora* Zeller & Toth *Caloplaca stillicidiorum* (Vahl) Lynge, *Caloplaca ulcerosa* Coppins & P. James, *Catinaria montana* (Nyl.) Vainio, *Letharia vulpina* (L.) Hue y *Thelenella modesta* (Nyl.) Nyl., son algunos de los táxones más significativos desde el punto de vista fitogeográfico.

Introduction

This study is part of a broader project on the biodiversity of Iberian Paramerae, with particular regard to their lichen flora. Here we present the first results of a survey of epiphytic lichens occurring on the more representative phorophytes of the Javalambre mountains, which were never studied before by lichenologists.

The survey area is located in the southern part of Teruel country, bordering the provinces of Valencia (close to "Rincon de Ademuz"), Cuenca and Castellón (Fig. 1) . These mountains are the southeasternmost extensions of the Iberian Chain, and are the most important high plateau south of the Mijares river. The prevailing geological substratum is Triassic and Cretaceous limestone, but there are also outcrops of marls, gypsum-rich marls and gypsum, with a predominance of basic substrata.

The main summits range from 1200 to 2020 m, the highest peaks being the

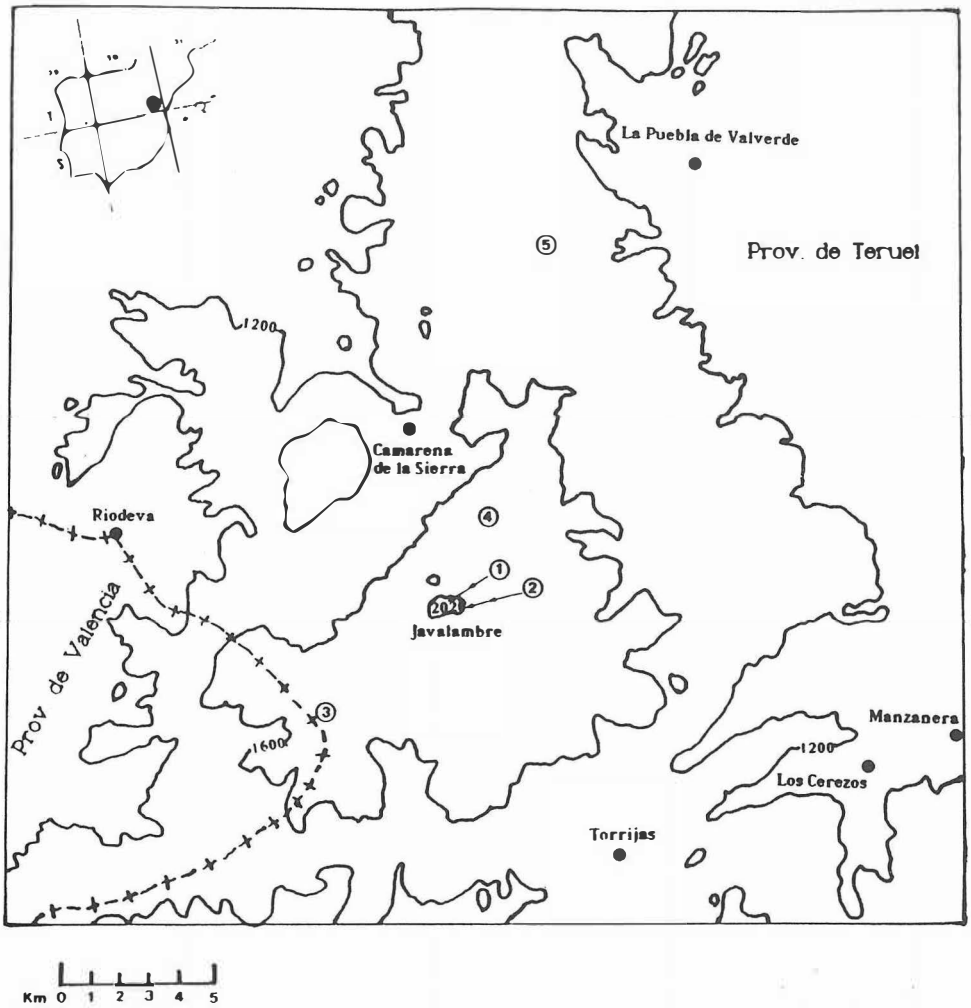

Fig. 1: Study area with sampled localities.

Upper Javalambre Mt. (2020 m), Javalambre Mt. (1985 m) and the Calderon Mt. ("Rincón de Ademuz" 1836 m). These mountains have a continental character, in spite of their being close to the sea (80 Km), and are dominated by a coniferous woodland with *Pinus sylvestris* L., *Pinus nigra* Arnold subsp. *salzmannii* (Dunal) Franco, and, in a lower layer, with *Juniperus sabina* L. and *Juniperus communis* L. subsp. *hemisphaerica* (J. & K. Presl.) Nyman.

There are no metereological data on the survey area (Aguilella 1988), and those of neighbouring stations (Sarrión, Arroyo Cerezo) are of little use, due to

the different situation; however, the analysis of the flora and vegetation can furnish some bioclimatic information. According to Rivas-Martínez (1987), the vegetation of the summits of the Javalambre mountains pertains to the *Sabino-Pineto sylvestris* community (see also Rivas-Goday & Borja 1961). At lower altitudes there are open forests dominated by the Spanish juniper (*Juniperus thurifera* L.) and the common juniper (*Juniperus communis* L. subsp. *hemisphaerica*) *Junipereto hemisphaerico-thuriferae,* whith a dense shrubby formation which is replaced by grasslands after disturbance, the latter usually with *Festuca hystrix* and *Poa ligulata.* From the phytogeographical point of view both formations belong to the Mediterranean-Iberolevantine Superprovince, Castellano-Maestrazgo-Manchega Province, Maestracense sector (Rivas-Martínez, 1987).

Material and Methods

The observed localities are listed below, with the elevation and the UTM coordinates:

1.Hs, TERUEL: Puebla de Valverde, Cerro de Javalambre, 30TXK684406, 2020 m.
2.Hs, TERUEL: Puebla de Valverde, Alto del Ventisquero, 30TXK693414, 1900 m.
3.Hs, TERUEL: Camarena de la Sierra, Refugio ICONA, 30TXK6439, 1750 m.
4.Hs, TERUEL: Puebla de Valverde, Alto del Ave, 30TXK700440, 1700 m.
5.Hs, TERUEL: Puebla de Valverde, Masia los Enebrales, 30TXK716528, 1250 m.

Nomenclature follows Poelt (1969), Poelt & Vezda, (1977, 1981), Hafellner (1984), and Eriksson & Hawksworth (1986, 1987, 1988 and 1989); furthermore, we have consulted Santesson (1984), Hawksworth & al. (1980) and Cannon & al. 1985), and some Floras and catalogues of Mediterranean areas such as Clauzade & Roux (1985) and Nimis & Poelt (1987), and several recent monographs of different groups.

In the catalogue the species are listed in alphabetical order and the numbers of localities are indicated. The phorophytes are abbreviated as follows: Ps (*Pinus sylvestris*), Jh (*Juniperus hemisphaerica*), Jth (*Juniperus thurifera*), Js (*Juniperus sabina*). Also, we mark with * taxa which are new to the Teruel province and with ** those which are new to the Iberian Peninsula. Reference collections have been deposited at the VAB-LICH. Herbarium.

Results (species list)

Anaptychia ciliaris (Ach.) Körber - Loc.: 3,4,5. Ps, Js, Jth.
* *Aspicilia mutabilis* (Ach.) Körber - Loc.: 2,5. Jh, Js, Jth.
* *Arthonia radiata* (Pers.) Ach. - Loc.: 3. Ps.
* *Bacidia naegelii* (Hepp) Zahlbr. - Loc.: 3,5. Ps, Jth.
** *Banhegya setispora* Zeller & Toth - Loc.: 2. Js.
* *Bryoria fuscescens* (Gyeln.) Brodo & D. Hawksw. - Loc.:3. Ps.
Caloplaca cerina (Ehrh. ex Hedw.) Th. Fr. - Loc.: 2,3,4,5. Jh, Js, Ps, Jth.

Caloplaca cerinella (Nyl.) Flagey - Loc.: 1. Jh.
* *Caloplaca cerinelloides* (Erichs) Poelt ined. - Loc.: 1 Jh.
* *Caloplaca ferruginea* (Huds.) Th. Fr. - Loc.: 2,3,4. Ps, Jh.
Caloplaca haematites (Chaub. ex St.-Amans) Zwackh - Loc.: 2,3. Ps, Jh.
* *Caloplaca holocarpa* (Hoffm.) Wade - Loc.:1,2,3,4.Ps,Jh, Js.
* *Caloplaca pollinii* (Massal.) Jatta - Loc.: 2,4. Ps, Js.
* *Caloplaca stillicidiorum* (Vahl) Lynge - Loc.: 5. Jth.
* *Caloplaca ulcerosa* Coppins & P. James - Loc.: 5. Jth.
* *Candelariella vitellina* (Ehrht.) Müll. Arg. - Loc.: 2,3. Jh, Js.
* *Candelariella xanthostigma* (Ach.) Lettau - Loc.: 2,3. Ps, Jh, Js.
* *Catillaria chalybeia* (Borrer) Massal. - Loc.: 2,3,4,5. Ps, Jh, Js, Jth.
* *Catillaria nigroclavata* (Nyl.) Schuler - Loc.: 2,3,4,5. Ps, Jh, Js, Jth.
* *Catinaria montana* (Nyl.) Vainio - Loc.: 4. Ps.
Cetraria chlorophylla (Willd.) Vainio - Loc.: 2, 4. Ps, Jh.
* *Cladonia pyxidata* (L.) Hoffm. - Loc.: 2, 4. Ps, Jh, Js.
* *Collema subflaccidum* Degel. - Loc.: 3. Ps.
* *Hyperphyscia adglutinata* (Flörke) Mayrhofer & Poelt - Loc.: 5. Jth.
Hypogymnia bitteriana (Zahlbr.) Räsänen - Loc.: 3,4. Ps.
* *Hypogymnia tubulosa* (Schaerer) Havaas - Loc.: 3,4. Ps.
Lecanora carpinea (L.) Vainio - Loc.: 3,4. Ps, Js.
Lecanora chlarotera Nyl. - Loc.: 1,2,3,4,5. Ps, Jh, Js, Jth.
* *Lecanora sienae* B. de Lesd. - Loc.: 1,2,3,4,5. Ps, Jh, Js, Jth.
* *Lecidella achristotera* (Nyl.) Hertel & Leuckert - Loc.: 1,2,3,4,5. Ps, Jh, Js, Jth.
Lecidella elaeochroma (Ach.) M. Choisy - Loc.: 1,2,3,4,5. Ps, Jh, Js, Jth.
* *Lecidella euphorea* (Flörke) Hertel - Loc.: 1,2,3,4,5. Ps, Jh, Js, Jth.
* *Leptogium teretiusculum* (Wallr.) Arnold - Loc.: 2. Jh.
Letharia vulpina (L.) Hue - Loc.: 3. Ps.
* *Mycocalicium parietinum* (Ach. ex Schaerer) Hawksworth - Loc.: 5. Jth.
* *Ochrolechia szatalaensis* Vers. - Loc.: 4. Ps, Jh, Js, Jth.
* *Ochrolechia turneri* (Sm.) Hasselrot - Loc.: 3,4. Ps.
Parmelia acetabulum (Necker) Duby - Loc.: 3,4. Ps, Js, Jth.
Parmelia exasperata de Not. - Loc.: 3,4. Ps, Js, Jth.
Parmelia exasperatula Nyl. - Loc.: 3,4. Ps, Js, Jth.
* *Parmelia incolorata* (Parr.) Lettau - Loc.: 4. Ps, Jh.
* *Parmelia laciniatula* (Flagey ex Olivier) Zahlbr. - Loc.: 4. Ps.
* *Parmelia saxatilis* (L.) Ach. - Loc.: 3,4. Ps.
* *Parmelia sulcata* Taylor - Loc.: 3. Ps.
Parmelia tiliacea (Hoffm.) Ach. - Loc.: 3. Ps.
* *Parmeliopsis ambigua* (Wulfen) Nyl. - Loc.: 3. Ps.
Physcia adscendens (Fr.) Olivier - Loc.: 3,4. Ps, Jh, Js, Jth.
Physcia aipolia (Ehrh.) Fürnrohr - Loc.: 4. Ps, Jh, Js, Jth.
Physcia biziana (Massal.) Zahlbr. - Loc.: 1,2. Jh.

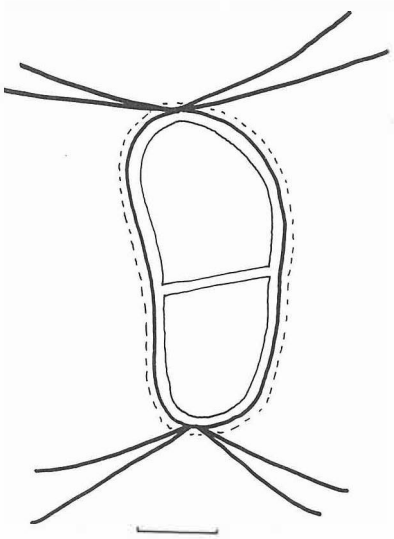

Fig. 2: *Banhegyia setispora* VAB-LICH. 5065. A mature ascospore with setose ends . Scale = 5 µm.

Physcia semipinnata (Gmelin) Moberg - Loc.: 4. Ps, Jh, Js, Jth.
Physconia venusta (Ach.) Poelt - Loc.: 4. Ps.
Platismatia glauca (L.) W. Culb & C. Culb. - Loc.: 3,4. Ps.
Pseudevernia furfuracea (L.) Zopf - Loc.: 3,4. Ps, Jh, Js.
* *Pyrrhospora quernea* (Dickson) Körber - Loc.: 3. Ps.
Ramalina farinacea (L.) Ach. - Loc.: 3. Ps.
Ramalina fraxinea (L.) Ach. - Loc.: 4. Ps.
* *Rinodina archaea* (Arnold) Arnold - Loc.: 3,4. Ps, Jh, Js, Jth.
Thelenella modesta (Nyl.) Nyl. - Loc.: 3. Ps, Jth.
* *Usnea hirta* (L.) Web. ex Wigg. - Loc.: 3. Ps.
Xanthoria parietina (L.) Th. Fr. - Loc.: 3. Ps, Js, Jth.
* *Xanthoria polycarpa* (Hoffm.) Rieber - Loc. 5. Jth.

Discussion

Crustose species are 50% of the total, with a prevalence of species of nutrient-rich bark, such as some *Teloschistaceae;* these are more abundant over junipers and savins at high elevations, where cattle raising is common. Fruticose lichens such as *Usnea, Ramalina, Bryoria, Pseudevernia* are rare at high altitudes, perhaps because of the relatively dry climate*; Anaptychia, Letharia,* and other species, on the contrary, are abundant in shaded north-facing pinewoods; there, also the abundance of epiphytic species of *Ochrolechia* and *Cladonia* indicates a subhumid-humid ombroclimate.

31 taxa are new to the Teruel province; among the most interesting species we can cite *Aspicilia mutabilis*, a mediterranean element typical of the Ibero-Levantine supramediterranean areas with subhumid-humid ombroclimate, occurring in *Xanthorion* communities on very sunny and nutrient-rich bark, *Caloplaca stillicidiorum*, which is rare in the high mountains of the Iberian Peninsula *Caloplaca ulcerosa*, located only in old and well-preserved woods, *Catinaria montana* and *Letharia vulpina*, whose records are among southernmost in the Iberian Peninsula, *Thelenella modesta*, which is particularly rare in Central Europe, probably because of recent environmental changes (Mayrhofer, 1987). *Banhegyia setispora* a saprophytic lichenicolous fungus, is especially interesting because of its curious ascospores (Fig. 2), which are hyaline, ellipsoid, with rounded apices, 1-septate, the lower cell somewhat shorter, 20 x 7.5 µ, and setose at both ends; this species is new to Spain.

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