

Epiphytic lichens on *Juniperus oxycedrus* L. in the Iberian Peninsula

by

G. Aragón¹, F.J. Sarrión² and I. Martínez^{3*}

¹Centro de Documentación, Organismo Autónomo Parques Nacionales
Ministerio de Medio Ambiente, c/ Gran Vía de San Francisco 4, 28005-Madrid, Spain

²Departamento de Biología Vegetal I, Facultad de Biología, Universidad Complutense de Madrid
28040-Madrid, Spain

³Área de Biodiversidad y Conservación, ESCET, Universidad Rey Juan Carlos
c/ Tulipán s/n, 28933-Móstoles, Madrid, Spain
e-mail: aragonmartinez@terra.es; rosarri@wanadoo.es; isabel.martinez@escet.urjc.es

With 1 figure

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Abstract: The epiphytic lichen flora on *Juniperus oxycedrus* in southern Spain is investigated. The main studied areas are 'Sierra de Segura' (Jaén prov.), 'Montes de Toledo' (Ciudad Real and Toledo provs.) and 'Sierra Madrona' (Ciudad Real prov.). A total number of 111 species are reported. *Ramboldia insidiosa*, *Rhizocarpon schedomices* and *Rinodina excrecens* are new to the Iberian Peninsula, while *Rimularia gyrizans* is new to Spain. Other taxa (*Aspicilia lignicola*, *Bacidia absistens*, *Calicium montanum*, *Rinodina furfuracea* and *Xyloschistes platytropa* var. *pyrenaica*) are specially considered due to their chorological and ecological value for Europe.

Resumen: Se presenta un estudio sobre la flora líquénica de *Juniperus oxycedrus* en el Sur de España. Las áreas estudiadas son las siguientes: Sierra de Segura (Jaén), Montes de Toledo (Ciudad Real y Toledo) y Sierra Madrona (Ciudad Real). Se citan un total de 111 especies. *Ramboldia insidiosa*, *Rhizocarpon schedomices* y *Rinodina excrecens* son nuevas para la Península Ibérica y *Rimularia gyrizans* es nueva para España. Táxones como *Aspicilia lignicola*, *Bacidia absistens*, *Calicium montanum*, *Rinodina furfuracea* y *Xyloschistes platytropa* var. *pyrenaica* son especialmente considerados por su valor ecológico y corológico en Europa.

Introduction

In central and southern Spain, the junipers (*Juniperus oxycedrus*) are a representative element of the *Quercus ilex* subsp. *ballota* forests (*Junipero oxycedri-Quercetum rotundifoliae* Rivas-Martínez 1964). These forests are characterized by the presence of ancient trees of *Q. ilex*, mixed with very old and twisted trees of *J. oxycedrus*. The

junipers can reach over two metres in diameter and they are characterized by their hard wood which is largely dead. Many of these junipers are mainly restricted to stony slopes of deep valleys and steep ravines. In these conditions, the forest stands are open and the junipers are subjected to intense winds and highly sunstroke, which cause a great drought on the trunks.

The lichen flora growing on the junipers is poorly known and only a few bibliographic references are available. In Spain the first studies were carried out by Sarrión & Burgaz (1995) and later Aragón & Martínez (1997) added some data about this specific flora in a broad context. And in the rest of Europe, there is only a study of the lichen flora growing on *Juniperus oxycedrus* in Italy (Zedda & Sipman 2001). By this, the aim of this study is to increase the knowledge of the lichen flora on *Juniperus oxycedrus*.

Material and methods

The authors carried out field studies since 1995 to 2002. A total number of 1300 specimens were collected in 10 localities, being all the samples deposited in MA, MACB and MAF herbaria. In the most controversial lichens, an analysis of secondary lichen products was performed according to standardized procedures (White & James 1985). Current mycological terminology is used and generally follows Kirk et al. (1996), and phytoclimatic terminology is according to Rivas-Martínez (1987).

SURVEY AREA

The survey area is located in the centre and south-east of Spain (Fig. 1) and is constituted by different mountains reliefs. 'Montes de Toledo' (1) and 'Sierra Madrona' (2) are formed of medium-height mountains similar in altitude to "Appalachian relief", 600 to 1450 m altitude; the substrate is composed of granites, quartzites, siliceous and clayey slates and the climate is typically Mediterranean, with Pm = 500 to 800 mm and T = 12.5 to 15.5°C. However, Sierra de Segura (3) is located into the Betic Mountains, the altitudinal rank comprises from 2107 m of the highest peak to 540 m, the substrate is composed of hard limestone and dolomites from the Jurassic to Cretacic periods and the climate is Mediterranean, with Pm = 600 to 1307 mm and T = 17°C to 6°C upper 2000 m alt.

Studied localities with UTM grid: MONTES DE TOLEDO: 1- Toledo: Los Navalucillos, arroyo del Chorro, 30SUJ5978, 870 m. 2- Toledo: Hontanar, río Estena, 30SUJ6380, 800 m. 3- Ciudad Real: Navas de Estena, collado de Acebuches, 30SUJ6671, 800 m. SIERRA DE SEGURA: 4- Jaén: Santiago-Pontones, río Aguamulas, 30SWH1810, 800 m. 5- Jaén: La Iruela, río Borosa, cerrada de Elías, 30SWH1305, 950 m. 6- Jaén: La Iruela, arroyo de las Truchas, 30SWH1103, 1.000 m. SIERRA MADRONA: 7-Ciudad Real: Fuencaliente, chorrera del arroyo del Robledo de las Hoyas, 30SUH8256, 800 m. 8- Ciudad Real: Solana del Pino, garganta de la Sorda, 30SVH0752, 850 m. 9- Ciudad Real: Almodovar del Campo, umbría de Hato Blanco, 30SUH8166, 910 m. 10- Ciudad Real: Fuencaliente, Abulagoso, 30SUH8558, 1285 m

Results and discussion

A total of 111 species (see list of species) is reported here from bark and lignum of *Juniperus oxycedrus*. *Ramboldia insidiosa*, *Rhizocarpon schedomices* and *Rinodina excrecens* are cited for the first time in the Iberian Peninsula, while *Rimularia gyrizans* is new for Spain. Moreover, *Aspicilia lignicola*, *Bacidia absistens*, *Calicium montanum*, *Rinodina furfuracea* and *Xyloschistes platytropa* are specially considered due to their chorological and ecological value for Europe.

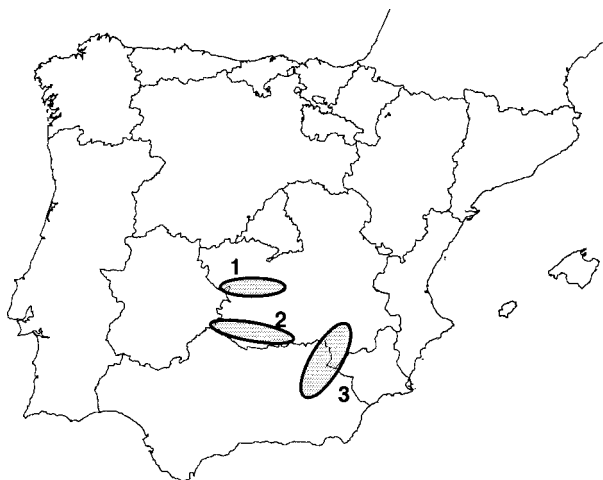


Fig. 1: Location of the studied area in the Iberian Peninsula. 1. Montes de Toledo. 2. Sierra Madrona. 3. Sistema Bético.

List of species. L: lignum of *Juniperus oxycedrus*; B: bark of *J. oxycedrus*; L/B: lignum and bark of *J. oxycedrus*; 0: absent.

Species/Loc	1	2	3	4	5	6	7	8	9	10
<i>Agonimia octospora</i>	0	B	0	0	0	0	0	0	0	0
<i>Amandinea punctata</i>	L	L	0	0	0	0	0	0	0	0
<i>Anaptychia ciliaris</i>	B	B	B	0	0	0	B	0	0	0
<i>Aspicilia lignicola</i>	0	0	0	B	B	0	0	0	0	0
<i>Bacidia absistens</i>	0	0	0	0	0	0	0	B	0	0
<i>Bacidia friesiana</i>	0	0	0	0	0	0	B	0	0	0
<i>Bacidia rubella</i>	B	0	0	0	0	0	0	0	0	0
<i>Buellia cedricola</i>	L	L	L	L	L	L	L	L	L	L
<i>Buellia griseovirens</i>	0	0	0	B	B	B	B	0	0	0
<i>Buellia iberica</i>	0	L	B	0	0	0	L	0	B	B
<i>Calicium abietinum</i>	L	0	0	L	L	0	0	0	L	0
<i>Calicium glaucellum</i>	0	0	L	0	L	0	L	L	L	0
<i>Calicium montanum</i>	L	L	L	L	L	0	L	0	0	0
<i>Caloplaca cerina</i>	0	0	L	L	L	L	0	0	0	0
<i>Caloplaca ferruginea</i>	0	0	0	0	0	B	0	0	0	0
<i>Caloplaca flavorubescens</i>	0	0	0	0	0	B	0	0	0	0
<i>Caloplaca herbidella</i>	L/B	L/B	B	B	0	B	B	0	0	0
<i>Caloplaca holocarpa</i>	0	0	0	0	B	0	0	0	0	0
<i>Caloplaca obscurella</i>	0	B	0	0	0	0	0	0	0	0
<i>Candelaria concolor</i>	0	B	0	0	B	0	0	0	0	0
<i>Candelariella viae-lacteeae</i>	0	0	0	0	B	0	0	0	0	0
<i>Candelariella vitellina</i>	L	L	0	0	0	L	L	0	B	L/B
<i>Catillaria chalybæa</i>	0	0	0	L	0	0	0	0	0	0
<i>Catillaria nigroclavata</i>	L/B	L/B	L/B	L/B	L/B	L/B	0	0	B	0
<i>Cetraria aculeata</i>	L	L	0	0	0	0	0	0	0	0
<i>Cladonia chlorophaea</i>	0	0	0	0	0	0	L	B	L	0

Species/Loc	1	2	3	4	5	6	7	8	9	10
<i>Collema furfuraceum</i>	B	0	0	0	0	0	0	0	0	0
<i>Collema subflaccidum</i>	0	0	0	0	0	0	0	B	0	0
<i>Cyphelium tigillare</i>	L	L	L	L	0	L	L	L	L	L
<i>Degelia plumbea</i>	0	B	0	0	0	0	0	0	0	0
<i>Dendriscoaulon umhausense</i>	0	B	B	0	0	0	0	0	0	0
<i>Diploschistes muscorum</i>	0	0	0	0	0	0	L	0	0	0
<i>Flavoparmelia caperata</i>	0	0	0	0	0	0	0	B	0	0
<i>Fuscopannaria ignobilis</i>	B	B	0	0	0	0	0	0	0	0
<i>Fuscopannaria mediterranea</i>	0	B	0	B	0	0	0	B	0	0
<i>Fuscopannaria olivacea</i>	B	0	0	B	B	0	0	B	0	0
<i>Hypocenomyce scalaris</i>	L/B	L/B	0	L	B	0	L	L	L	L
<i>Hypogymnia farinacea</i>	L/B	L/B	0	0	0	0	0	0	L	0
<i>Hypogymnia physodes</i>	0	0	0	0	0	0	B	0	0	0
<i>Hypogymnia tubulosa</i>	0	0	0	B	0	0	0	0	0	0
<i>Lasallia pustulata</i>	L	L	0	0	0	0	0	0	0	L
<i>Lecanactis latebrarum</i>	L	0	0	0	0	0	0	0	0	0
<i>Lecanora chlorotera</i>	B	B	0	B	0	B	0	0	0	0
<i>Lecanora hagenii</i>	0	0	0	0	B	B	0	0	0	0
<i>Lecanora horiza</i>	0	0	0	B	0	B	0	0	0	0
<i>Lecanora varia</i>	L	L	L	L	L	L	L	L	L	L
<i>Lecidea botryosa</i>	L	L	0	0	0	0	L	L	0	0
<i>Lecidea exigua</i>	0	0	0	L	L	0	0	0	0	0
<i>Lecidea oxycedricola ined</i>	L	L	L	0	0	0	0	L	0	L
<i>Lecidella elaeochroma</i>	B	0	0	B	0	B	0	0	0	0
<i>Lecidella pulveracea</i>	0	0	0	0	0	0	B	0	0	0
<i>Lepraria incana</i>	0	L/B	0	L	L	0	0	0	0	0
<i>Lepraria lobificans</i>	L/B	L	B	0	B	0	L	L/B	L	L
<i>Leprolomma membranaceum</i>	0	B	0	0	0	0	0	0	0	0
<i>Leptogium lichenoides</i>	0	B	0	B	0	0	0	0	0	0
<i>Leptogium subtile</i>	0	B	0	0	0	0	0	0	0	0
<i>Leptogium teretiusculum</i>	0	0	0	0	0	0	0	B	0	0
<i>Megaspora verrucosa</i>	0	B	0	B	0	B	0	0	0	B
<i>Melanelia fuliginosa</i>	B	B	0	0	B	0	B	0	0	0
<i>Melanelia laciniatula</i>	0	0	0	B	0	0	0	0	0	0
<i>Micarea prasina</i>	L/B	B	0	0	0	0	L	0	0	0
<i>Mycocalicium subtile</i>	0	0	L	0	L	0	L	L	0	0
<i>Neofuscelia pulla</i>	L	L	0	0	0	0	0	0	L	0
<i>Neofuscelia verruculifera</i>	0	0	0	0	0	0	0	0	L	0
<i>Ochrolechia subviridis</i>	0	0	0	0	0	0	0	B	0	0
<i>Parmelia saxatilis</i>	L	B	L	0	L	B	L	L	L	L
<i>Parmelia submontana</i>	0	0	0	L	0	0	0	0	0	0
<i>Parmelia sulcata</i>	B	B	0	0	0	0	0	0	0	0
<i>Parmelina tiliacea</i>	B	0	0	0	0	0	L	L	L	L
<i>Pertusaria albescens</i>	L/B	B	B	B	0	0	0	0	0	L
<i>Pertusaria amara</i>	L/B	L/B	0	0	B	0	0	0	0	0
<i>Pertusaria coccodes</i>	0	L	0	0	0	0	0	0	0	0
<i>Pertusaria coronata</i>	B	0	0	0	0	B	0	0	0	0
<i>Pertusaria flavida</i>	L	L/B	L/B	0	0	0	0	0	0	0
<i>Pertusaria hemisphaerica</i>	0	0	0	0	0	B	0	B	0	0
<i>Pertusaria ophthalmiza</i>	0	0	L	0	0	0	0	0	L	0
<i>Pertusaria paramerae</i>	0	0	0	L	L	L	0	0	0	0
<i>Pertusaria pertusa</i>	L/B	L	0	0	0	0	0	0	0	L
<i>Pertusaria slesvicensis</i>	0	0	0	0	0	0	B	0	0	0
<i>Phlyctis argena</i>	0	0	0	0	0	0	0	B	0	0
<i>Physcia adscendens</i>	0	0	0	B	0	B	0	0	0	0

Species/Loc	1	2	3	4	5	6	7	8	9	10
<i>Physcia aipolia</i>	0	0	0	B	B	0	0	0	0	0
<i>Physcia semipinnata</i>	0	0	0	B	B	B	0	0	0	0
<i>Physcia tenella</i>	0	0	0	B	B	0	0	0	0	0
<i>Physconia distorta</i>	0	B	B	0	0	0	0	0	0	0
<i>Physconia enteroxantha</i>	B	0	0	0	0	0	0	0	0	0
<i>Physconia servitii</i>	0	0	0	0	0	0	0	B	0	0
<i>Physconia subpulverulenta</i>	0	0	B	0	0	0	0	0	B	0
<i>Physconia venusta</i>	0	B	B	0	0	0	0	0	0	0
<i>Placynthiella icmalea</i>	L	L	0	0	0	0	L	L	L	L
<i>Platysmatia glauca</i>	L	L/B	0	0	0	0	0	0	L	L
<i>Pseudevernia furfuracea</i>	L	L/B	0	0	0	0	0	0	L	L
<i>Pyrrhospora elabens</i>	L	L	L	L	L	L	L	L	L	L
<i>Ramboldia insidiosa</i>	L	L	L	0	0	0	L	L	L	L
<i>Rhizocarpon schedomyces</i>	L	L	L	0	0	0	0	0	0	0
<i>Rimularia gyrizans</i>	0	L	0	0	0	0	0	0	0	0
<i>Rinodina anomala</i>	0	0	0	L	0	0	0	0	0	0
<i>Rinodina capensis</i>	0	B	0	0	0	0	0	0	B	0
<i>Rinodina furfuracea</i>	0	0	0	0	B	0	0	0	0	0
<i>Rinodina oleae</i>	0	0	0	0	B	B	0	0	0	0
<i>Rinodina sophodes</i>	0	0	0	B	0	0	B	0	0	0
<i>Tephromela atra</i>	0	L	0	0	0	0	0	0	0	0
<i>Usnea wasmuthii</i>	L	0	L	0	0	0	0	0	0	0
<i>Trapeliopsis flexuosa</i>	L	L	0	0	0	0	0	0	0	0
<i>Waynea adscendens</i>	0	B	0	0	0	0	0	B	0	0
<i>Xanthoparmelia conspersa</i>	L	L	0	0	0	0	0	0	0	0
<i>Xanthoparmelia somloensis</i>	L	L	0	0	0	0	0	0	0	0
<i>Xanthoparmelia tinctina</i>	L	L	0	0	0	0	0	0	0	L
<i>Xyloschistes platytropa</i>	0	L	L	L	L	0	0	0	L	L

The special interest of this phorophyte is not only by the scarce data about its lichen flora but also by its specific lignicolous lichen species, as Sarrión & Burgaz (1995) pointed out.

Many of the lichen species which colonize the juniper bark are very similar to those grow on other phorophytes with acid bark. Eutrophic species are frequent and mainly belong to *Caloplaca*, *Catillaria*, *Physcia*, *Physconia*, *Rinodina* genera. Furthermore, the lichen flora growing on junipers is different according to the different microhabitats found in the phorophyte. The lignum is mainly colonized by *Lecanora varia*. In exposed and sunny situations are quite often species of the *Buellietum cedricolae* Burgaz & Sarrión 1995 such as *Buellia cedricola*, *Cyphelium tigillare*, *Lecidea oxycedricola*, *Pyrrhospora elabens*, *Rimularia gyrizans* and *Xyloschistes platytropa*. The thinner branches are covered by thalli of *Parmelia saxatilis*, *Parmelina tiliacea*, *Platysmatia glauca* and *Pseudevernia furfuracea* (*Pseudevernetum furfuraceae* Hil. 1925). On horizontal and high surfaces are frequent species such as *Lecidea botryosa*, *Placynthiella icmalea*, *Trapeliopsis flexuosa* together with *Hypocenomyce scalaris* and *Calicium montanum*. In surfaces near the soil, or in crevices appear saxicolous and terricolous species: *Amandinea punctata*, *Cetraria aculeata*, *Lasallia pustulata*, *Neofuscelia pulla*, *N. verruculifera*, *Xanthoparmelia conspersa*, *X.*

somloensis and *X. tinctina*, all of them lacking from the junipers of the Sierra de Segura, due to the specificity of these species by the acid substrata. On vertical surfaces occur species such as *Calicium abietinum*, *C. glaucellum* and *Mycocalicium subtile* (*Calicium glaucelli* Kalb 1966 corr. Wirth 1980).

Agonimia octospora, *Bacidia absistens*, *B. friesiana*, *B. rubella*, *Caloplaca obscurella*, *Collema subflaccidum*, *Degelia plumbea*, *Dendriscoaulon umhausense*, *Fuscopannaria ignobilis*, *F. mediterranea*, *Leptogium lichenoides*, *L. subtile*, *L. tertiussculum*, *Ochrolechia subviridis* and *Waynea adscendens* are very rare taxa which colonize the bark of old mossy junipers located in shaded and humid situations.

The species growing on *Juniperus oxycedrus* with wide distributional range were 58%. The species with temperate-oceanic distribution were 11%, mostly of them contained cyanobacterial photobiont. They mainly grow on old mossy junipers located in deep valleys and steep ravines where the relative humidity remains for a long time. Another element well represented with the 17% of the species has an extensive distribution in the centre and/or north of Europe while in the Mediterranean Region is confined to mountainous zones. Finally, the species restricted to the Mediterranean area in Europe were 14%.

If we compare our results with Zedda & Sipman (2001), it is possible to find some similarities, although there are also some differences. Both studies share 35 species, but they are mainly widespread taxa (e.g. *Caloplaca ferruginea*, *Candelariella vitellina*, *Hypocenomyce scalaris*, *Hypogymnia tubulosa*, *Parmelia saxatilis*, etc.). In relation with the total number of species, the difference is clear, we report 111 species while Zedda & Sipman (2001) include only 68 species in their study. However, if we compare each one of the mountainous systems included in our study with the only locality presents in the Italian study, the differences are minimized: 72 species in Montes de Toledo, 53 species in Sierra de Segura and 54 species in Sierra Madrona.

The most important differences are referred to the Mediterranean species percentage: 7% in Sardinia and 14% in the Spanish studied area. This might be due to the different climatic conditions, because the annual average temperature in Sardinia is sensitively lower (11,7°C) and the average annual rainfalls is higher (1147 mm). Hereby, Zedda & Sipman (2001) report species with higher humid requirements such as *Calicium adpersum*, *Chaenotocopsis nana*, *Chaenotheca phaeocephala*, *Leprocaulon microscopicum*, *Ochrolechia androgyna* and *Pyrrhospora querneae*, probably due to the highest precipitations of the studied area.

Notes about some interesting species

Aspicilia lignicola (Anzi) Hue

In Spain it is known from only three populations more, growing on *Juniperus thurifera*, which are located in the Serranía de Cuenca and Sierra del Tremedal (Martínez et al. 2003). The only known records in the world are from the Alps (Austria, Italy and France) (Ozenda & Clauzade 1970; Nimis 1993; Hafellner & Türk 2001) and the Atlas (Algeria) (Esnault 1985).

Studied material: JAÉN: La Iruela, Sierra de Segura, río Borosa, cerrada de Elías, 30SWH1405, 1000 m, on *Juniperus oxycedrus*, G. Aragón & I. Martínez, 14-V-1995, Aragón 712/95. Santiago-Pontones, Sierra de Segura, río Aguamulas, cerca del cortijo del Mulón, 30SWH1810, 950 m, on *Juniperus oxycedrus*, G. Aragón & I. Martínez, 21-III-1995, Aragón 240/95; *ibid.*, 13-V-1995, Aragón 572/95.

Bacidia absistens (Nyl.) Arnold

This is a scarce species in the Iberian Peninsula, being more frequent in more oceanic and humid areas (Tavares 1950; Carballal & Álvarez 1994; Fos 1998; Jones 1999). This is a subatlantic species in Europe, which appears in old and well-established forests (Purvis et al. 1992; Nimis 1993). It is also known from the Macaronesian area (Hafellner 1995) and North America (Ekman 1996).

Studied material: CIUDAD REAL: Solana del Pino, umbría valle de Alcuadía, 30SVH0360, 900 m, on bark of *Juniperus oxycedrus*, A.R. Burgaz, I. Martínez & F.J. Sarrión, 4-2-1997, Sarrión 1100.

Calicium montanum Tibell

This species has been recently described, so its distribution area is yet uncertain: Germany, Italy, Portugal and Spain (Tibell 1999). Six populations have been found in Spain on *Juniperus oxycedrus* and two more on lignum of *Quercus pyrenaica*.

Studied material: CIUDAD REAL: Navas de Estena, Montes de Toledo, collado de Acebuches, 30SUJ6671, 800 m, on bark of *Juniperus oxycedrus*, G. Aragón 950/02, 21-V-2002. Fuencaliente, sierra de Quintana, umbría de Burcio del Pino, 30SUH9351, 1010 m, on lignum of *Quercus pyrenaica*, F.J. Sarrión, 13-3-1998, Sarrión 2098. Fuencaliente, umbría de sierra de Dormideros, cerca del río Cereceda, 30SUH9056, 860 m, on lignum of *Quercus pyrenaica*, F.J. Sarrión, 27-6-1993, Sarrión 120. Fuencaliente, Hoya de los pinos, 30SUH9053, 920 m, on lignum of *Juniperus oxycedrus*, F.J. Sarrión, 30-5-1998, Sarrión 2357. JAÉN: La Iruela, Sierra de Segura, río Borosa, cerrada de Elías, 30SWH1405, 1000 m, on *Juniperus oxycedrus*, G. Aragón & I. Martínez, 14-V-1995, Aragón 705/95. Santiago-Pontones, Sierra de Segura, río Aguamulas, cerca del cortijo del Mulón, 30SWH1810, 950 m, on *Juniperus oxycedrus*, G. Aragón & I. Martínez, 13-V-1995, Aragón 648/95. TOLEDO: Los Navalucillos, Montes de Toledo, Las Becerras, arroyo del Chorro, 30SUJ5780, 1000 m, on *Juniperus oxycedrus*, G. Aragón & I. Martínez, 26-III-1995, Aragón 463/95. Hontanar, Montes de Toledo, río Estena, 30SUJ6380, 875 m, on *Juniperus oxycedrus*, G. Aragón, J.L. Izquierdo & I. Martínez, 9-VII-1995, Aragón 1007/95; *id.*, Aragón 1048/95.

Fuscopannaria olivacea (P.M. Jørg.) P.M. Jørg.

The ecological requirements of this species are similar to *Fuscopannaria ignobilis* and *F. mediterranea*, although these taxa have a wider ecological range. *Fuscopannaria olivacea* is a very rare taxon and when appears only develops one or two individuals. It shows a mediterranean distribution (Jørgensen 1978; Jones 1980; John 1996; Nimis 1993). In Spain it is only known from Cádiz (Arvidsson 1979; Fos 1998), Málaga (Arvidsson 1979; Seaward & Arvidsson 1997) and Mallorca provinces (Jørgensen 1978; Boom 1999), and it is also reported from Portugal (Jørgensen 1978; Boom & Giralt 1996; Jones 1980; 1999).

Studied material: CIUDAD REAL: Solana del Pino, garganta de Valhondo, 30SVH0250, 850 m, on bark of *Juniperus oxycedrus*, F.J. Sarrión, 12-3-1995, Sarrión 2. JAÉN: La Iruela, Sierra de Segura, río Borosa, cerrada de Elías, 30SWH1405, 1000 m, on *Juniperus oxycedrus*, G. Aragón & I. Martínez, 14-V-1995, Aragón 700/95; *id.*, Aragón 716/95. Santiago-Pontones, Sierra de Segura, río Aguamulas,

cerca del cortijo del Mulón, 30SWH1810, 820 m, on *Juniperus oxycedrus*, G. Aragón & I. Martínez, 4-XI-1997, Aragón 3385/97. TOLEDO: Los Navalucillos, Montes de Toledo, Las Becerras, arroyo del Chorro, 30SUJ5879, 950 m, on *Juniperus oxycedrus*, G. Aragón 166/95, A. Herrero & I. Martínez, 11-II-1995, MA-Lichen 7152.

Pertusaria paramerae Crespo & Vězda

In Spain it is a frequent species on branches and trunks of *Juniperus thurifera*, mainly in continental areas of northern half (Crespo & Vězda 1985; Monso 1991; Etayo & Blasco 1992; Aragón et al. 1999; Martínez et al. 2001a, b). However, it occasionally appears in northwestern Iberian Peninsula, where it colonizes bark and lignum of *Juniperus phoenicea* (Giralt 1996). In the Betic mountains, *P. paramerae* grows on lignum of *Juniperus oxycedrus*, probably due to the scarcety of *J. thurifera* in this area. It is also known also from the Atlas in Morocco (Boqueras 1997).

Studied material: JAÉN: La Iruela, Sierra de Segura, río Borosa, cerrada de Elías, 30SWH1305, 900 m, on lignum of *Juniperus oxycedrus*, G. Aragón & I. Martínez, 3-V-1996, Aragón 1148/96. La Iruela, Sierra del Pozo, arroyo de las Truchas, 30SWH1103, 1000 m, on lignum of *Juniperus oxycedrus*, G. Aragón & I. Martínez, 9-I-1998, Aragón 0344/98. Santiago-Pontones, Sierra de Segura, río Aguamulas, cerca del cortijo del Mulón, 30SWH1810, 950 m, on lignum of *Juniperus oxycedrus*, G. Aragón & I. Martínez, 21-III-1995, Aragón 237-4/95.

Ramboldia insidiosa (Th. Fr.) Hafellner

R. insidiosa is a lichenicolous fungi which grows on apothecia of *Lecanora varia*, but it can develop a crustaceous, granular to areolate thalli together with the photobiont of *L. varia* which finally disappears.

This is the first time that *R. insidiosa* is reported from the Iberian Peninsula. However, this is a quite often lichen, growing in the meso- and subhumid supramediterranean belts. It prefers dry and hard bark of junipers species. This taxon spreads from northern Europe to the Mediterranean Region and the British Isles (Purvis et al. 1992).

Studied material: ALBACETE: Vianos, Calar del Mundo, 30SWH4955, 1450 m, on lignum of *Juniperus phoenicea*, 1996, G. Aragón 353/96, A. Herrero & I. Martínez (MA). CIUDAD REAL: Almodovar del Campo, Sierra del Rey, 30SUH8265, 1100 m, on branches of *Juniperus oxycedrus*, 1998, F.J. Sarrión 1939 (MACB); ibidem, on *Lecanora varia*, on bark of *Juniperus oxycedrus*, 1998, F.J. Sarrión 1929 (MACB). Almodovar del Campo, umbría de Hato Blanco, 30SUH8166, 1000 m, on *Lecanora varia*, 1998, F.J. Sarrión 2167 (MACB). Brazatortas, cumbres de la Sierra del Rey, 30SUH8165, 1080 m, on bark of *Juniperus oxycedrus*, 1998 F.J. Sarrión 1920 (MACB). Brazatortas, barranco del Puerto, 30SUH8065, 810 m, on *Lecanora rugosella*, on *Quercus broteroi*, 1998, F.J. Sarrión 2241 (MACB). Fuencaliente, cumbres hoya de Los Pinos, 30SUH9053, 1060 m, on branches of *Juniperus oxycedrus*, 1998, F.J. Sarrión 2507 (MACB). Fuencaliente, sierra de Navalmanzano, 30SUH9053, 1020 m, on lignum of *J. oxycedrus*, 1998, F.J. Sarrión 2326, 2504. Fuencaliente, arroyo del Robledo de las Hoyas, 30SUH8256, 900 m, on branches of *Juniperus oxycedrus*, 1997, A.R. Burgaz, I. Martínez & F.J. Sarrión 2462 (MACB). Fuencaliente, Abulagoso, collado anterior al pico, 30SUH8558, 1230 m, on *Lecanora varia*, on died juniper, 1993, F.J. Sarrión 200 (MACB). Jaén Prov, Aldeaquemada, Sierra Morena, cascada de La Cimbarra 30SVH6749, 760, on died juniper, 1994, F.J. Sarrión (MA). TOLEDO: Hontanar, Montes de Toledo, río Estena, 30SUJ6380, 875 m, on lignum of *Juniperus oxycedrus*, 1995, G. Aragón 1034/95, J.L. Izquierdo & I. Martínez (MA). Los Navalucillos, Montes de Toledo, arroyo del Chorro, 30SUJ5879, 950 m, on lignum of *Juniperus oxycedrus*, 1995, G. Aragón & I. Martínez (MA).

Rhizocarpon schedomyces Hafellner & Poelt

It is a new record for the Iberian Peninsula. *R. schedomyces* grows on *Pertusaria flavida* thalli, appearing in the subhumid mesomediterranean belt of the 'Montes de Toledo'. Its world distribution area is restricted to a few localities in the Alps (Hafellner & Poelt 1976).

Studied material: CIUDAD REAL: Navas de Estena, Montes de Toledo, collado de Acebuches, 30SUJ6671, 800 m, on *Pertusaria flavida*, on bark of *Juniperus oxycedrus*, G. Aragón 952/02, 21-V-2002. TOLEDO: Los Navalucillos, Montes de Toledo, arroyo del Chorro, 30SUJ5978, 950 m, on *Pertusaria flavida*, on lignum of *Juniperus oxycedrus*, G. Aragón 470/02, 03-V-2002. Hontanar, Montes de Toledo, río Estena, 30SUJ6280, 950 m, on *Pertusaria flavida*, on lignum of *Juniperus oxycedrus*, G. Aragón 879/02, 21-V-2002.

Rimularia gyrizans (Nyl.) Hertel & Rambold

This species shows saxicolous-silicolous preferences and it was only collected once on lignum of *Juniperus oxycedrus*. In the Iberian Peninsula it was known only from Portugal (Boom & Giralt 1996; 1999; Boom 1999), so this is the first time that is reported from Spain. It is widely distributed in Europe (Boom & Giralt 1996).

Studied material: TOLEDO: Hontanar, Montes de Toledo, río Estena, 30SUJ6280, 950 m, on lignum of *Juniperus oxycedrus*, G. Aragón 898/02, 21-V-2002.

Rinodina excrecens Vainio

The world distribution area of this species is only limited to four populations, growing on *Pinus* lignum and bark of *Juniperus communis*, *Pinus halepensis* and *Quercus robur*, being known from Siberia, Austria and Croatia (GIRALT et al. 1994, 1995). It is a new record for the Iberian Peninsula.

Studied material: Ciudad Real: Arroba de los Montes, estrecho de las Hoces del Guadiana, Tabla de La Murciana, 30SUJ57 37, on bark of *Juniperus oxycedrus*, F.J. Sarrión, 16-7-1998, Sarrión 1361.

Rinodina furfuracea H. Magn.

It is a very scarce and poorly known species in the Iberian Peninsula (Magnusson 1947; Giralt et al. 1995). In Europe mainly appears around the Mediterranean Sea, in Croatia, Greece, Italy, Spain and Portugal (Magnusson 1947; Giralt et al. 1995).

Studied material: JAÉN: La Iruela, Sierra de Segura, valle del río Borosa, 30SWH1305, 850 m, on *Juniperus oxycedrus*, G. Aragón & I. Martínez, 3-XI-1997, Aragón 3192/97.

Xyloschistes platytropa (Nyl.) Vain.

The studied samples belong to the var. *pyrenaica* Etayo. At the moment, this variety was only known from the Pyrenees mountains (Etayo, 1990), so with ours records its world distribution area is enlarged to southern Spain.

Material estudiado: CIUDAD REAL: Almodóvar del Campo, sierra del Rey, pico Hato Blanco, 30SUH8265, 1100 m, on branches of *Juniperus oxycedrus*, F.J. Sarrión, 19-II-1998, Sarrión 1945. Fuencaliente, Abulagosos, crestones anteriores al pico, 30SUH8558, 1250 m, on lignum of *Juni-*

perus oxycedrus, F.J. Sarrión, 27-VI-1993, Sarrión 301. Fuencaliente, cumbre de la Sierra de Dormideros, 30SUH9055, 1180 m, on bark of *Juniperus oxycedrus*, F.J. Sarrió, 30-V-1993, Sarrión 859. JAÉN: La Iruela, Sierra de Segura, río Borosa, cerrada de Elías, 30SWH1405, 1000 m, on lignum of *Juniperus oxycedrus*, G. Aragón & I. Martínez, 14-V-1995, Aragón 704/95. Santiago-Pontones, Sierra de Segura, río Aguamulas, cerca del cortijo del Mulón, 30SWH1810, 950 m, on lignum of *Juniperus oxycedrus*, G. Aragón & I. Martínez, 13-V-1995, Aragón 571/95. Santo Tomé, Sierra de las Villas, subida al cerro Vilchetes, 30SWH0209, 1150 m, on lignum of *Juniperus oxycedrus*, G. Aragón & I. Martínez, 7-IV-1998, Aragón 0998/98. Villacarrillo, Sierra de las Villas, Lancha de la Escalera, 30SWH0814, 1450 m, on lignum of *Juniperus phoenicea*, G. Aragón & I. Martínez, 8-IV-1998, Aragón 1146/98. TOLEDO: Los Navalucillos, Montes de Toledo, arroyo del Chorro, 30SUJ5978, 950 m, on lignum of *Juniperus oxycedrus*, G. Aragón 472/02, 03-V-2002. Hontanar, Montes de Toledo, río Estena, 30SUJ6280, 950 m, on lignum of *Juniperus oxycedrus*, G. Aragón 862/02, 21-V-2002.

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