

## **Contribution to the flora of Portugal, lichens and lichenicolous fungi IV**

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**Abstract** – Twenty four lichens and lichenicolous fungi are reported as new to Portugal, including seven records new to Iberian Peninsula. These reports are from a wide range of localities throughout the country. Epiphytic, terricolous as well as saxicolous species are recorded. Some very rare species are also treated. An annotated list with notes on morphology, chemistry and ecology is given.

**Lichens / lichenicolous fungi / Portugal / Iberian Peninsula / new records**

### **INTRODUCTION**

Since 1983, the author carried out lichenological fieldwork during short visits throughout Portugal. Some floristic surveys have been published. From the upper belt in Serra da Estrela, 250 lichens are recorded (v.d. Boom & Jansen 2002); more than 200 lichens and lichenicolous fungi are recorded from Montesinho Natural Park (v.d. Boom 2003b); more than 50 lichenicolous fungi are recorded from Portugal by v.d. Boom & Etayo (2000).

The investigated samples in this work were collected mainly in the summer of 1997 and 1999. More than 900 specimens are gathered during these two trips and most of them are more or less common species, several are rare and recently published, however the most interesting specimens are recorded in an annotated list below. Among the identified specimens, twenty four appear to be new for the country of which seven new for the Iberian Peninsula. Some older specimens for which there was no name available earlier, are treated here.

### **MATERIAL AND METHODS**

About 900 specimens of lichens and lichenicolous fungi were collected from 72 localities in 1997 and 1999 and deposited in the private herbarium of the author. The most interesting specimens are mentioned in an annotated list below. The specimens have been studied mostly according to Clauzade & *al.* (1989), Hawksworth (2003), Purvis & *al.* (1992), Santesson & *al.* (2004) or Wirth (1995) except for recently monographed taxa.

The listed taxa are checked with the recent checklist for the Iberian Peninsula (Llimona & Hladun 2001). For selected specimens, the secondary metabolite content was investigated by TLC, following Orange & *al.* (2001). Selected specimens are identified by specialists (see annotated list and acknowledgements). Indications of the main collecting sites (A – K) are given in figure 1.

## THE SPECIES

### *Agonimia octospora* Coppins & P. James

Trás-os-Montes, Serra do Gerês, near Cabril, along road to Pincães, on *Quercus robur*, 450 m (site B), 24 July 1999, v.d. Boom 23183, 23187 (hb v.d. Boom). The minute squamules are somewhat elongate, branched and pale greyish with a slightly shiny upper surface. Only the latter specimen contains perithecia with 8 ascospores per ascus of  $35\text{--}65 \times c. 25 \mu\text{m}$ . *A. octospora* resembles *A. tristricula* (Nyl.) Zahlbr., however this latter species is easily distinguishable by the 2-spored asci and large ascospores ( $60\text{--}80\text{--}120\text{--}150 \times 26\text{--}50 \mu\text{m}$ ). *A. octospora* is an old woodland species mainly from the most western part of Europe and was previously reported from Great Britain in the north (Purvis & al. 1992) to northern Spain (Llimona & Hdlun (2001) as most southern area. First recorded here for Portugal.

### *Agonimia repleta* Czarnota & Coppins

Algarve, Serra de Monchique, 1 km N of Caldas de Monchique, *Olea* orchard with *Ceratonia* and *Quercus*, on S slope, terricolous near base of *Q. suber*, 250 m (site K), 28 July 1993, v.d. Boom 14819 (hb v.d. Boom). The specimen is likely to be confused with *A. allobata* (Stizenb.) P. James, a species known from Iberian Peninsula, but this latter species has a different ecology, it grows usually on shaded tree-bases in sheltered and humid sites. This specimen of *A. repleta* is characterized by the  $\pm$  pyriforme perithecia ( $200\text{--}280 \mu\text{m}$  wide), 8-spored asci, hyaline muriforme ascospores ( $40\text{--}47 \times 12.5\text{--}16 \mu\text{m}$ ) and  $\pm$  roughened upper surface of the perithecia, in contrast to *A. allobata* which has smooth perithecia without a well-defined neck. *A. repleta* has been found on bare soil in a poor lichen community, accompanying lichens are *Moelleropsis nebulosa* (Hoffm.) Gyeln. and *Lepraria* sp.

This species seems to be widely distributed in mountainous regions in central Europe. According to Czarnota (2003) it also occurs in western Europe (British Islands and Spain). First record of Portugal.

### *Agonimia opuntiella* (Buschardt & Poelt) Vězda

Beira Litoral, SW of Oliveira do Hospital, road 230, *Olea* orchard, 350 m (site E), 19 July 1993, v.d. Boom 14529 (hb v.d. Boom). In 1997 fertile material of this species has been distributed by Vězda (1997). The very small squamules with the characteristic hyaline hairs makes this an easily overlooked species. For additional information see v.d. Boom & al. (1998). In Spain it seems to be a rather common species (several specimens in hb v.d. Boom). Although this species is not recorded for Portugal before, most probably it is not rare in the country. Several times it has been found accompanying in herbarium specimens. First recorded here for Portugal.

### *Arthonia cretacea* Zahlbr.

Alentejo, S of Sines, near Porto Covo, Iihano do Pessegueiro, ruins near coast, on an old wall, 75 m (site J), 3 August 1997, P. v.d. Boom 19233 (hb v.d. Boom). Ident. R. Sundin. The thallus is pure white, up to c. 0.5 mm thick, matt, cracked areolate, delimited by a small brown line, containing *Trentepohlia* algae. Apothecia numerous present, immersed, dark brownish to black, white pruinose,

roundish, polygonal to somewhat elongate, up to 1 mm wide, epithecium moderately brown, K+ greenish, hymenium up to 120 µm high, hypothecium dark brown, paraphysoids are richly branched and anastomosed, the ascospores are narrowly ellipsoid to ovoid, 3-septate, 19-22 × 5-6(-7) µm. This specimen fits well with material from eastern Europe except the measurements of the ascospores which are somewhat larger in the Portugal specimen. According to R. Sundin (pers. comm.) this latter feature falls in the variability of the species. *A. cretacea* resembles *Arthonia* species such as *A. anombrophila* Coppins & P. James, *A. pruinata* (Pers.) Steud. ex A.L. Sm. or *A. zwackhii* Sandst. However these species are corticolous and are all distinguishable by a hyaline hypothecium which can be sometimes pale straw. *A. cretacea* was previously known from mediterranean areas, with a more eastern distribution pattern in Europe (Nimis 1993), so this is the first record for Iberian Peninsula.

#### ***Bacidia trachona* (Ach.) Lettau**

Beira Litoral, SSW of Oliveira do Hospital, near Benfeita, Fraga da Pena. Small valley with a waterfall, on shaded vertical schistose rock, c. 700 m (site E), 21 July 1999, v.d. Boom 23134 (hb v.d. Boom); Ibid. valley along a stream, on vertical shaded wall of barn, 450 m (site E), 22 July 1999, v.d. Boom 22971 (hb v.d. Boom). The thin rimose, pale greenish thallus contains the many characteristic sessile and conspicuous pycnidia. Pycnidia contain a dark brown wall which react K + purplish, they are c. 0.25 mm diam. and the conidia are 3-5 × 1-1.5 µm. *B. trachona* is mostly found sterile. This species is typical of shaded and sheltered underhangs or vertical rock-faces (calcareous or acidic), near streams. Most of the Iberian records are from SE Spain (Llimona and Hladun 2001). More info is given by Purvis & al. (1992) and v.d. Boom & al. (1998). First records for Portugal.

#### ***Caloplaca albolutescens* (Nyl.) Oliv.**

Estremadura, 25 km W of Setubal, near Aldeia do Meio, coastal area, on compact sandy soil, c. 10 m (site H), 12 August 1987, v.d. Boom 6609 (hb v.d. Boom).

Although in the checklist of lichens of Great Britain and Ireland this species is mentioned as synonym of *C. teicholyta* (Ach.) J. Steiner, other checklists are treated this as a separated species (Diederich & Serusiaux 2000), Aptroot & al. (1999), Scholz (2000). In Wirth (1995) is demonstrated by excellent photographs that this two species (*C. albolutescens* and *C. teicholyta*) are indeed distinct species. The former is always fertile and the latter is only rarely fertile. The specimen from Portugal is richly fertile and fits well with specimens from the Benelux, where both species are known from the same substrata (hb v.d. Boom). Previously only once recorded from Iberian Peninsula in Llimona & Hladun (2001). First record for Portugal.

#### ***Cladonia pseudopityrea* Vainio**

Beira Alta, Serra da Estrela, NW of Gouveia, terricolous, UTM: 29-T-PE-20900-85000, 660 m (site E), 24 May 1997, leg. J. Jansen (hb v.d. Boom 25463). Ident. A. Burgaz. This specimen contains a well developed greyish brown primair thallus, the podetia are scarce. It is a rare species in Iberian Peninsula. Some records are known from Portugal, mainly from ± maritime areas (Burgaz & al. 1999). In the recent paper about lichens of Serra da Estrela (v.d. Boom & Jansen 2002), this species is not included.

***Herteliana taylorii* (Salwey) P. James**

Estremadura, Sintra, near Castela Pena, on acidic schistose outcrops along the road, 500 m (site G), 9 August 1987, v.d. Boom 6495 (hb v.d. Boom). Beira Litoral, Oliveira do Hospital, near Benfeita, Fraga da Pena, small valley with a waterfall, on vertical shaded and exposed schistose rock, c. 700 m (site E), 21 July 1999, v.d. Boom 23132 (hb. v.d. Boom). *H. taylorii* is characterized by the creamy white, thick cracked areolate thallus with initially immersed apothecia which become sessile. The ascospores are simple, broadly fusiform with pointed apices, their measurement are somewhat shorter ( $15\text{--}17 \times c. 6 \mu\text{m}$ ), than what is mentioned in Purvis & al. (1992). According to Purvis & al. (1992), this species is distributed in the most western parts of Europe and known only from the British Islands. This is the first report of Iberian Peninsula.

***Lecania chlorotiza* (Nyl.) P. James**

Alto Douro, W of Villa Real, Amarante, campsite, N sloping *Pinus Quercus* forest and steep N facing sandy rocks, on roots of *Quercus* under overhang in sheltered and shaded situation (site D), 16 July 1999, v.d. Boom 22947 (hb v.d. Boom). Ident. M. Brand. The specimen contains pale pycnidia with the characteristic gaping ostiole, including macroconidia of  $4.4 \times 5.2 - 1.4 \times 1.6 \mu\text{m}$ . This species don't belong to *Lecania* s.str. According to Purvis & al. (1992), this is a rare species and known from northwestern Europe. Regarding Iberian Peninsula, previously this species had only been recorded from western Pyrenees (Llimona & Hladun 2001). New to Portugal.

***Lecanora farinaria* Borrer**

Beira Alta, Serra da Estrela, WNW of Manteigas, road to Ponte Cabaco, near Penhas Douradas, roadside trees, on *Salix*, 1400 m (site E), 24 July 1997, v.d. Boom 19410 (hb v.d. Boom). The characteristic black apothecia with a sorediate margin are absent in this specimen, but the greyish to yellowish farinose to granular soredia are abundantly present. Atranorin & unidentified fatty acids are detected by TLC. Ident. T. Tønsberg. According to Tønsberg (1992), *L. farinaria* is a very variable species with respect to shape and colour of the soralia, apothecia have rarely been found. *L. farinaria* is most likely to be confused with *Buellia griseovirens* (Turner & Borrer ex Sm.) Almb., with which it often grows. This specimen was growing in a rather poor lichen community, accompanied by *Lecanora* aff. *symmicta* (Ach.) Ach., *Lecidella elaeochroma* (Ach.) M. Choisy, *Melanelia subaurifera* (Nyl.) Essl. and *Rinodina orculata* Poelt & Steiner. It is widely distributed, mainly in western Europe, with the previously vertical distribution range from sea-level to 370 m (Tønsberg 1992). Previously is was known from SE Spain (Llimona & Hladun 2001) and material from that region was distributed by Vězda (1974). New to Portugal.

***Lecidea erythrophaea* Flörke**

Alentejo, SE of Alvito, Baragem de Odivelas, valley with various trees, on *Fraxinus angustifolia*, 75 m (site I), 10 July 1995, v.d. Boom 17135 (hb v.d. Boom). Ident. M. Brand. According to Wirth (1995), *L. erythrophaea* has a more northern distribution in Europe, from boreal to mountain areas in the central part. However it is several times recorded from Spain, mainly from atlantic regions (Llimona & Hladun 2001). New to Portugal.

***Leptogium biatorinum* (Nyl.) Leighton**

Ribatejo, E of Tomar, road to Olalhas, old wall along a road, 100 m (site F), 4 August 1997, v.d. Boom 19280. Conf. P. Jørgensen. According to Purvis & al. (1992), this species is synonym with *L. byssinum* (Hoffm.) Zwackh ex Nyl. However in the opinion of P.M. Jørgensen this must be based on confusion, because both species may grow in similar habitats. *L. biatorinum* has a squamulose thallus and concave, sessile apothecia with a prominent proper margin (Jørgensen 1994). This species occurs terricolous, as well as on walls. The encountered population was extensive, well developed and abundantly fertile. It was not recorded for Iberian Peninsula before.

***Micarea subviridescens* (Nyl.) Hedl.**

Alto Douro, W of Villa Real, Amarante, campsite, N sloping *Pinus Quercus* forest, on N facing sandy rocks (site D), 16 July 1999, v.d. Boom 22935 (hb v.d. Boom). Conf. M. Brand. This species belongs to the *Micarea prasina* Fr. complex and was previously included in that species by Coppins (1983). However recently there are some publications of this separated species which is easily recognized by the leprarioid, bluish green thallus which contain prasinic acid. Even the ecology is different from *M. prasina* s. str. *M. subviridescens* is mainly known terricolous, growing on sandy soils. It is easily overlooked for a *Lepraria* species. For more information see v.d. Boom (2003a). New for Iberian Peninsula.

***Placynthiella dasaea* (Stirt.) Tønsberg**

Beira Litoral, SW of Oliveira do Hospital, road Venda da Galizes to Ponte das Tres Entradas, terricolous, 350 m (site E), 19 July 1993, v.d. Boom 14504 (hb v.d. Boom). Trás-os-Montes, Torre de Moncorvo, road to Lagoaca valley of Douro, N slope with *Quercus* trees, on *Quercus*, 550 m (site C), 15 July 1999, v.d. Boom 22884 (hb v.d. Boom). Alto Douro, Villa Real, Serra do Marao, Carneiro, SW sloping *Pinus* woodland, on *Pinus* (site D), 17 July 1999, v.d. Boom 22960. Some specimens are fertile, but even sterile it is easily recognized by the typical fine globular soredia which may form rounded or somewhat irregular consoredia with a pale greenish to greenish brown colour, containing gyrophoric acid. This species is common in most parts of Europe. Recently it is more and more recognized, but in the past is must be overlooked for *P. icmalea* (Ach.) Coppins & P. James. Although this species is not mentioned in Llimona & Hladun (2001), it is widely distributed in Iberian Peninsula (several records in hb v.d. Boom, to be published in forthcoming papers). First recorded here for Portugal.

***Psoroglaena stigonemoides* (Orange) Henssen**

Beira litoral, SSW of Oliveira do Hospital, Serra do Açor, bottom of valley along stream, underside of overhanging trunk of *Salix*, 450 m (site E), 22 July 1999, v.d. Boom 22970 (hb. v.d. Boom); Ibid. SSE of Benfeita, N sloping *Castanea* woodland, on *Sambucus*, 550 m (site E), 21 July 1999, v.d. Boom 23163 (hb. v.d. Boom). The latter specimen is fertile with several pale brown perithecia of c. 0.2 mm diam. It was found without accompanying lichens. Because this species is often sterile, it is easily overlooked for green algae of which it often grows together. Previously it was known only from western Europe, British Islands and France (Purvis & al. 1992), Benelux (Diederich & Sérusiaux 2000), but it occurs also in central Europe (Hafellner & Türk 2001; Santesson & al. 2004) and SW Europe (Spain) Llimona & Hladun (2001). New to Portugal.

***Pyrrhospora rubiginans* (Nyl.) P. James & Poelt**

Alto Douro, NW of Villa Real, Parc Natural do Alvão, along road 304, S of Ermelo, on vertical schistose outcrops (site D), 18 July 1999, v.d. Boom 23092 (hb v.d. Boom). Ident. M. Brand. The specimen is abundantly fertile. It is easily recognized by the sorediate thallus and dark reddish brown K+ purplish apothecia. This species, described from Sweden, is rare in western Europe (Hafellner 1993). Currently it is known from Norway, Sweden, Finland (Santesson & al. 2004), Scotland and Belgium (Sérusiaux & al. 1999). New to Iberian Peninsula.

***Rhizocarpon advenulum* (Leight.) Hafellner & Poelt**

Trás-os-Montes, Serra de Reboredo, Torre Moncorvo, road to Maçores, open *Pinus* woodland, on granite outcrops, 900 m (site C), 14 July 1999, v.d. Boom 22831 (hb v.d. Boom). Ident. J. Etayo. This lichenicolous fungus was growing on a saxicolous *Pertusaria* sp. The thallus is most probably endokapylic, apothecia are c. 0.5 mm diam., hypothecium dark reddish brown, paraphyses lax in KOH and conglutinated in water. Ascospores are c.  $25 \times 16 \mu\text{m}$ , 1-septate, with a distinct perispore. This species is widely distributed, but rare in the British Islands and according to Purvis & al. (1992) endemic. It is not mentioned in Llimona & Hladun (2001). New to Iberian Peninsula.

***Rhizocarpon epispilum* (Nyl.) Zahlbr.**

Trás-os-Montes, Serra de Mogadouro, 2km SW of Castanheira, nearby chapel, granite outcrops, on N exposed sloping rock, 990 m (site C), 12 July 1999, v.d. Boom 22749 (hb v.d. Boom), Ident. J. Etayo. This specimen is characterized by the 1-septate dark brown ascospores of c.  $25 \times 12 \mu\text{m}$  and apothecia of c. 0.4 mm diam. This lichenicolous species was growing on an unidentified saxicolous *Pertusaria* species. It is widely distributed in mediterranean to submediterranean areas. In Llimona & Hladun (2001) are several references for this species in Spain, where the species is not rare. This is the first record for Portugal.

***Rimularia limborina* Nyl.**

Trás-os-Montes, c. 12 km E of Torre Moncorvo, Mós, S sloping schistose cuttings along path, 300 m (site C), 15 July 1999, v.d. Boom 22917 (hb v.d. Boom). This species is easily recognized by the gyrose apothecia with relative large hyaline ascospores which becoming brown when old. *R. limborina* is widely distributed in Europe from north-western to central areas (Purvis & al. 1992). From Iberian Peninsula there are only a few specimens recorded (Llimona & Hladun 2001). From Portugal there is only one old record known (Sampaio 1970), it regards a 85 year old record from Vila do Conde.

***Roselliniella nephromatis* (P. Crouan) Matzer & Hafellner**

Beira Litoral, SW of Oliveira do Hospital, road 230, *Olea* orchard, Venda da Galizes to Ponte das Tres Entradas, on *Olea europea*, on *Nephroma laevigata* Ach., 350 m (site E), 19 July 1993, v.d. Boom 14533 (hb. v.d. Boom). Ident. J. Etayo. This rare species was described from France and known from Scotland (Matzer & Hafellner 1990), but recently also reported from Portugal by Martínez (2002). It is probably an overlooked species.

***Scoliciosporum pruinosum* (P. James) Vězda**

Alto Douro, W of Villa Real, Amarante, campsite, N sloping *Pinus Quercus* forest, on N facing sandy rocks (site D), 16 July 1999, v.d. Boom 22954 (hb v.d. Boom).

This is a rather small collection. It has been found in a poor lichen community, among *Lepraria* material at the underside of an overhanging trunk of *Quercus*. There are several records known from Spain (Llimona & Hladun 2001). New to Portugal.

***Stigidium microspilum* (Körber) D. Hawksw.**

Minho, Serra do Gerês, N of Salamonde, along road to Albufeira do Salamonde, small cleft with mixed trees, on *Corylus*, on *Graphis scripta* (L.) Ach., 500 m (site B), 25 July 1999, v.d. Boom 23217 (hb v.d. Boom). *S. microspilum* is widely distributed in Europe, but easily overlooked. This lichenicolous species is restricted to the host species *G. scripta*. *S. microspilum* occurs in some areas in NW Europe, Hawksworth (2003), Diederich & Sérusiaux (2000), Santesson & al. (2004), Scholz (2000). It is only rarely recorder for northern Spain (Llimona & Hladun 2001). New to Portugal.

***Thrombium epigaeum* (Pers.) Wallr.**

Beira Alta, Serra da Estrela, NE of Manteigas, Cruz das Jogadas, forest with *Pinus* trees, on NE exposed outcrops along path, 1100 m (site E), 26 July 1997, v.d. Boom 19127, (hb v.d. Boom). *T. epigaeum* is widely distributed in Europe and is found on recently disturbed consolidated soil of sheltered cuttings and earth banks along roads or trails. In Iberian Peninsula it is only rarely recorded and the previously known two Portuguese records are at least 80 years old (Sampaio 1970).

***Trapelia corticola* Coppins & P. James**

Trás-os-Montes, Serra do Gerês, NE of Cabril, Xertelo, along road near village, small *Quercus* forest, on *Q. robur* trunk, 700 m (site B), 25 July 1999, v.d. Boom 23248 (hb v.d. Boom); Ibid. W of Cabril, roadside mature *Quercus* trees, on *Q. suber*, 450 m (site B), 24 July 1999, v.d. Boom 23204 (hb v.d. Boom). The specimens are sterile, however they are characterized by the inconspicuous small contiguous areoles which are sometimes scattered with a smooth upper surface and the convex soralia with farinose soredia, which are abundantly present. It is mainly distributed in western Europe. Llimona & Hladun (2001) refer to several records from mainly north-western Spain. These are the first records for Portugal.

***Trapelia placodioides* Coppins & P. James**

Beira litoral, SSW of Oliveira do Hospital, 3 km W of Piódão, N-facing acidic rock (schistose) outcrops, c. 700 m (site E), v.d. Boom 23177 (hb v.d. Boom). The very rare apothecia are lacking in this specimen, however the somewhat convex, pale pinkish, matt areoles are present and even the soralia at the sides of areoles. According to Purvis & al. (1992), it is distributed from northern to central Europe and recently, this species is recorded from a megalithic monument in Galicia (NW Spain), in that area it seems to be a rare species (Prieto & al. 1999). New to Portugal.

***Tremella cladoniae* Diederich & M.S. Christ.**

Trás-os-Montes, Serra do Gerês, W of Cabril, along road to Pincães, W side of village, small *Quercus* forest, on *Quercus robur* trunk, 450 m (site B), 24 July 1999, v.d. Boom 23210 (hb v.d. Boom). The specimen contains *Cladonia* squamules without podetia, on which the fruits of *T. cladoniae* were growing. This species was previously mainly known from central Europe (Diederich 1996), but recently it is recorded from north-western Europe for example by Diederich & Sérusiaux (2000). Most probably this is an overlooked species. This is the first record for Portugal.

***Vezdaea aestivalis* (Ohl.) Tsch.-Woess & Poelt**

Trás-os-Montes, Serra do Gerês, Paradela centre, trees and old wall along garden, 750 m (site B), 26 July 1999, v.d. Boom 23477 (hb v.d. Boom). It was growing on bryophytes on a vertical surface of stones on a wall. The only accompanying lichen was *Leptogium lichenoides* (L.) Zahlbr. *V. aestivalis* is known from a wide range of substrata, often in nutrient-enriched situations and it is widely distributed in Europe. It is several times recorded from Spain (Llimona & Hladun 2001). Although it is the most conspicuous species of the genus it is easily overlooked. First record for Portugal.

***Vezdaea leprosa* (P. James) Vězda**

Alentejo, SE of Sines, NE of Cercal, Barragem de Campilhas, near bridge, open woodland with *Acacia*, *Cistus ladanifer* and schistose outcrops, on vertical facing soil, 125 m (site J), 1 August 1997, v.d. Boom 19173, 19182 (hb v.d. Boom). A comprehensive investigation of this species, particular based on populations in northern Germany, was provided by Ernst (1995). This species is widely distributed in Europe, mainly from boreal areas to central parts. In Llimona & Hladun (2001) this species is not recorded, so this is the first report for Iberian Peninsula.

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