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New records for the Mycobiota of Greece

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Yunanistan Mikobiyotası için yeni kayıtlar

Abstract: Eight rare fungi, *Arachnopeziza obtusipila* Grelet, *Chaetothiersia cupressicola* Valencia, Van Vooren & M. Vega, *Chondrogaster pachysporus* Maire, *Ciboria brunneorufa* Bres., *Kallistoskypha incarnata* (Duvernoy & Maire) Pfister, Agnello, Lantieri & LoBuglio, *Lambertella palmeri* Raitv. & R. Galán, *Perilachnea fallax* M. Carbone, Valencia, Tello & Van Vooren and *Perilachnea humarioides* Valencia, M. Vega & Van Vooren, are reported for the first time from Greece. This paper provides the descriptions of the recorded collections, accompanied by images of their macroscopical and microspical features.

Key words: *Ascomycota, Basidiomycota,* mycodiversity, new record

Özet: Sekiz nadir mantar, *Arachnopeziza obtusipila* Grelet, *Chaetothiersia cupressicola* Valencia, Van Vooren & M. Vega, *Chondrogaster pachysporus* Maire, *Ciboria brunneorufa* Bres., *Kallistoskypha incarnata* (Duvernoy & Maire) Pfister, Agnello, Lantieri & LoBuglio, *Lambertella palmeri* Raitv. & R. Galán, *Perilachnea fallax* M. Carbone, Valencia, Tello & Van Vooren ve *Perilachnea humarioides* Valencia, M. Vega & Van Vooren, Yunanistan'dan ilk kez rapor edilmiştir. Bu makale, yeni kaydedilen örneklerin betimlemelerini, makroskobik ve mikroskobik görüntüleri eşliğinde, sunmaktadır.

Anahtar Kelimeler: *Ascomycota, Basidiomycota,* mikoçeşitlilik, yeni kayıt

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1. Introduction

The diversity of ascomycetes in typical Mediterranean ecosystems in Greece is poorly studied, probably due to their limited distribution. Especially for the species included in this study, their small size plays a crucial role in their difficult identification. On the contrary, the study of hypogeous asco and basidiomycetes in Greece has brought great results, and several new species from Greece have been published (Paz et. al., 2017; Vidal et. al., 2023). Still, *Chondrogaster pachysporus* Maire is an easily overlooked species, because it is completely surrounded by a mass of roots, together with plant debris and soil.

The genus *Arachnopeziza* Fuckel was created by Fuckel (1870). In his monograph of *Arachnopezizeae* Korf (1951), *Arachnopeziza* was delimited by apothecia seated on subiculum, with hyaline excipulum, straight hairs, 1−7-septate ascospores and saprotrophic mode of nutrition. A key to the twelve species known up to date is included in this work. In the world this species is recorded mainly from coniferous wood (Morozova, 2014). Due to its very small size it is not easily distinguishable.

The genus *Lambertella* Höhn. was created by Höhnel (1918). Until Whetzel (1943) extended it to eight species, his work has served as a basis for further studies and new articles. Thus, after a few years, Dumont (1971) produced a monograph in which he included keys to identify a total of twenty nine species. Korf and Zhuang (1985) created new keys to incorporate all these taxa together. The species was first described from Baja California - Mexico (Galan et al., 1994). It was first found in Europe in Colmenarejo - Madrid (Galan and Prieto, 2004). *Lambertella palmeri* Raitv. & R. Galán is an ascomycete ephemeral with a small size. It needs high humidity levels for its growth. It is dark-coloured, it does not contrast on dark leaves, so it is not easily noticed. Galan and Prieto (2004) had hypothesized that it occurs in other Mediterranean countries on hardwood species of the genus *Quercus* L. spp. as shown in the present work. In the work of Martinez et al. (2013) the species is reported as the second Spanish and European record.

Ciboria brunneorufa Bres. is a rare species that until 2007 was known only from the Iberian Peninsula (Ormad and Garcia, 2007). Pancorbo and Ribes (2010) provided additional information on its morphology and ecology, including descriptions of its microscopic features. This species was recorded in the Balkan Peninsula, Bosnia and Herzegovina, for the first time by Jukić (2016), who reports that many of the previous authors did not report the existence of two different types of paraphyses. Due to its small dimensions it is not easily distinguishable.

The study of *Caloscypha incarnata* Duvernoy & Maire from North Africa and Italy by Pfister et al. (2013), using SSU, LSU rDNA, and morphology allowed this species to be placed in a new genus, *Kallistoskypha* Pfister, Agnello, Lantieri & LoBuglio. This ascomycete is found in association with eucalypt species. It was also found side by side with *Plectania rhytidia* (Berk.) Nannf. & Korf, just as in Italy, in the collection dated 13-02-2010. In the above mentioned paper, the authors demonstrated that the recent new species *Marcelleina parvispora* Rubio, Tabarés & Martinez from Spain, (Rubio et al., 2010) is conspecific.

Chaetothiersia cupressicola Valencia was first described from collections made at two different sites in Spain and appears to be clearly associated with woody debris of *Cupressus* L. spp. (Van Vooren et al., 2021). Although this ascomycete shows a bright yellow hymenium, it appears that mycologist had not previously discovered this species.

It was found for the second time in Europe - Bulgaria and it had been hypothesized that the species might also be present in Greece (Slavova et al., 2021). This collection from Greece seems to be the third in Europe.

The genus *Perilachnea* Van Vooren was recently created to include species that, apart from the different genetic profile, differs from *Trichophaea* Boud. s. str. by deeply cupulate apothecia (at least in young state), mainly with a *Humaria*-like appearance, bi- or pluriguttulate ascospores, paraphyses containing small lipid bodies, and saprobic status (Van Vooren et al., 2021). *Perilachnea fallax* M. Carbone, Valencia, Tello & Van Vooren was first described recently (Van Vooren et al., 2022) and was given that name because of the deception, since it is morphologically very similar to *flavobrunnea*. *Perilachnea humarioides* Valencia, M.Vega & Van Vooren was also described in the above paper and given this name because of its close macroscopic similarity to *Humaria hemisphaerica* (F.H. Wigg.) Fuckel.

The genus *Chondrogaster* Maire is closely related to *Hysterangium* Vittad., from which it was segregated and differs in the lack of a distinct columella and the presence of a mycelial mass covering the whole basidioma (Giachini et al., 2000). Both the currently known species *C. angustisporus* and *C. pachysporus* are associated with *Eucalyptus* L'Hér. spp. and are probably native to Australia, but have spread to many areas of the world where *Eucalyptus* plantations have been established for forestry purposes. The external morphology of basidiomata, completely surrounded by a mass of roots, together with plant debris and soil, makes it difficult to identify in the field.

According to the existing check-lists of Greek ascomycetous (Zervakis et al., 1999), basidiomycetous (Zervakis et. al., 1998) and hypogeous macrofungi (Diamandis and Perlerou, 2008), these eight species have not been previously reported in Greece. This study aims to make a contribution to the mycobiota of Greece.

2. Materials and Method

Ascomata of *Arachnopeziza obtusipila* were collected from Rafina district of Attica province and Distrato district of Ioannina province, *Chaetothiersia cupressicola* were collected from Spata district of Attica province and the *Ciboria brunneorufa, Kallistoskypha incarnata, Lambertella palmeri*, *Perilachnea fallax* and *Perilachnea humarioides* were collected from Artemida district of Attica province. Basidiomata of *Chondrogaster pachysporus* were collected from Artemida district of Attica province and Kalloni district of Lesvos province. Examination of macro- and microscopic features is based on fresh material. Microscopic studies were performed on dried and fresh specimens under two microscopes. A binocular Olympus ECEBi and AmScope T120C-E5-3PL trinocular light microscope. The specimens were submerged in water and Melzer reagent. Cotton blue was used to highlight spore ornamentations and Congo Red was employed to stain cell walls of different elements. Spore dimensions were obtained from measurement of 30 random, mature spores using Piximetre 5.10 software. The specimens were identified with the help of Montecchi and Sarasini (2000), Pfister et al. (2013), Van Vooren et al. (2021, 2022), Ormad and Garcia (2007), Jukić (2016) and Morozova (2014). The nomenclature follows mainly "Index Fungorum" (http://www.indexfungorum.org). Where VK is the initials of the author and the collection code. The samples included in this study are kept in the author's private fungarium.

3. Results

Ascomycota Caval.-Sm.

Leotiomycetes O.E. Erikss. & Winka

Helotiales Nannf.

Arachnopezizaceae Hosoya, J.G. Han & Baral

Arachnopeziza obtusipila Grelet (Figs. 1,2)

Syn: [*Arachnopeziza zonulata* var. *obtusipila* (Grelet) Malençon & Bertault]

Macroscopic and microscopic features: Apothecia gregarious, sessile, microscopic, 0.1-0.3 µm in diameter, with whitish hymenium, regular hairy girth and waxy flesh. Ascospores smooth, hyaline, asymmetrical, elongate, with one pole slightly conical, measuring 25-27.5 × 3-4.5 µm, with 1-3 -often indistinct- septa at maturity, (seen distinctly

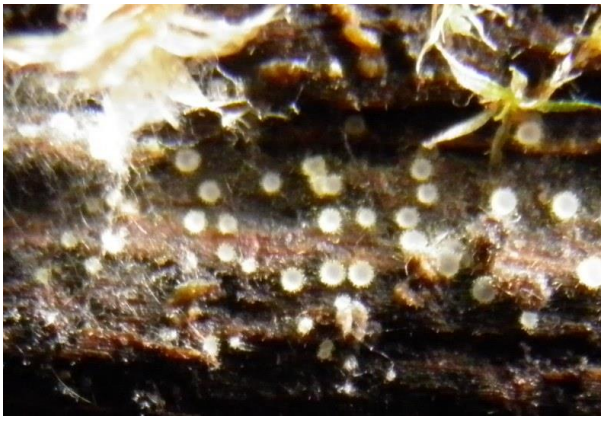

Figure 1. Apothecia of *Arachnopeziza obtusipila* on rotten wood of *Pinus halepensis* Mill.

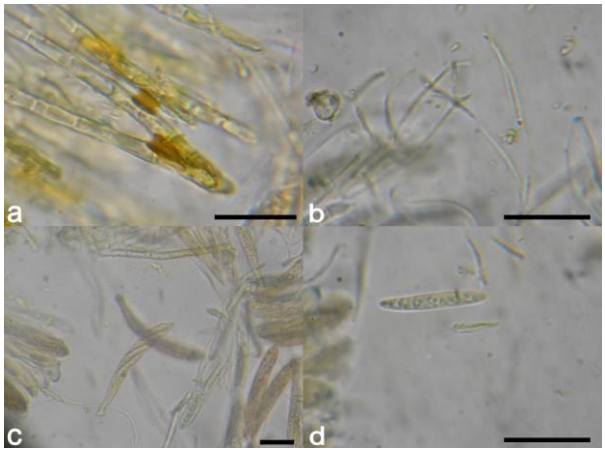

Figure 2. Hairs (a), paraphyses (b), asci (c), ascospore (d) (bars: 20 µm)

with Melzer's) and many small droplets. Asci cylindrical, 8-spored 70 -75 × 8-9.5 µm, with conical, starchy apex. Hairs yellowish, smooth, almost hyaline, rather thick-walled, septate, blunt, 90-105 × 3.5-4.5 µm long, with clumps of yellow or hyaline resinous material. Paraphyses hyaline, capitate, thin-walled, septate, sometimes bifid, 1-1.5 µm thick. Fruiting herbaceously, usually in dense

formations, on moist, decaying wood of conifers, especially pines.

Specimen examined: Greece, Attica, Rafina, on a fallen branch of *Pinus halepensis* Mill., 05.02.2015, Leg: and Det: Kaounas V, VK4009. Greece, Ioannina, Distrato, in rotten broadleaf wood, 21.05.2022, Leg: and Det: Konstantinides G, GK13932.

Rutstroemiaceae Holst-Jensen, L.M. Kohn & T. Schumach.

Lambertella palmeri Raitv. & R. Galán (Figs. 3,4)

Macroscopic and microscopic features: Apothecia cup-shaped to discoid, up to 1.5 mm high and up to 1 mm in diameter. White outer surface, yellowish in young specimens and more brown in mature specimens. Marginal is always paler and outer surface is covered with whitish hairs. Hymenium is yellowish and as it matures a blackish colour becomes visible, which takes reason of the maturation of the spores emerging from the asci. Paraphyses are cylindrical, septate, sometimes branched, as long as the asci and between 1-1.5 µm wide. Asci are 8spored, in a row arranged the spores but sometimes in two, cylindrical, inamyloid, 99-132 × 11-16 µm. Ascospores have an unusual shape, with a horn-like appendage at each end, in some cases different, but generally resembling the shape of a 'croissant' or a Napoleon's hat Baral and Marson (2005) or a garlic clove. Initially they are hyaline, then they take on an olive green to dark brown colour. With the hollow region lighter in colour, with lipid droplets internally and smooth external appearance, (28.1) 29 - 35.7 (39.3) × (8.3) 9 - 10.3 (11) µm, X = 32.6 × 9.6 µm, Q = (2.9) 3 - 3.7 (3.9), Qm = 3.4. Ectal excipulum is formed by cylindrical cells, while in the middle layer these cells are more elongated and compressed and become almost spherical at the top. The hairs are cylindrical, yellowish to brownish and thin-walled, 4-5 µm thick. Marginal hairs of the hymenium are colourless, hyaline, similar to paraphyses, except for the thickness, which is 1-2 µm.

Figure 3. *Lambertella palmeri*, fresh ascomata on rotten leaves debris of *Quercus coccifera* L.

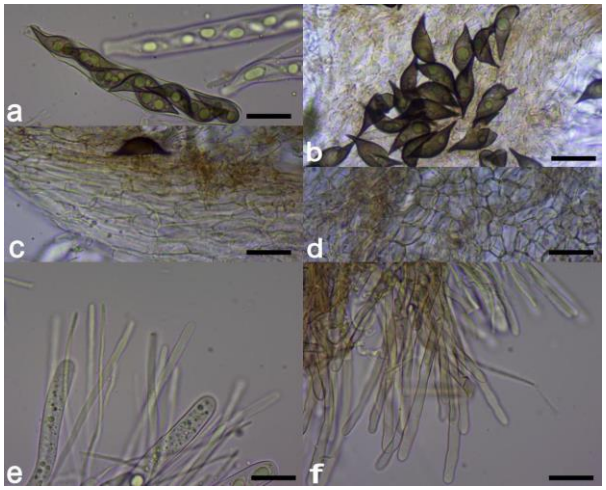

Figure 4. Asci (a), ascospores (b), ectal excipulum (lower-middle zone) (c), ectal excipulum (d), asci, paraphyses and marginal hairs (e) and external hairs (f) of *L. palmeri* (bars: 20 µm)

Specimen examined: Greece, Attica, Artemida, in fallen leaf of *Quercus coccifera* in forest with *Pinus halepensis*, 17.01.2022, Leg: and Det: Kaounas V, VK6632. There is a known, earlier collection of the species, from Heraklion, Crete, 25.03.2020, Leg: Gavalas J. and Det: Wergen B.

Sclerotiniaceae Whetzel

Ciboria brunneorufa Bres. (Figs. 5,6)

Macroscopic and microscopic features: Apothecia cup-shaped, to nearly flat, with small indistinct stipe. Diameter 2-4 mm and 2-3 mm high. Hymenium smooth, beige to brown, with pink or rust tint. Margin conspicuous in mature apothecia, usually slightly darker than hymenium. Outer side of apothecia more shiny than hymenium, sometimes with almost hairy surface across stipe. Asci cylindrical, 8-spored, usually with ascospores arranged in two rows, rarely in one row, 91.9 - 106 × 7.8 - 11.1 µm. Ascospores smooth and vitreous, elliptic to spindle-shaped, aseptate, often slightly unequal, with 1-4 larger lipid droplets 0.7-1.5 µm in diameter and several smaller ones at each pole, (11.8) 12.1 - 14.4 (14.5) × (3.9) 4.1 - 4.8 (5) µm, X = 13.3 × 4.5 µm, Q 2.6 - 3.5, Qm = 3. Paraphyses cylindrical, septate, up to 130 µm long, usually as long as asci. Two types were observed: one rather broad, 3.5-5.5 µm at apex, septate, containing pinkish-reddish pigment; the other narrower, 2.2-3.7 µm, septate, without pigment and hyaline, rarely bifid. Medullary excipulum consisting of cylindrical elongate, subhyaline to brownish, slightly convex cells with rounded edges, 5.5-8.5 µm wide and 50-110 µm long. Ectal ecipulum consisting of irregular spherical cells, 7-25 µm in diameter. There are small scattered hyphoid hairs formed by two or three cylindrical cells, the latter larger than the others, up to 22 µm long. The last cell is usually 5.5-6.5 µm thick and can be up to 13 µm thick.

Figure 5. *Ciboria brunneorufa*, fresh ascomata growing on fallen leaves of *Pistacia lentiscus* L.

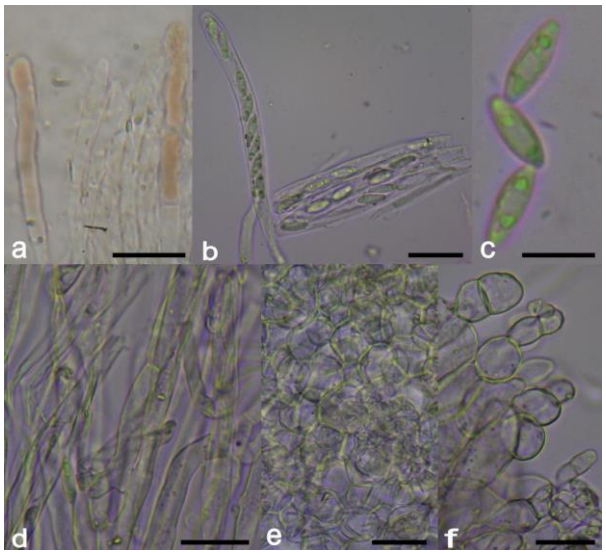

Figure 6. Pigmented paraphyses with refractive vacuoles (a), asci (b), ascospores in water (bar: 10 µm) (c), medullary excipulum (d), ectal excipulum (e), short hyphoid hairs of ectal excipulum (f) of *C. brunneorufa* (bars: 20 µm)

Specimen examined: Greece, Attica, Artemida, in fallen leaf of *Pistacia lentiscus* in forest with *Pinus halepensis*, 29.12.2021, Leg: and Det: Kaounas V, VK6521.

Pezizomycetes O.E. Erikss. & Winka

Pezizales J. Schröt.

Incertae sedis

Kallistoskyphaceae Ekanayaka, K.D. Hyde, Q. Zhao & E.B.G. Jones

Kallistoskypha incarnata (Duvernoy & Maire) Pfister, Agnello, Lantieri & LoBuglio (Figs. 7,8)

Syn: *Barlaeina incarnata* (Duvernoy & Maire) Sacc., *Caloscypha incarnata* Duvernoy & Maire, *Marcelleina parvispora* E. Rubio, Tabarés & Alej. Martínez.

Macroscopic and microscopic features: Apothecia deeply cupulate to cup-shaped, often compressed on one side, never completely flat, even at maturity, up to 15- 16 mm in diameter. Hymenium smooth, coral pink to cherry red in young specimens, changing with age to pale pink, fleshy pink, yellowish-cream, yellowish, with pink spots. External surface white to whitish-yellow to uniform color with hymenium at maturity, finely granulose, often with mycelial strands attached to the substrate, leaves or twigs. These hyaline hairs are visible with the hand lens, especially at the margin. Stipe sometimes clearly visible, 3-4 mm long, with mycelial tufts present and firmly attached to soil debris. Flesh waxy, very brittle, thin and unlayered visible to the naked eye, without the appearance of milk in the section. Odour and taste are not distinct.

These hyaline hairs are visible with the hand lens, especially at the margin. Stipe sometimes clearly visible, 3-4 mm long, with mycelial tufts present and firmly attached to soil debris. Flesh waxy, very brittle, thin and unlayered visible to the naked eye, without the appearance of milk in the section. Odour and taste are not distinct. Ascospores spherical, 8.1-9.8 µm in diameter, smooth, with thick walls, with many small oil droplets, rarely with one large droplet. Asci 145-180 × 9- 11.5 µm, cylindrical, 8spored, uniseriate,

Figure 7. *Kallistoskypha incarnata,* fresh ascomata on rotten leaves debris

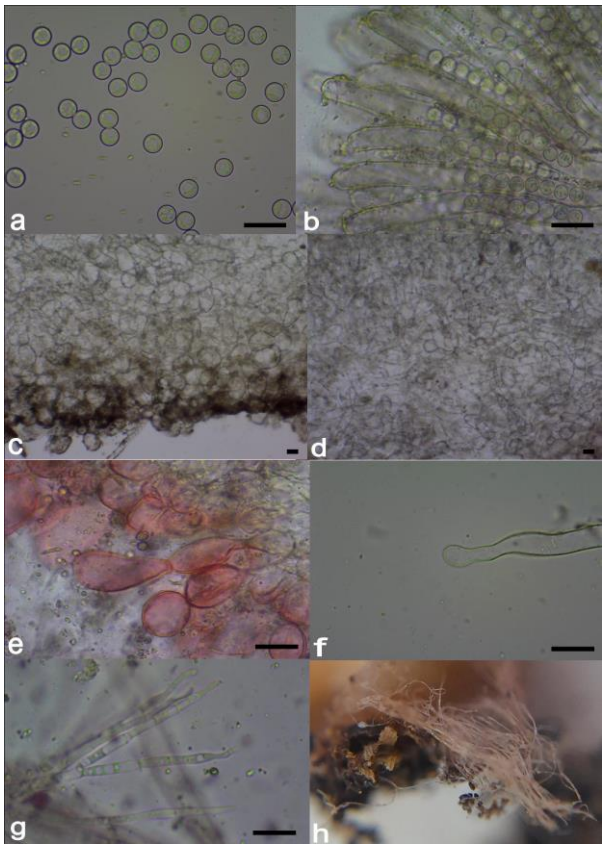

Figure 8. Ascospores (a), asci (b), ectal excipulum (c), medullary excipulum (d), outer cells of the ectal excipulum (with congo red) (e), base of the asci (f), paraphyses (g), mycelial tufts (firmly attached to soil remnants) (h) of *K. incarnata* (bars: 20 µm)

inamyloid. Paraphyses as long as asci, cylindrical, with septa and branched, simple and slightly enlarged at the top or more or less pointed, 2-3(-3.5) µm in diameter. Subhymenium consisting of cells 8-15 µm in diameter. Medullary excipulum in the upper part consisting of elements 20-35(-40) µm, below this area more elongated club-shaped cells, up to 80×40 µm mixed with other smaller and narrower cells having parallel orientation, below this there is a layer of hyphae measuring, 35-70 × 10-15 µm. Ectal excipulum thick, about 90-120 µm, consisting of a chain of 3-5(-6) cells, with the terminal cell extended, subspherical to branchial, thick-walled, coated and with granules of refractive granular/gelatinous material, up to 30 µm wide. Habitat and ecology. In rich soil mixed with

decaying wood debris; a few stocks found in small pieces of wood or dried leaves. Reserves generally in soil under leaves of *Eucalyptus* species.

Specimen examined: Greece, Attica, Artemida, under leaves of *Eucalyptus* sp. in forest with *Pinus halepensis*, 22.02.2024, Leg: and Det: Kaounas V, VK7892.

Pyronemataceae Corda

Chaetothiersia cupressicola Valencia, Van Vooren & M. Vega (Figs. 9,10)

Macroscopic and microscopic features: Apothecia 8 mm in diameter, sessile, at first slightly obconical, then cupulate or discoid, slightly depressed in the centre. Hymenium yellow to glossy yellowish. External surface pale yellow or paler, with brownish hairs at the margin and numerous anchoring hyphae at base. Subhymenium composed of narrow hyphae mixed with subspherical elements. Medullary excipulum thick, with hyaline hyphae, 4-8.5 µm wide. Ectal excipulum thin, with hyaline cells, 15-22 × 10-16 µm, with a yellowish wall in the outer part. Marginal hairs dense, pale brown, sometimes subhyaline at the top, straight or sometimes curved, (200-) 310-1000 × 8-12 µm, septate, thickly walled 0.8-1.7 µm, sharp at the top, with simple and often narrowly elongate base, sometimes showing hyaline amorphous material in lower part. Excipular hairs similar but shorter, 40-450 × 8-12 µm, pale brown, rarely subhyaline, sharp at the top, but shorter ones are clavate. Anchoring hyphae present, up to 470 µm long, 5-10 µm wide, flexible, arising from a bulbous base, with yellowish wall. Ascospores uniseriate, ellipsoid, (14.8-) 16.6-17.4 (-19.2) × (9.7-) 10.9-11.5 (-12.6) µm, x =17 × 11.2 µm, Q = 1.4-1.5-1.6, Qm = 1.5, hyaline, rather thick walled, smooth, containing two large lipid droplets, 5-7 µm in diameter, accompanied by smaller droplets. Asci cylindrical, 242-310 × 11-14 µm, 8spored. Paraphyses straight, thin, hyaline, septate, sometimes with slightly enlarged at the top, 3-4 µm diam, with yellowish interior and with sporadic tiny granular dark yellow pigments.

Specimen examined: Greece, Attica, Spata, in rotting remains of *Cupressus sempervirens*, 10.03.2024, Leg: and Det: Kaounas V, VK7971.

Perilachnea fallax M. Carbone, Valencia, Tello & Van Vooren (Figs. 11,12)

Figure 9. *Chaetothiersia cupressicola* in rotting remains of *Cupressus sempervirens* L.

Macroscopic and microscopic features: Apothecia solitary or gregarius, 5-7 mm in diameter, sessile, cupuliform, spreading at maturity. Hymenium whitish to grey, with outer surface whitish to pale yellowish, covered with short brownish hairs. Margin densely covered with dark brown hairs. Subhymenium very thin, consisting of small subspherical hyaline cells. Medullary excipulum about 90-115 µm thick, consisting of hyaline hyphae, 3.5-8.5 µm wide, mixed with some subspherical or clavate cells, 8-23 × 7-15 µm. Ectal excipulum about 200-250 µm thick, consisting of hyaline cells, 19-36 × 8-28 µm, with thick walls. Marginal cells consisting of spherical or subspherical cells, 10-21 × 10-15 µm, clavate in outer part. Excipular hairs 50-600 × 5-9 µm, superficial, brown, septate, thick-walled 1-1.5 µm, obtuse or slightly pointed at the top, with enlarged base. Marginal hairs similar but longer and denser, 150-1200 × 5-10 µm, superficial,

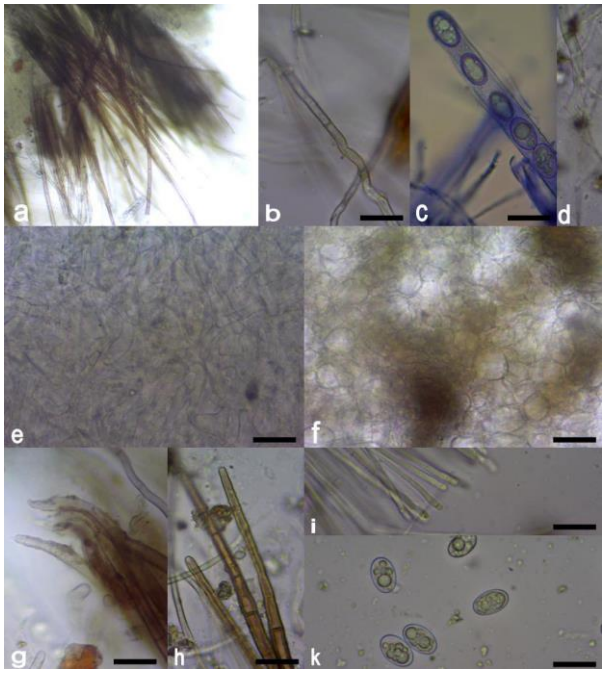

Figure 10. Marginal hairs (a), anchoring hyphae (b), asci and ascospores in cotton blue (c), base of the asci (d), medullary excipulum (e), ectal excipulum (f), excipulum hairs base (g), excipulum hairs (g), paraphyses (i) spores (k) of *C. cupressicola* (bars: 20 µm)

Figure 11. *Perilachnea fallax,* fresh ascomata on rotten wood debris of *Pinus halepensis*

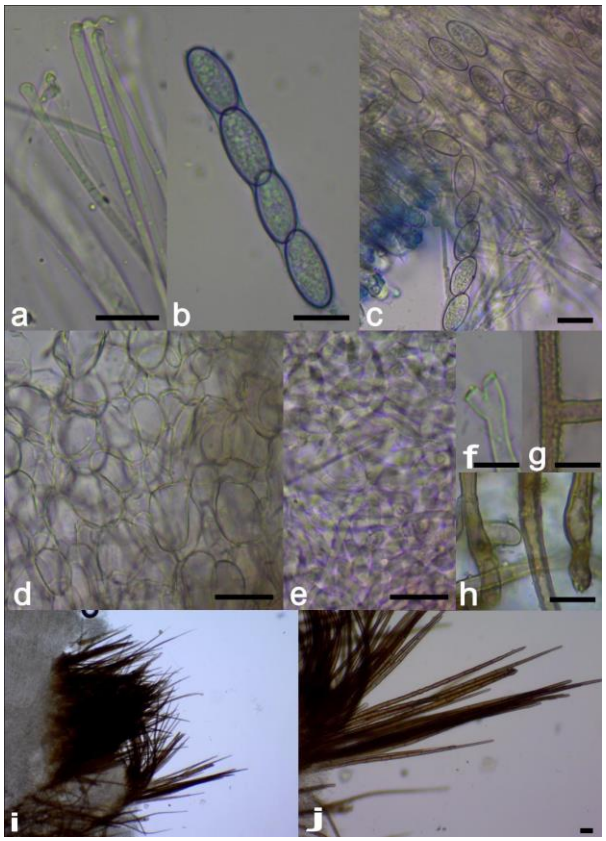

Figure 12. Paraphyses (a), ascospores (in cotton blue) (b), asci, ascospores and paraphyses (c), ectal excipulum (d), medullary excipulum (e), base of the asci (f), vertical hair bifurcation (g), base of the hairs (h) and hairs (i-j) of *P. fallax*, (a, b, c, d, e, j, bars: 20 µm), (f, g, h, bars: 10 µm)

septate, straight or slightly curved, with simple base, pointed at the top, 1.5-2 µm thick walled. Anchoring hyphae present, hyaline, 4-7 µm wide. Ascospores uniseriate, ellipsoid to elongate with tapered ends, (18.2) 20 - 20.8 (22.6) × (8.8) 9.6 - 9.9 (10.7) µm, X = 20.4 × 9.8 µm, Q 1.8 - 2.3, Qm = 2.1, hyaline, smooth, thick-walled (0.5-0.7 µm), containing several small lipid droplets in living state. Asci 8spored, cylindrical 260-300 × 9-11 µm. Paraphyses filamentous, hyaline, septate, straight, 3-4.5 µm in diameter, or slightly enlarged at the top.

Specimen examined: Greece, Attica, Artemida, on the ground, on rotten branches of *Pinus halepensis*, 08.02.2024, Leg: and Det: Kaounas V, VK7837.

Perilachnea humarioides Valencia, M. Vega & Van Vooren (Figs. 13,14)

Macroscopic and microscopic features: Apothecia solitary or gregarius, 6-10 mm in diameter, up to 8 mm high, sessile, deeply cupuliform, spreading at maturity. Hymenium whitish, to greyish, yellowish cream at the end. External surface yellowish cream, covered with short brownish to ochre hairs. Margin hairy, with brown to dark brown hairs, curved, organized in small pyramidal tufts. Subhymenium and medullary excipulum indistinguishable, slender, about 110-120 µm thick, composed of hyaline

hyphae, 3.5-7.5 µm wide, intermixed with some swollen or clavate cells, 11-28 × 7.5-12.5 µm. Ectal excipulum about 250-300 µm thick, with hyaline cells, (6.5) 8-35 µm diam, thick walled. External cells, hyaline, with terminal cell spherical, 11.5-37 × 8.5-26.5 µm. Marginal hairs

Figure 13. *Perilachnea humarioides*, fresh ascomata on rotten wood debris *Prunus dulcis* (Mill.) Rchb.

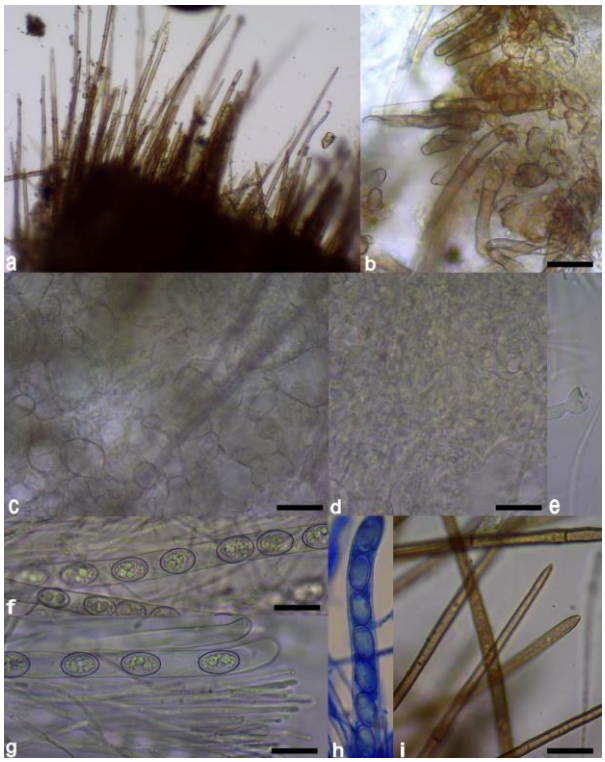

Figure 14. Marginal hairs (a-b), ectal excipulum (c), medullary excipulum (d), base of the asci (e), ascospores (f), asci, ascospores and paraphyses (g) asci and ascospores (in cotton blue) (h) and excipulum hairs (i) of *P. humarioides* (bars: 20 µm)

superficilal, of two types: first, short, 64-220 × 8-17 µm, pale brown, straight, with simple base, septate, blunt at the top, often mixed with clavate cells; second, long, 260-1030 (1300) × 8-12 (16) µm, brown, straight or slightly flexible, with a simple base, enlarged or bulbous to 27 µm, septate, acute at the top or sometimes rounded, 1-1.2 (2.6) µm thick walled. Excipular hairs superficial, similar to short hairs, not bulbous, 17.5-650 × 5-12 µm. Anchoring hyphae present, hyaline, 4-7 µm wide. Ascospores uniseriate, ellipsoid, (15.7) 16.7-17.4 (18.4) × (9.9) 10.6-11 (11.7) µm, X = 17.1 × 10.8 µm, Q 1.5-1.7, Qm = 1.6, hyaline, smooth, thick-walled, containing several lipid droplets, with 2-3 drops larger than others, up to 5 µm in diameter. Asci 8spored, cylindrical, 280-320 × 10-15 µm. Paraphyses filamentous, hyaline, septate, straight, 3-3.5 µm in diameter, not or slightly enlarged at the top.

Specimen examined: Greece, Attica, Rafina, on a fallen branch of an unknown broad-leaved tree, fallen from pruning debris, in a forest with *Pinus halepensis*, 02.02.2024, Leg: and Det: Kaounas V, VK7801. Greece, Attica, Artemida, on a rotten branch from *Prunus dulcis*, 07.03.2024, Leg: and Det: Kaounas V, VK7952.

Basidiomycota R.T. Moore

Agaricomycetes Doweld

Hysterangiales K. Hosaka & Castellano

Mesophelliaceae Jülich

Chondrogaster pachysporus Maire (Figs. 15,16)

Macroscopic and microscopic features: Basidiomata 0.5-1.5 cm in diameter, spherical or distorted by close contact with other specimens, as they almost always occur in small groups of 2-3-4 specimens, which in turn are clustered in nests of several specimens, interconnected by a matrix of accumulated masses of hyphae and rhizomorphs protruding from peridium, small roots, soil and other plant debris. This is particularly distinct at the base of the basidiomata, where the whole appears to be enveloped in a kind of dense and compact shell, a few millimetres thick, which is not separated until the gleba is detached from the peridium, which remains attached to this shell like a thin membrane. Peridium initially 0,5-1 mm thick (in young specimens), whitish in section and on the surface, with a cottony structure, but then tapering to a thin, almost imperceptible and greyish membrane, closely attached to the outer shell; hyphal structure with regular-length elements, 3-8 µm in diameter, as well as thicker elements, ellipsoidal-macroconical. Gleba compact, elastic when young, with a structure formed by rounded or elongated small cells, 0.5-2 mm wide. Which are separated by cotton white plates with a hyphal structure, continuous with the peridium. Filled with spores in a rather thick, pale white brownish matrix. Eventually, the plates become thinner, grayish, while the color of the gleba becomes darker, ending in a chocolate or dark tobacco brown. Odor light, noticeable only after short storage in a small box, with a phenol or fruit smell, no garlic smell. Basidiospores ochre-coloured at maturity, ellipsoid to broad ellipsoid, sometimes slightly ovate or with a hint of papilla, completely enveloped in a thick, very irregularly wavy or slit-like perisporium from completely amorphous to nodular or reticulate, very loose or even 4-5 µm thick, making the basidiospores appear larger and thicker, whereas under this perisporium the basidiospores are smooth and thin-walled in profile, 13.1-16 × 6.7-9 µm, Q = 1.6-2.1, X = 14.6 × 7.8 µm, Qm = 1.9, with a wide and short residual support. Habitat: Hypogeous or semihypogeous under leaves, in loose and sandy soils, in *Eucalyptus* sp. stands, from late autumn to spring.

Figure 15. Fresh basidiomata of *Chondrogaster pachysporus*

Specimen examined: Greece, Attica, Rafina, hypogeous, under of *Eucalyptus sp.* in a forest with *Pinus halepensis*, 22.02.2024, Leg: and Det: Kaounas V, VK7893.

4. Discussions

Species which are similar to *Arachnopeziza obtusipila* are *A. aurata* and *A. delicatula* have narrower and much longer spores (43-80 × 1.4-3.4 µm and 24-48 × 2-3.4 µm respectively). *Arachnopeziza aranea* has much shorter spores (5.5-9.6 × 2-2.7 µm). Also it is obviously closely related to *A. cornuta*, but differs particularly in the spores (8.9-17.7 × 2-3.4 µm) and paraphyses (Korf, 1951). *Arachnopeziza engelii* has cream to pink apothecia, and narrower ascospores (20-24 × 3.5-4.0 µm) (Engel, 1993), *A. ochracea* has beige apothecia, shorter asci and smaller ascospores (16.8 -21.3 × 2.6-3.7 µm) (Iturriaga and Korf, 1988). *Arachnopeziza hiemalis* has wider ellipsoidal ascospores (20-28 × 4.5-5.5 µm) (Wang, 2009). *Arachnopeziza trabinelloides* is easily identified because it is completely yellow. It is closely related to another taxon, *A. leonina* ((12)13,8-16,4(19,5) × 3,4-4 µm) and *A. variepilosa* is supported as a separate distinct lineage, (Kosonen et al., 2021).

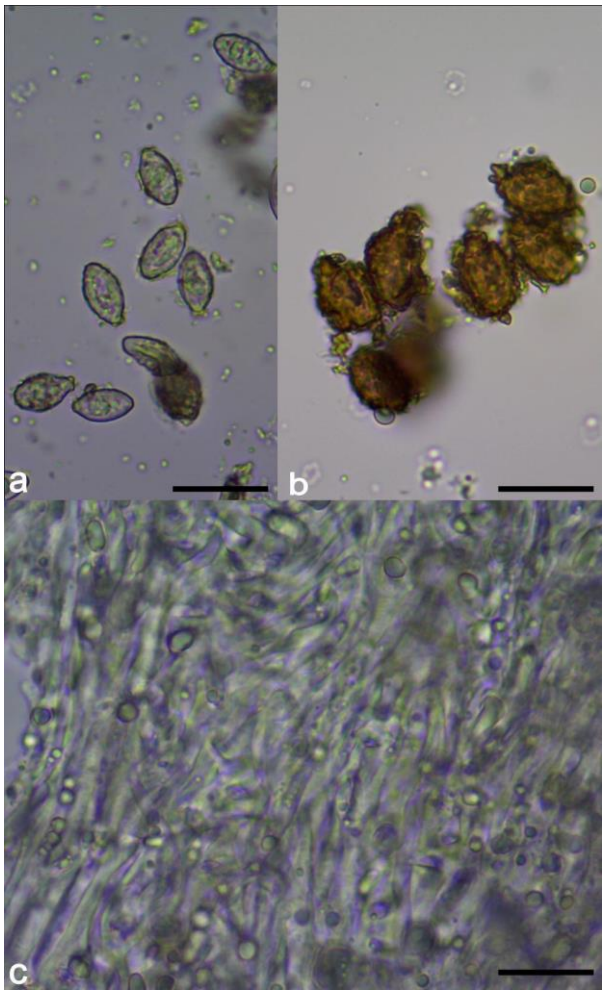

Figure 16. Immature basidiospores (a), mature basidiospores (b) and detail of the trama (c) of *C. pachysporus* (bars: 20 µm)

Lambertella palmeri has similar spores to *Bicornispora seditiosa* and *Bicornispora exophiala* but is a completely different species macroscopically. Phylogenetic analyses of the D1 and D2 domains of the nuc 28S rDNA region of the types of *B. exophiala* and *B. seditiosa* not only confirmed a close relationship between those taxa but surprisingly also with species of *Lambertella* (*Rutstroemiaceae*), particularly with *L. palmeri* (Gala´n et al., 1994). *Lambertella berberidis*, living on dead *Berberis* L. leaves, has spores with different tips and somewhat smaller 20-30 x 8-12 µm (Dumont, 1976). *Lambertella pruni*, growing on stratified *Prunus* L. fruits, has amyloid asci and even smaller ascospores (13-19 × 7-9 µm) (Dumont, 1971). These two species, except for *L. palmeri*, are of spring occurrence, which is not common in the genus (Galan and Prieto, 2004). But the collection from Heraklion, Crete, is from the spring (March).

No other species is known to have similar morphological and microscopic characteristics to *Ciboria bruneorrufa* and the same host, *Pistacia lentiscus*.

Just as for our specimen, *Kallistoskypha incarnata*, there is no other known species with macro- and micromorphological characters matching the literature, as well as the presence of the same *Eucalyptus* host.

Chaetothiersia cupressicola differs from *C. eguttulata* by its guttulate ascospores, longer marginal hairs, and its growth on woody debris and dead branches of *Cupressus* (Van Vooren et al., 2021), while *C. eguttulata* by its grows on debris of *Abies* Mill. Moreover it could be confused with another species growing on dead twigs of *Cupressus*, *Strobiloscypha cupressina* B. Perić & Pfister, which usually has apothecia with a greyish to glaucous hymenium but some collections are yellowish coloured (Perić et al., 2014). Microscopically, *S. cupressina* has ascospores with a different shape and content, and its hairs arise from an enlarged to bulbous base and have rounded apices.

Perilachnea fallax differs mainly from the *P. flavobrunnea* by its spore shape, often more elongated or oblong. The ascospore content is also slightly different, with larger lipid bodies present in *P. flavobrunnea*. To *P. fallax* occurs in decaying litter *Cupressus sempervirens* and *Pinus halepensis*, while the *P. flavobrunnea* in decaying litter *Juniperus* or *Cupressus*. For this reason a careful examination of fresh material and of naturally-ejected mature ascospores is required to separate these two species, especially when both collections are growing on *Cupressus* (Van Vooren et al., 2022). *Perilachnea ochraceoflava* is well distinguished from *P. fallax* by the definitely larger ascospores.

Perilachnea humarioides differs from other *Perilachnea* species by its growth in association with woody debris of deciduous trees, and microscopically by smaller ascospores and mean Q ratio than those of *P. flavobrunnea* and *P. fallax* (Van Vooren et al., 2022). In addition, it differs from *Trichophaea* Boud. s. str. by deeply cupulate apothecia (at least in young state), mainly with a *Humaria*-like appearance, bi- or pluriguttulate ascospores, paraphyses containing small lipid bodies, a saprobic status, and genetic profile (Van Vooren et al., 2022). Macroscopically, this species resembles *Humaria hemisphaerica* in having deeply cup-shaped apothecia and long marginal hairs. The examination of microscopical characters contradicted this resemblance, revealing smooth pluriguttulate ascospores vs. warted biguttulate ascospores in *H. hemisphaerica*. The molecular data confirmed its originality and positioned it in *Perilachnea*, a result in conformity with the characters of this genus. Ecologically, *P. humarioides* appears to be the first species of the genus associated with woody debris of deciduous trees, with the exception of *P. hemisphaerioides* which is carbonicolous and can possibly be found on various types of burnt wood (Van Vooren et al., 2022).

Chondrogaster pachysporus is easily identified because its basidiomata are surrounded by a nest or a cover of roots, plant debris and soil, resembling a shell, like *C. angustisporus*, but the gleba of the first at maturity is completely black while the second is olive black. Basidia are also a good differentiating feature if available in young specimens, as they are mostly bisporic in *C. angustisporus* and monosporic in *C. pachysporus* (Vidal, 1994; Sulzbacher et al., 2010; Giachini et al., 2000). In our sample, due to maturity, we could not observe basidia, as in Montecchi and Sarasini (2000) is not mentioned. However, there is a report of 3-spored or 4-spored basidia, (Moreno et al., 2005). *Chondrogaster pachysporus* is easily distinguished by the morphology and size of the basidiospores, since they are 6-9 µm wide, compared to *C. angustisporus* which reach 4-5 µm and in the first the basidiospores are completely surrounded by a very loose and wrinkled perisporium.

The macro and micromorphological characters of our samples fit in with the literature. Therefore *Arachnopeziza obtusipila*, *Chaetothiersia cupressicola*, *Ciboria brunneorufa*, *Kallistoskypha incarnata*, *Lambertella palmeri*, *Perilachnea fallax*, *Perilachnea humarioides* and *Chondrogaster pachysporus* are new records for Greek mycobiota.

References

Baral HO, Marson G (2005). In vivo veritas. Over 10000 Images of fungi and plants (microscopical drawings, water colour plates, photo macro- & micrographs), with materials on vital taxonomy and xerotolerance. DVD, 3rd edition.

Diamandis S, Perlerou C (2008). Recent records of hypogeous fungi in Greece. Acta Mycologica 43(2): 139-142.

Dumont KP (1971). *Sclerotiniaceae* II. *Lambertella*. Memoirs of the New York Botanical Garden 22 (1): 1-178.

Dumont KP (1976). *Lambertella berberidis* nov. sp. from India. Canadian Journal of Botany 54(16): 1868-1871.

Engel H (1993). Pilzfunde an Lindenästen (*Tilia* spec.). Die Pilzflora Nordwestoberfrankens (Weidhausen b. Coburg) 14-15: 119-243.

Fuckel L (1870). Symbolae Mycologicae. Jahrb Nassau Ver Naturk.23(24): 1-459.

Galan R., Raitviir A, Ayala N, Ochoa C (1994). First contribution to the knowledge of the Helotiales of Baja California and adjacent areas. Mycological Research 98(10): 1137-1152.

Galan R, Prieto F (2004). *Lambertella palmeri* Raitv. & R. Galán descubierta en el Continente Europeo. Boletín de la Sociedad Micológica de Madrid 28: 161-167.

Giachini AJ, Oliveira VL, Castellano MA, Trappe JM (2000). Ectomycorrhizal fungi in exotic *Eucalyptus* and *Pinus* plantations in southern Brazil. Mycologia 92: 1166-1177.

Höhnel FXR (1918). Fragmente zur mykologie. Sitzungsber. Kaiserl Akad Wiss Wien Math-Naturwiss Cl Abt 127: 329-93.

Index Fungorum (2024). http://www.indexfungorum.org/names/Names.asp / [accessed 14 March 2024].

Iturriaga T, Korf RP (1988). *Arachnopeziza ochracea* comb. nov. and a new synonym of *Polydesmia pruinosa.* Mycotaxon 31: 245-249.

Jukić N (2016). First record of the Mediterranean species *Ciboria brunneorufa* in the Balkan Peninsula. Czech Mycology 68(2): 127-137.

Korf RP (1951). A Monograph of the *Arachnopezizeae*. Lloydia 14(3): 129-180.

Korf RP, Zhuang W-Y (1985). A synoptickey to the species of *Lambertella* (Sclerotiniaceae), with comments on a version prepared for taxadat, Anderegg's computer program. Mycotaxon 24: 361-386.

Kosonen T, Huhtinen S, Hansen K (2021). Taxonomy and systematics of *Hyaloscyphaceae* and *Arachnopezizaceae.* Persoonia 46: 26-62.

Martinez F, Martinez R, Melendez A, Perez-Del-Amo CM (2013). *Lambertella palmeri*, un ascomiceto muy poco citado, encontrado en La Rioja. N 8 Boletín Micológico de FAMCAL 8: 11-16.

Montecchi A, Sarasini M (2000). Funghi Ipogei D'Europa. Vicenza: Fondazione Centro Studi Micologici dell'AMB.

Moreno BA, Fernandez JG, Calmaestra EP (2005). Tesoros de nuestros montes. Trufas de Andalucia. Cordaba: Consejería de Medio Ambiente.

Morozova II (2014). New records of discomycetous fungi from Ukraine. Turkish Journal of Botany 38(2): 398-405.

Ormad J, Garcia F (2007). *Ciboria brunneorufa* Bres. (1903), un ascomycete poco frecuente. Butlletin Societat Micologica Valenciana 12: 101-104.

Pancorbo F, Ribes MA (2010). Setas de dunas mediterraneas. Boletín de la Sociedad Micológica de Madrid 34: 271-294.

Paz A, Bellanger JM, Lavoise C, Molia A, Ławrynowicz M, Larsson E, Ibarguren IO, Jeppson M, Læssøe T, Sauve M, Richard F, Moreau PA (2017). The genus *Elaphomyces* (*Ascomycota, Eurotiales*): a ribosomal DNA-based phylogeny and revised systematics of European 'deer truffles'. Persoonia 38: 197-239.

Perić B, LoBuglio KF, Pfister DH (2014). The genus *Strobiloscypha*: a new species and an unresolved phylogenetic placement. Mycologia Montenegrina 16: 7-22.

Pfister DH, Agnello C, Lantieri A, LoBugio KF (2013). The Caloscyphaceae (*Pezizomyces, Ascomycota*), with a new genus.. Mycological Progress 12(4): 667-674.

Rubio E, Tabarés M, Martínez MA (2010) *Marcelleina parvispora* (Ascomycota, Pezizales), a new *Marcelleina* species from Catalonia (Spain). Revista Catalana Micologia 32: 31-35.

Slavova M, Assyov B, Martinez G (2021). Raros e interesantes ascomicetos cupresícolas de Bulgaria, Grecia y España. Yesca 33: 144-157.

Sulzbacher MA, Corte VG, Coelho G, Jacques RJS Antoniolli ZI (2010). Chondrogaster pachysporus in a Eucalyptus plantation of southern Brazil. Mycotaxon 113: 377-384.

Van Vooren N, Valencia FJ, Carbone M, Lindemann U, Vega M, Valade F (2021). Exploring the European *Trichophaea*-like discomycetes (*Pezizales*) using morphological, ecological and molecular data. Ascomycete.org, 13(1): 5-48.

Van Vooren N, Valencia FJ, Carbone M, Vega M (2022). Exploring the European *Trichophaea*-like discomycetes (*Pezizales*) using morphological, ecological and molecular data. Part 3: New discoveries in *Perilachnea.* Ascomycete.org, 14(1): 7-17.

Vidal JM (1994). Algunos hongos hipogeos interesantes para la micoflora catalana. Butll. Society Catalana Micologia 16-17: 221-248.

Vidal JM, Cseh P, Merényi Z, Bóna L, Rudnóy S, Bratek Z, Paz A, Mleczko P, Kozak M, Chachuła P, Assyov B, Slavova M, Kaounas V, Konstantinidis G, Rodríguez F, J. Cabero J, García-Verdugo F, García-Alonso F, Mahiques R, Fantini P, States JS (2023). The genus *Gautieria* (*Gomphales*) in Europe and the Mediterranean Basin: a morphological and phylogenetic taxonomic revision. Persoonia 50: 48-122.

Wang Y-Z (2009). A new species of *Arachnopeziza* from Taiwan. Mycotaxon 108: 485-489.

Whetzel HH (1943). A monograph of *Lambertella*, a genus of brown-spored inoperculate discomycetes. Lloydia 6: 18-52.

Zervakis G, Dimou DM, Balis C (1998). A check-list of the Greek macrofungi including hosts and biogeogrphic distribution: I. *Basidiomycotina*. Mycotaxon 66: 273-336.

Zervakis G, Lizoň P, Dimou DM, Polemis E (1999). Annotated check-list of the Greek macrofungi: II. *Ascomycotina*. Mycotaxon 72: 487-506.