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## An insight into the presence of lignicolous fungi in Sicily (southern Italy)

### Abstract

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Thirty-six lignicolous fungal species (4 *Ascomycota* and 32 *Basidiomycota*), included in 16 families and 28 genera have been recorded in different natural and reforested areas of Sicily. *Amylostereum laevigatum*, *Ceriporia excelsa*, *Phlebia lilascens*, and *Stereum insignitum* represent new records for Sicily. Notes on some rare species are also here reported.

*Key words:* fungal diversity, ecology, distribution, forest fungi, Mediterranean area.

### Introduction

Fungi as heterotrophes represent one of the most important organisms in forest ecosystems (Carroll & Wicklow 1992; Zhu & al. 2015). Fungi that not only grow on wood but cause process of wood decaying are included in the category “lignicolous fungi” (Mueller & al. 2004). They degrade different plant host materials and colonise different environmental niches by producing different enzymes (Petre & al. 2014). According to the type of decay that they cause the lignicolous fungi are brown rot, soft rot, and white rot (Fukasawa & al. 2011). Lignicolous fungi are one of the key player organisms in the forest ecosystems due to the following issues: they are essential for the functioning of forest ecosystems since they contribute to the wood decomposition and nutrient recycling, soil formation and the general carbon budget (Lonsdale 2008; Županić & al. 2009). The residual products of decomposition from fungal action have variable pH, solubility and redox potentials thus can have a noticeable effect on the environment of the specific area. In particular, these products can be incorporate in the soil and sediment over time (Dashtban & al. 2010).

Some species of wood-decay fungi attack dead wood, such as brown rot, and some, such as *Armillaria* species, are parasitic and colonize living trees. Lignicolous fungi possess high decay ability on different living forest trees (Worrall & al. 1997; Fukasawa

& al. 2011; Angelini & al. 2016) as well as on many other woody plant species such as tree fruit and ornamental trees (Adaskaveg & al. 1993; Auetragul & al. 2015).

Biodiversity studies of these fungi have been carried out in Italy over the last decades (Venturella 1991; Bernicchia 2005; Venturella & al. 2011; Landi & al. 2015). New sets of data including both ecological (Angelini & al. 2016; Venturella & al. 2015) and distributive data (Karadelev & al. 2017) are constantly appearing during regular examination and investigation of this area.

The aim of this paper was to improve the knowledge of the ecological and distribution data on lignicolous fungi from Sicilian forest ecosystems and to highlight the presence of some rare and interesting species for the examined southern region in Italy. A special attention was paid to natural reserves and regional parks of Sicily within which fall different forest types of particular biogeographic importance such as woods of *Fagus sylvatica* L., mixed woods of *Quercus petraea* (Matt.) Liebl. and *Ilex aquifolium* L., *Taxus baccata* L., *Abies nebrodensis* (Lojac.) Mattei, and *Chamaerops humilis* L.

## Materials and Methods

Observation on different forest ecosystems in the Nebrodi Regional Park (province of Messina), the Zingaro Oriented Natural Reserve (province of Trapani), and the Madonie Regional Park (province of Palermo) and in areas planted with *Acacia karoo* Hayne were carried out during spring in 2016.

For identification of species standard methods were used, implying microscoping, application of reagents (Melzer reagent, Sulphovanilin, Cotton blue, KOH, etc.) and consulting the following keys and monographs as resources for determination of the collected fungi: Eriksson & Ryvarde (1973); Eriksson & al. (1978, 1984); Breitenbach & Kränzlin (1981, 1986); Jülich (1984); Hjortstam & al. (1987); Hansen & Knudsen (1992, 1997, 2000); Ryvarde & Gilbertson (1993-1994); Bernicchia (2005) and Bernicchia & Gorjon (2010).

The nomenclatural notes are referred to Index Fungorum (<http://www.indexfungorum.org/names/names.asp>) while the nomenclature of vascular plants follow The Euro+Med PlantBase - The Information Resource for Euro-Mediterranean plant diversity (<http://www.emplantbase.org/home.html>).

The herbarium samples were prepared in the airdryer and kept in the Macedonian Collection of Fungi of the Institute of Biology at the Faculty of Natural Sciences and Mathematics in Ss. Cyril and Methodius University in Skopje in the Republic of Macedonia (MCF) and in the Herbarium SAF of the Department of Agricultural, Food and Forest Sciences in the University of Palermo (Italy).

The species are reported in a taxonomical order including both phylum (Ascomycota and Basidiomycota) and family name in the list. Data pertaining to geographical distribution, altitude, forest association, and data source are provided under each fungal species.

**List of species****ASCOMYCOTA***Bertiaceae* Smyk***Bertia moriformis* (Tode) De Not.**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *Fagus sylvatica* L. and *Taxus baccata* L., on fallen branches of *F. sylvatica*, 18 May 2016, Karadelev & Venturella *s.n.*, SAF100.

*Diatrypaceae* Nitschke***Diatrype disciformis* (Hoffm.) Fr**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen branches of *F. sylvatica*, 18 May 2016, Karadelev & Venturella *s.n.*, SAF101.

*Xylariaceae* Tul. & C. Tul.***Annulohypoxyton cohaerens* (Pers.) Y.M. Ju, J.D. Rogers & H.M. Hsieh**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen branches of *F. sylvatica*, 18 May 2016, Karadelev & Venturella *s.n.*, MCF-16299.

***Biscogniauxia nummularia* (Bull.) Kuntze**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen branches of *F. sylvatica* and *Acer campestre* L., 18 May 2016, Karadelev & Venturella *s.n.*, MCF-16285.

**BASIDIOMYCOTA***Amylostereaceae* Boidin, Mugnier & Canales***Amylostereum laevigatum* (Fr.) Boidin**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on bark of living trees of *T. baccata*, 18 May 2016, Karadelev & Venturella *s.n.*, SAF102.

*Auriculariaceae* Fr.***Auricularia mesenterica* (Dicks.) Pers.**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen trunks and stumps of *T. baccata*, 18 May 2016, Karadelev & Venturella *s.n.*, SAF103.

***Eichleriella deglubens* (Berk. & Broome) Lloyd**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen branches of *T. baccata*, 18 May 2016, *Karadelev & Venturella s.n.*, MCF-16284; Collesano (Madonie Regional Park, province of Palermo), 460 m, mixed forest of *Quercus suber* L. and *Q. virgiliana* (Ten.) Ten., on fallen branches of *Q. suber* L., 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16297; Isnello, Contrada Montaspro (Madonie Regional Park, province of Palermo), 800 m, mixed forest of *Quercus ilex* L. and *Q. virgiliana*, on fallen branches of *Q. ilex*, 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16286; Petralia Sottana, Piano Pomieri (Madonie Regional Park, province of Palermo), 1200 m, mixed forest of *Quercus petraea* (Matt.) Liebl. and *Ilex aquifolium* L., on fallen branches of *I. aquifolium* L., *Karadelev & Venturella s.n.*, MCF-16283.

***Exidia glandulosa* (Bull.) Fr.**

Petralia Sottana, Piano Pomieri (Madonie Regional Park, province of Palermo), 1200 m, mixed forest of *Q. petraea* and *I. aquifolium*, on fallen branches of *Q. petraea*, *Karadelev & Venturella s.n.*, SAF104.

***Exidiopsis effusa* Bref.**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen branches of *F. sylvatica* and *A. campestre*, 18 May 2016, *Karadelev & Venturella s.n.*, MCF-16298.

*Corticaceae* Herter***Vuilleminia comedens* (Nees) Maire**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on dry branches of living trees of *F. sylvatica*, 18 May 2016; *Karadelev & Venturella s.n., s.n.*, Petralia Sottana, Piano Pomieri (Madonie Regional Park, province of Palermo), 1200 m, mixed forest of *Q. petraea* and *I. aquifolium*, on dry branches of living trees of *Q. petraea*, *Karadelev & Venturella s.n.*, MCF-16289.

***Vuilleminia coryli* Boidin, Lanq. & Gilles**

Isnello, Contrada Montaspro (Madonie Regional Park, province of Palermo), 800 m, mixed forest of *Q. ilex* and *Q. virgiliana*, on dry branches of living tree of *A. campestre*, 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16301; Polizzi Generosa, SP 119, near Vallone Madonna degli Angeli, (Madonie Regional Park, province of Palermo), 1100 m, reforestation of *Castanea sativa* Miller and *A. campestre*, on fallen branches of *A. campestre*, 20 May 2016, *Karadelev & Venturella s.n.*, SAF105.

***Vuilleminia cystidiata* Parmasto**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on dry branches of living trees of *Crataegus monogyna* Jacq., 18 May 2016; *Karadelev & Venturella s.n.*; Isnello, Contrada Montaspro (Madonie Regional Park, province of Palermo), 800 m, mixed forest of *Q. ilex* and *Q. virgiliana*, on dry branches of living tree of *C. monogyna*, 20 May 2016, *Karadelev & Venturella s.n.*, SAF106.

*Hydnodontaceae* Jülich***Subulicystidium longisporum* (Pat.) Parmasto**

Collesano (Madonie Regional Park, province of Palermo), 460 m, mixed forest of *Q. suber* and *Q. virgiliana*, on fallen branches of *Q. suber*, 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16305.

*Hymenochaetaceae* Donk***Trichaptum bifforme* (Fr.) Ryvarden**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen trunks of *A. campestre*, 18 May 2016, *Karadelev & Venturella s.n.*, SAF107.

*Lachnocladiaceae* D.A. Reid***Scytinostroma hemidichophyticum* Pouzar**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen branches of *F. sylvatica*, 18 May 2016, *Karadelev & Venturella s.n.*, MCF-16300.

*Meruliaceae* P. Karst.***Junghuhnia nitida* (Pers.) Ryvarden**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen trunks of *F. sylvatica*, 18 May 2016, *Karadelev & Venturella s.n.*, SAF108.

***Phlebia lilascens* (Bourdot) J. Erikss. & Hjortstam**

Isnello, Contrada Montaspro (Madonie Regional Park, province of Palermo), 800 m, mixed forest of *Q. ilex* and *Q. virgiliana*, on fallen branches of *Q. virgiliana*, 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16296.

***Steccherinum ochraceum* (Pers.) Gray**

Isnello, Contrada Montaspro (Madonie Regional Park, province of Palermo), 800 m, mixed forest of *Q. ilex* and *Q. virgiliana*, on fallen branches of *Q. virgiliana*, 20 May 2016, *Karadelev & Venturella s.n.*, SAF109.

*Peniophoraceae* Lotsy***Peniophora incarnata* (Pers.) P. Karst.**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on dry branches of living trees of *F. sylvatica*, 18 May 2016, *Karadelev & Venturella s.n.*, SAF110.

***Peniophora lycii* (Pers.) Höhn. & Litsch.**

Zingaro Oriented Natural Reserve (province of Trapani), 50 m, Mediterranean maquis with *Spartium junceum* L. and *Chamaerops humilis* L., on dry branches of *S. junceum*, 19 May 2016, *Karadelev & Venturella s.n.*, MCF-16279; ss 113, near Città del Mare-Perla del Golfo (Terrasini, province of Palermo), 20 m, planted *Acacia karoo* Hayne, on fallen branches of *A. karoo*, 19 May 2016, *Karadelev & Venturella s.n.*, MCF-16287

***Peniophora meridionalis* Boidin**

Isnello, Contrada Montaspro (Madonie Regional Park, province of Palermo), 800 m, mixed forest of *Q. ilex* and *Q. virgiliana*, on dry branches of living trees of *Q. ilex*, 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16294.

***Peniophora nuda* (Fr.) Bres.**

ss 113, near Città del Mare-Perla del Golfo (Terrasini, province of Trapani), 20 m, planted *A. karoo* Hayne, on fallen branches of *A. karoo*, 19 May 2016, *Karadelev & Venturella s.n.*, MCF-16295

***Peniophora pini* (Schleich.) Boidin**

Polizzi Generosa, SP 119, near Vallone Madonna degli Angeli, (Madonie Regional Park, province of Palermo), 1100 m, reforestation of *Pinus nigra* J.F. Arnold, on dry branches of *P. nigra*, 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16282.

***Peniophora quercina* (Pers.) Cooke**

Petralia Sottana, Piano Pomieri (Madonie Regional Park, province of Palermo), 1200 m, mixed forest of *Q. petraea* and *I. aquifolium*, on dry branches of living trees of *Q. petraea*, *Karadelev & Venturella s.n.* MCF-16292; on dry branches of living trees of *Q. ilex*, *Karadelev & Venturella s.n.*, MCF-16293.

*Phanerochaetaceae* Jülich***Byssomerulius corium* (Pers.) Parmasto**

Isnello, Contrada Montaspro (Madonie Regional Park, province of Palermo), 800 m, mixed forest of *Q. ilex* and *Q. virgiliana*, on dry branches of living trees of *A. campestre* L., 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16302.

***Ceriporia excelsa* S. Lundell ex Parmasto**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen branches of *F. sylvatica*, 18 May 2016, *Karadelev & Venturella s.n.*, SAF111.

***Phlebiopsis ravenelii* (Cooke) Hjortstam**

Collesano (Madonie Regional Park, province of Palermo), 460 m, mixed forest of *Q. suber* and *Q. virgiliana*, on fallen branches of *Q. suber*, 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16290; Isnello, Contrada Montaspro (Madonie Regional Park, province of

Palermo), 800 m, mixed forest of *Q. ilex* and *Q. virgiliana*, on fallen branches of *Q. ilex*, 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16288.

***Porostereum spadiceum* (Pers.) Hjortstam & Ryvarden**

Zingaro Oriented Natural Reserve (province of Trapani), 50 m, Mediterranean maquis with *S. junceum* and *C. humilis*, on dry branches of *S. junceum*, 19 May 2016, *Karadelev & Venturella s.n.*, MCF-16291.

*Polyporaceae* Fr. ex Corda

***Cerioporus varius* (Pers.) Zmitr. & Kovalenko**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen trunks of *F. sylvatica*, 18 May 2016, *Karadelev & Venturella s.n.*, SAF112.

***Picipes badius* (Persoon) Zmitr. & Kovalenko**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen trunks of *A. campestre*, 18 May 2016, *Karadelev & Venturella s.n.*, MCF-16304.

***Daedaleopsis nitida* (Durieu & Mont.) Zmitr. & Malysheva**

Isnello, Contrada Montaspro (Madonie Regional Park, province of Palermo), 800 m, mixed forest of *Q. ilex* and *Q. virgiliana*, on trunks of *Q. ilex* L., 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16303.

***Trametes versicolor* (L.) Lloyd**

Collesano (Madonie Regional Park, province of Palermo), 460 m, mixed forest of *Q. suber* and *Q. virgiliana*, on fallen branches of *Q. suber*, 20 May 2016; *Karadelev & Venturella s.n.*; Isnello, Contrada Montaspro (Madonie Regional Park, province of Palermo), 800 m, mixed forest of *Q. ilex* and *Q. virgiliana*, on logs of *Q. ilex* and *Q. virgiliana*, 20 May 2016, *Karadelev & Venturella s.n.*, SAF113.

*Schizophoraceae* Jülich

***Schizopora paradoxa* (Schrad.) Donk**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on fallen branches of *F. sylvatica*, 18 May 2016, *Karadelev & Venturella s.n.*, SAF 220; Collesano (Madonie Regional Park, province of Palermo), 460 m, mixed forest of *Q. suber* and *Q. virgiliana*, on fallen branches of *Q. virgiliana*, 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16281; Isnello, Contrada Montaspro (Madonie Regional Park, province of Palermo), 800 m, mixed forest of *Q. ilex* L. and *Q. virgiliana*, on stem of *Q. ilex* L., 20 May 2016, *Karadelev & Venturella s.n.*, MCF-16280.



*Stereaceae* Pilát***Stereum hirsutum* (Willd.) Pers.**

Isnello, Contrada Montaspro (Madonie Regional Park, province of Palermo), 800 m, mixed forest of *Q. ilex* and *Q. virgiliana*, on logs of *Q. ilex*, 20 May 2016; Karadelev & Venturella s.n., s.n. Piano Battaglia, (Madonie Regional Park, province of Palermo), 1600 m, *F. sylvatica* forest, on fallen branches of *F. sylvatica*; Karadelev & Venturella s.n.; Petralia Sottana, Piano Pomieri (Madonie Regional Park, province of Palermo), 1200 m, mixed forest of *Q. petraea* and *I. aquifolium*, on fallen branches of *Q. petraea*; Karadelev & Venturella s.n.; Polizzi Generosa, SP 119, near Vallone Madonna degli Angeli, (Madonie Regional Park, province of Palermo), 1100 m, reafforestation of *C. sativa* and *A. campestre*, on fallen branches of *C. sativa*, 20 May 2016, Karadelev & Venturella s.n., SAF114.

***Stereum insignitum* Quél.**

Bosco della Tassita (Nebrodi Regional Park, province of Messina), 1347 m, mixed forest of *F. sylvatica* and *T. baccata*, on dry branches of living trees of *F. sylvatica*, 18 May 2016, Karadelev & Venturella s.n., SAF115.

*Tremellaceae* Fr.***Tremella mesenterica* Retz.**

Petralia Sottana, Piano Pomieri (Madonie Regional Park, province of Palermo), 1200 m, mixed forest of *Q. petraea* and *I. aquifolium*, on fallen branches of *Q. petraea*, Karadelev & Venturella s.n., SAF116.

**Discussion and Conclusions**

In the Mediterranean forests, a high level of diversity for plants and fungi can be recognized (Scarascia-Mugnozza & al. 2000). In the last years, this diversity is subjected to a massive anthropic pressure, to wrong silvicultural treatments and to the effect of climatic changes. In particular, the interruption in the practice of removal of woody material into the forests has favored the permanence of common lignicolous species, which typically grow on small branches and wood residues of different sizes.

In different natural and reforested areas of Sicily, we recorded thirty-six lignicolous fungi species (4 *Ascomycota* and 32 *Basidiomycota*), included in 16 families and 27 genera. Most of the specimens were collected in *Fagus sylvatica* and *Taxus baccata* mixed forests (19 records) and *Quercus ilex* and *Q. virgiliana* mixed forests (12 records). A lower number of specimens arise from *Q. petraea* and *Ilex aquifolium* mixed forest (6 records) and from *Q. suber*, *Q. virgiliana*, and *Q. petraea* mixed forest (5 records). Three specimens were recorded in *Castanea sativa* and *Acer campestre* mixed forest, on plant of *A. campestre* and two in the maquis with *Spartium junceum* and *Chamaerops humilis*, respectively. On isolated plants of *Pinus nigra* and *F. sylvatica* were instead collected only a specimen per each trees.



All lignicolous species belongs to the ecological category Sw (saprotroph on wood): they mainly colonize fallen branches, barks, trunks, stumps, and logs both of dead or living trees.

Species like *Auricularia mesenterica*, *Byssomerulis corium*, *Bertia moriformis*, *Diatrype disciformis*, *Exidia glandulosa*, *Peniophora incarnata*, *P. lycii*, *P. meridionalis*, *P. quercina*, *Stereum hirsutum*, *Steccherinum ochraceum*, *Schizopora paradoxa*, *Trichaptum bifforme*, *Tremella mesenterica*, and *Trametes versicolor* are very common and widely distributed in the Italian forest ecosystems. Referring to the survey of Bernicchia & al. (2008), *Vuilleminia comedens* is a widely distributed lignicolous species in the forests of the Italian territory. *V. coryli* is an uncommon species in Italy previously recorded for Friuli Venezia Giulia, Emilia Romagna, Lazio, Sardinia, and Tuscany (Bernicchia & al. 2008). *Acer campestre* is a new substratum here reported for *V. coryli*. Finally, the very rare *V. cystidiata* confirms, even in the Sicilian forests, its preference for the wood of members of family *Rosaceae* and in particular for that of shrubs of the genus *Crataegus* L.

*Annulohyphoxylon cohaerens*, introduced in Italy with trade, is a conspicuous cause of rot disease on beech trees and it is included in the European Database of the Invasive Forest Pathogens (IFPs) (Schumacher & al. 2006; Santini & al. 2013).

In *Fagus sylvatica* woods of Italy, in recent times, the biotic and abiotic stresses have determined an increase of attacks by pathogenic fungi and particularly by *Biscogniauxia nummularia*, a xylariaceous fungus associated with severe beech-decline events (Luchi & al. 2006). The presence of *B. nummularia* in Bosco della Tassita confirms the stress conditions of beech trees in Sicily.

*Eichleriella deglubens* is a very rare saprotroph previously recorded in Sicily on trunks of *Quercus ilex* L. (Venturella & al. 2007). Its distribution in Italy is limited to scattered localities of few regions, i.e. Sardinia, Trentino Alto Adige and Veneto (Onofri & al. 2003). *T. baccata*, *Q. suber*, and *I. aquifolium* are new substrata here reported for *E. deglubens*.

The distribution of *S. longisporum* in Italy is limited to few regions (Onofri & al. 2003). In this paper, we report the second findings of this species in Sicily on a different substratum, i.e. fallen branches of *Q. suber*.

The presence of *Scytinostroma hemidichophyticum* and *Junghuhnia nitida* on fallen branches of *F. sylvatica*, in a mixed forest of *F. sylvatica* and *T. baccata* is confirmed in this paper.

The infrequent *P. spadiceum* is reported on a unusual substratum, the Spanish broom (*S. junceum*), at the sea level in the Mediterranean maquis.

*Phlebiopsis ravenelii* previously recorded for Italy in the maquis of *Arbutus unedo* L. (Pérez Gorjón & al. 2006) it has been collected on different substrata, i.e. fallen branches of *Q. ilex* and *Q. suber*.

As also reported for other geographic areas by Zmitrovich & al. (2016), *Ceriporus varius*, confirms its presence and its ecological role with old-growth broadleaf trees. The presence of *D. nitida* in mixed forests of the Mediterranean southern regions is also confirmed (Pisani & al. 2016).

The following species *Amylostereum laevigatum*, *Ceriporia excelsa*, *Phlebia lilascens*, and *Stereum insignitum* represent new records for Sicily. In particular, *S. insignitum* is a thermophilous species with a rather restricted distribution in southern Europe (Winterhoff 1992). Furthermore, *C. excelsa*, *Exidiopsis effusa* and *Vuilleminia coryli* are rare species, recorded on different deciduous substrata, in Italy (Onofri 2005). *Phlebia lilascens*, infre-

quent in Italy and locally frequent in some European countries (Pérez Gorjón & al. 2009), is reported for the first time on *Quercus virgiliana*. In addition, *P. badius* has a scattered distribution in Italy (Onofri & al. 2003).

Specific record is that of *Peniophora nuda* on planted *Acacia karoo*. This species was previously reported only for the region of Lombardia and Veneto on different substrata (Onofri 2005). Furthermore, *Peniophora pini* is reported for the first time in southern Italy on *Pinus nigra* since it was previously recorded only in Piedmont and Trentino Alto Adige (Onofri 2005).

In conclusion, the Sicilian forests express a high level of lignicolous fungi diversity, some of them very rare in Europe (Karadelev & al. 2017) and this data is also confirmed by the presence of *Ceriporia excelsa*, a taxon included among the sets of Indicator (Signal) species for cryptogams biodiversity (Nordén & al. 2007). Besides many of the recorded polyporoid taxa are important producers of substances having immunomodulatory, antitumoral, antiviral, and antihyperlipidemic effect and represent a very important genetic resource, which should be maintained for different applications in the near future (Zmitrovich & Kovalenko 2016).

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The authors contributed equally to this work.

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