

# Basidiomycete diversity within Calabrian pine (*Pinus brutia*) ecosystems on the island of Cyprus

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**ABSTRACT**—Extended areas on the island of Cyprus including the vast majority of forested land, are occupied by *Pinus brutia*, an ecologically important tree forming ectomycorrhizal associations with a wide array of fungi. In this third installment of macromycete inventories from selected ecosystems in Cyprus, the basidiomycete diversity within *P. brutia* communities is reported following a 12-y inventory. Two hundred and thirty-one taxa are compiled in an annotated checklist, 95 of which constitute new records for the country. Most notable of these are *Clitopilus daamsii*, *Hygrophorocybe nivea*, *Lepiota lepida*, *Leucoagaricus georginae*, *Rhodocybe matesina*, *Russula wernerii*, *Tephroclype striaeapilea*, *Tephroderma fuscopallens*, and *Tricholoma chrysophyllum*, which are rarely reported in published literature. Notes on the altitude, phenology and estimated abundance are provided, accompanied by selected imagery and a review of previously published records.

**KEY WORDS**—biogeographical distribution, checklist, East-Mediterranean pine, fungi, inventory, island biogeography, Turkish pine

## Introduction

*Pinus brutia* Ten., the Calabrian or East-Mediterranean pine, along with its sister-species the Aleppo pine (*P. halepensis* Mill.), are ecologically important constituents of the Mediterranean flora jointly occupying some 7 million hectares (Quézel 2000). Both species have developed efficient regeneration mechanisms to deal with wildfires in the region, and grow prolifically on dry and infertile substrates in the thermo-, meso- and supra-Mediterranean belts (Nahal 1983; Thanos & Doussi 2000; Mauri et al. 2016). On the island of Cyprus, Calabrian pine occupies some 175,000 hectares, accounting for ~90% of all woodland coverage on the country (Meikle 1977; Tsintides et al. 2002). Although pure stands sometimes occur, the majority of *P. brutia* populations are found in mixed ecosystems, with Kermes oaks [*Quercus coccifera* subsp. *calliprinos* (Webb) Holmboe], strawberry trees (*Arbutus andrachne* L.), and rockroses (*Cistus* L. spp.) usually present in the understorey. Throughout the meso- and supra-Mediterranean belts of the Troodos massif (400–1400 m. asl), *P. brutia* forms extensive forests with the narrow-endemic golden oak (*Quercus alnifolia* Poech), while at higher elevations it is replaced by *P. nigra* subsp. *pallasiana* (Lamb.) Holmboe, although both black- and Calabrian pines can co-exist within a narrow phytogeographical belt from 1200 to 1400 m. asl.

*Pinus brutia* forms ectomycorrhizal (EcM) associations with a wide array of basidiomycetes and ascomycetes. Such multifunctional mutualisms are fundamental for terrestrial ecosystems, enhancing plant productivity, alleviating abiotic and oxidative stress, and regulating carbon, nitrogen and phosphorus cycling (Smith & Read 2010; van der Heijden et al. 2015). The logs and branches of *P. brutia* moreover provide suitable substrates for a number of cellulolytic decomposers (Bernicchia 2005; Bernicchia & Gorjón 2010; Loizides 2018), while several terrestrial saprotrophs are commonly encountered among the tree litter (Athanasidou & Theohari 2001; Loizides et al. 2011; Polemis et al. 2012; Dimou et al. 2016). Although the physiology and biogeography of *P. brutia* have been extensively studied (Panetsos 1981; Thanos & Marcou 1991; Petrou & Milios 2012), little is known of the composition, structure and dynamics of its associated fungal diversity. Several basidiomycetes have been reported from *P. brutia* ecosystems in genus-specific taxonomic treatments and popular field guides from Cyprus, including a number of taxa described as new to science, such as *Clavulina iris* Loizides et al. (Crous et al. 2019), *Hydnellum dianthifolium* Loizides et al. (Loizides et al. 2016), *Hygrophorus meridionalis* Loizides et al. (Moreau et al. 2018), and *Russula hobartiae* Loizides & Vidal (Vidal et al. 2019). However, comprehensive inventories from *P. brutia* ecosystems are lacking, resulting in a fragmented understanding of the full range of macromycete diversity present in these important Mediterranean habitats. The basidiomycete diversity in Calabrian pine ecosystems is extensively documented in this paper,

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following a 12-y-inventory carried out in Cyprus between 2007 and 2019. A total of 231 taxa are overall compiled in an annotated checklist, 95 of which are reported from Cyprus for the first time. Some interesting finds and previously published records are discussed, and imagery, accompanied by brief taxonomic notes for critical taxa, are included.

## Materials & Methods

Material was collected as part of a general inventory in Cyprus carried out by the author from 2007 to 2019. A large number of sites across an extended altitudinal gradient were systematically surveyed following a sampling protocol described in Loizides (2016, 2018), and Loizides et al. (2019a, 2019b). Collections were photographed *in situ* and details on the macromorphological aspect, including size, colour, odour and oxidation of the flesh, were observed on freshly collected specimens. Iron sulfate (FeSO<sub>4</sub>), Guaiac tincture and Phenol were applied to observe chemical reactions on the flesh of species of the genus *Russula* Pers. Potassium hydroxide (5% KOH) was applied to observe chemical reactions on the pileus and flesh of *Cortinarius* (Pers.) Gray species. Microscopic studies were performed under a LEICA BM E binocular and an AM T360B trinocular microscopes, at ×40, ×100, ×400 and ×1000 magnifications. Congo Red in 10% ammonia (NH<sub>3</sub>), 5% potassium hydroxide (KOH), lactophenol cotton blue (LPCB), aqueous Phloxine, Melzer's solution and tap water were used accordingly as mounting mediums and diagnostically important microscopic structures were observed. The checklist is arranged in alphabetical order and includes previously reported taxa, as well as species newly identified in the course of this survey marked below with an asterisk (\*). Doubtful records, or species identified only to genus are excluded (see also "Discussion"). Wood-inhabiting aphyllorhaceous basidiomycetes and ascomycetes are included in separate dedicated checklists (Loizides 2018 & in prep.). Unless otherwise noted, specimens were collected, photographed and identified by the author. Index Fungorum (<http://www.indexfungorum.org>), Mycobank (<http://www.mycobank.org>), and recently published systematic revisions were consulted to provide most recently updated names for the cited taxa. Exsiccatae are kept in the private collection of the author, with selected collections deposited at ACAM (Agricultural University of Athens), BCN (Universitat de Barcelona Herbari), CEFE (Centre d'Ecologie Fonctionnelle et Evolutive, Montpellier), K (Royal Botanic Gardens at Kew), and LIP (Université de Lille).

## Species recorded

### *Agaricus augustus* Fr.

Occasionally encountered in black-and Calabrian pine forests, with one collection from a mixed *Pinus brutia/Quercus alnifolia/Arbutus andrachne* forest in Amiantos, 21-X-2011, ca 1300 m asl.

### *Agaricus bisporus* (J.E. Lange) Imbach

Common in pastures and along *Cupressus sempervirens* L. groves, but once collected in a coastal *P. brutia* forest in Akrotiri, 11-II-2014, ca 20 m asl.

### *Agaricus brunneolus* (J.E. Lange) Pilát

This bitter-almond scented wood dweller is frequently seen at various elevations, e.g., Saittás, 9-XII-2007 & 6-I-2017, ca 700 m asl; Platánia, 27-XI-2008, 1-XII-2009 & 23-XII-2018, ca 1200 m asl; Lysós, 18-I-2009, ca 600 m a.s.l.; Mávro Dáfos, 5-XII-2012, ca 1200 m asl; Trooditissa, 17-XI-2017, ca 1400 m asl. Also reported by Viney (2005) with its old name "*A. porphyrrhizon* P.D. Orton", from the pine woods of Pentadáktylos, Dec. 2001.

### *Agaricus impudicus* (Rea) Pilát

Probably the most common representative of the genus in Cyprus, with numerous sightings in all kinds of forests, including Calabrian pine forests in Amiantos, 19-X-2008 & 10-X-2009, ca 1300 m asl; Trooditissa, 13-X-2008, 26-X-2011, 31-X-2011 & 9-XI-2018, ca 1400 m asl; Plátres, 17-XI-2008, ca 1000 m asl; Saittás, 25-XI-2009 & 10-I-2017, ca 700 m asl; Kannaviou, 29-XI-2017, ca 800 m asl.

### \**Agaricus litoralis* (Wakef. & A. Pearson) Pilát

Three collections in different seasons, all from the same locality in a *P. brutia* forest at Agros, 4-IV-2007, 8-IV-2008 & 24-III-2011, ca 1000 m asl. Rare.

### *Agaricus macrocarpus* F.H. Møller

Reported by Loizides et al. (2011) based on a collection from a mixed *P. brutia/Q. alnifolia* forest in Plátres, 29-XII-2009, ca 1200 m asl, but several new species have been described in section *Arvenses* since (Parra Sánchez 2013), whose morphological identification is far from straight forward. Several species of this group seem to occur in Cyprus, including some not comfortably fitting available descriptions, that ultimately need to be resolved by DNA sequencing. A collection from Syrianóchori, Jan. 2001, was also reported as "*A. aff. macrocarpus*" by Viney (2005).

### *Agaricus moelleri* Wasser

Occasionally seen in mixed *P. brutia* forests (Loizides et al. 2011): e.g., Amiantos, 19-X-2008, ca 1300 m asl; Saittás,

4-XII-2008 & 30-XI-2016, ca 700 m asl; or Platánia, 10-X-2009 & 7-XI-2009, ca 1100 m asl.

\****Agaricus pampeanus*** Speng.

One collection fitting the description of this sparingly reported species, from a *P. brutia/Quercus alnifolia* forest clearing at Méssa Potamós, 12-XII-2011, ca 800 m asl. Rare.

***Agaricus pseudopratenensis*** (Bohus) Wasser

Common in the lowlands under *C. sempervirens* and open fields, but rarely also seen in *Cistus matorral* (Loizides 2016) and forest clearings: Saittä́s, 30-XI-2016, ca 650 m asl; Stavró́s tis Psó́kas, 29-XI-2017, ca 1200 m asl.

\****Agaricus sylvaticus*** Schaeff.

Rarely seen in riparian broadleaved forests and once in a Calabrian pine forest in Péra Pedí, 10-I-2017, ca 55 asl.

***Agaricus sylvicola*** (Vittad.) Peck *sensu lato*

Occasionally encountered in black pine and broadleaved riparian forests (Loizides et al. 2011), with a couple of collections from a Calabrian pine forest in Trimíklini, 23-XII-2007 & 17-XII-2011, ca 650 m asl.

***Agaricus xanthodermus*** Genev.

The “yellow stainer” is rare in Cyprus (Loizides et al. 2011), with a couple of records from mixed *P. brutia* forest clearings: Platánia, 16-XI-2014, ca 1100 m asl; Kannavióú, 29-XII-2016, ca 800 m asl.

***Amanita ovoidea*** (Bull.) Link

Probably the most widespread and ecologically versatile *Amanita* Pers. species on the island, occurring from near-sea level to ~1700 m asl in association with *Pinus* L., *Quercus* L., and occasionally *Eucalyptus* L'Hér. First reported on the island by Natrass (1937) from Ktíma (Paphos), Dec. 1932; and later also by Viney (2005) from Kaló Chorió, Nov. 1999, Loizides (2011), and Loizides et al. (2011, 2018) from Trimíklini, 13-X-2009, 10-XI-2012 & 14-XI-2012, ca 650 m asl; Kouká, 15-X-2009, ca 500 m asl; Karvounás, 16-X-2011 & 23-X-2011, ca 1200 m asl; Plátres, 19-XI-2011, ca 1200 m asl; Platánia, 16-XI-2014, ca 600 m asl; and Akrotíri, 24-XI-2014 & 10-XII-2017, ca 20 m asl. Sometimes collected for the table by the locals, which has led to a number of poisonings in the past likely due to confusion with *A. proxima* (Loizides et al. 2018).

***Amanita proxima*** Dumée

Several collections from Trimíklini, 30-X-2008, 10-XI-2012 & 1-XII-2017, ca 650 m asl; Kouka, 15-X-2009, ca 500 m asl; Karvounás, 13-X-2011, 16-X-2011 & 3-XI-2015, ca 1200 m asl; Kélefos, 31-X-2012, ca 500 m asl; and Akrotíri, 24-XI-2014 & 10-XII-2017, ca 20 m asl. Previously reported by Viney (2005) from Halé́fka, Nov. 1997, and by Loizides (2008), and Loizides et al. (2011 & 2018) from collections cited above. This fungus contains allenic norleucine, a potentially deadly nephrotoxin (De Haro et al. 1998) and can be confused with *A. ovoidea*, with which it shares the same habitat and distribution. Most likely the unidentified “white *Amanita*” species briefly discussed and sketched by Willimott (1933), responsible for a number of fatalities early last century.

***Arrhenia rickenii*** (Hora) Watling

Frequently seen on coastal and inland dunes (Loizides 2016), but also in mossy *P. brutia* forests in the thermo-Mediterranean belt: Mosfilotí, 23-I-2011, ca 250 m asl; Politikó, 9-I-2012, ca 400 m asl.

***Arrhenia spathulata*** (Fr.) Redhead

Sparingly encountered in matorral and mossy forests in the dunal and thermo-Mediterranean belts, such as Trimíklini, 26-XI-2008, 9-XII-2011 & 31-XII-2013, ca 650 m asl.

\****Atheniella flavoalba*** (Fr.) Redhead, Moncalvo, Vilgalys, Desjardin & B.A. Perry

One collection matching the description of this taxon, previously placed in genus *Mycena* (Pers.) Roussel. Found among *P. brutia* litter in Kélefos, 2-I-2009, ca 500 m asl. Distribution unclear.

\****Atractosporocybe inornata*** (Sowerby) P. Alvarado, G. Moreno & Vizzini

Previously placed in the genus *Clitocybe* (Fr.) Staude, this species was recently transferred to the new genus *Atractosporocybe* P. Alvarado et al. (Alvarado et al. 2015). Fairly widespread in upland *P. nigra* subsp. *pallasiana* forests and *Cedrus brevifolia* A. Henry ex Elwes & A. Henry plantations, but occasionally also encountered in mixed *P. brutia/Q. alnifolia* forests in Plátres, 17-XII-2007, ca 900 m asl; Álona, 5-XI-2009, ca 1300 m asl.; Mávro Dásos, 1-XII-2012, ca 1200 m asl; and Platánia, 30-XII-2014, ca 1100 m asl.

\****Baeospora myosura*** (Fr.) Singer

Sparingly seen on the island, this species inhabits fallen cones of conifers, particularly of *P. brutia*. Collected in Amíantos, 9-XI-2009, ca 1300 m asl; Kélefos, 29-XI-2009, ca 500 m asl; and Platánia, 21-XII-2011, ca 1100 asl.

\****Bovista aestivalis*** (Bonord.) Demoulin

A handful of collections, one from a *P. brutia* forest in Moniáti, 29-IX-2011, ca 750 m asl. Uncommon.

***Chalciporus amarellus*** (Quél.) Bataille

Previously reported by Viney (2005) from Halé́fka, Jan. 1998, this striking bolete is known only from three additional collections in Saittä́s, 17-XI-2007, ca 700 m asl; Platánia, 26-XI-2009, ca 1100 m asl; and Kélefos, 28-XI-2009, ca 450 m asl (Loizides et al. 2019a). Although all collections originate from *P. brutia* forests, this species is probably a

mycoparasite (Tedersoo et al. 2010; Nuhn et al. 2013).

***Chroogomphus mediterraneus*** (Finschow) Vila, Pérez-De-Greg. & G. Mir

One of the most widespread and consistently occurring fungi in Cyprus, present from the dunal zone to the peaks of the Troodos massif. Numerous sightings, including Péra Pedí, 21-XI-2007, ca 700 m asl; Pissouri, 25-I-2009, ca 200 m asl; Kélefos, 20-XI-2009, 28-XI-2009, 28-I-2010 & 2-XII-2014, ca 500 m asl; Kannavióu, 15-XII-2009, ca 800 m asl; Mosfilotí, 23-I-2011, ca 250 m asl; Akámas, 18-XII-2014, ca 150 m asl; Akrotíri, 12-I-2015 & 10-II-2017, ca 20 m asl. Collections reported by Viney (2005) and Loizides et al. (2011) as “*C. rutilus* (Schaeff.) O.K. Mill.”, all seem to belong to this widespread species (see Scambler et al. 2018 and “Discussion” for further remarks).

\****Clathrus ruber*** P. Micheli ex Pers.

The “lattice stinkhorn” is a rare species in Cyprus, known only from four collections in Saittás, 13-XII-2007, ca 700 m asl; Plátres, 17-X-2008 & 11-XII-2012, ca 900 m asl; and Kélefos, 1-I-2019, ca 500 m asl, all in mixed habitats.

***Clavulina coralloides*** (L.) J. Schröt. *sensu lato*

Reported by Viney (2005) as “*C. cristata*”, from Haléfka, Jan. 1998, and later by Loizides et al. (2011) from collections in Platánia, 5-XII-2009, ca 1150 m asl, and Loizides (2016) from collections under *Cistus*, but DNA sequencing suggests that more than one species might be involved (unpubl. data).

***Clavulina iris*** Loizides, Bellanger & P.-A. Moreau

Numerous collections of this recently described and widespread species, appearing from mid-winter to early spring in a variety of calcareous habitats in association with *Cistus*, *P. brutia* and *Quercus*, e.g. Péra Pedí, 24-III-2009 & 2-III-2019, ca 550 m asl; Souíni, 16-III-2012, 25-II-2013, 21-II-2015, 2-III-2015, 4-III-2019 & 6-III-2019, ca 400 m asl; Anogyra, 17-II-2015, ca 400 m asl; Platánia, 26-XII-2018, ca 1100 m asl; Kélefos, 1-I-2019, ca 500 m asl; and Trimíklini, 28-II-2019, ca 650 m asl (for sequenced collections and a detailed description see Crous et al. 2019).

\****Clitocella fallax*** (Quél.) Kluting, T.J. Baroni & Bergemann

Two collections from mixed forests in Cedar Valley, 18-XI-2009, ca 1100 m asl; and Kélefos, 20-I-2011, ca 450 m asl, matching the descriptions of this rarely reported species but featuring rather variable spores, ranging from 5–7 × 3.5–4.5 µm to 6–8 × 4–5 µm. In the phylogeny provided by Kluting et al. (2014), European collections from Norway and Spain form a well-supported clade distinct from a North American collection identified as this taxon, indicating the presence of more than one species under this name. European collections likely correspond to *C. fallax* ss. str.

***Clitocella popinalis*** (Fr.) Kluting, T.J. Baroni & Bergemann *sensu lato*

Reported by Viney (2005) as “*Rhodocybe popinalis*” from pine forests of Haléfka, Jan. 2001, and subsequently collected by the author in Kakomállis, 29-X-2009, ca 750 m asl; and Palechori, 2-XI-2009, ca 900 m asl. At present, collections identified as *C. popinalis* and the closely related *C. mundula* (Lasch) Kluting et al., seem to nest in multiple clades in published phylogenies (Kluting et al. 2014; Vizzini et al. 2016 & 2018), therefore deeper phylogenetic investigations are needed to clarify their precise taxonomic status.

***Clitocybe diatretra*** (Fr.) P. Kumm.

Reported by Viney (2005) from the pine woods of Áyios Amvrósios, Nov. 2000, and by Loizides et al. (2011) from a *P. brutia/Quercus coccifera* subsp. *calliprinos* forest clearing in Kélefos, 24-XII-2009, ca 500 m asl.

\****Clitocybe fragrans*** (With.) P. Kumm

One of several *Clitocybe* species with an aniseed odour, with a couple of collections from Kélefos, 2-XII-2008 & 2-I-2009, ca 500 m asl. More frequently seen in high elevation *P. nigra* subsp. *pallasiana* forests.

\****Clitocybe lituus*** (Fr.) Métrod

A couple of collections matching the description of this taxon from Álona, 5-XI-2009, ca 1300 m asl; and Saittás, 18-XII-2009, ca 650 m asl. Uncommon or rare.

\****Clitocybe metachroa*** (Fr.) P. Kumm.

Few collections from mixed *P. brutia* and *Q. alnifolia* forests in Mesa Potamos 2-XII-2007, ca 800 m asl; Platania 22-XII-2007 & 28-XI-2008, ca 1100 m asl; and Mavro Dasos 1-XII-2012, ca 1200 m asl. Probably common, but a remarkably variable taxon frequently confused with similar-looking species.

***Clitocybe obsolata*** (Batsch) Quél.

One collection matching the description of this species from a *P. brutia* forest in Péra Pedí, 10-I-2009, ca 550 m asl. Also reported by Viney (2005) from collections under *Cistus* in Karavas, Dec. 2001, but these may belong to *C. cistophila* Bon & Contu, instead (Loizides 2016). A number of aniseed-scented *Clitocybe* species seem to occur in Cyprus, whose identity is not clear since several early-described taxa have yet to be phylogenetically defined.

***Clitocybe odora*** (Bull.) P. Kumm.

Frequent under both broadleaved and coniferous trees, with several sightings from Calabrian pine ecosystems: Saittás, 9-XII-2007, ca 650 m asl; Péra Pedí, 13-X-2008, ca 650 m asl; Kannavióu, 15-XII-2009, ca 900 m asl; Kelláki, 21-XII-2009, ca 600 m asl; Kélefos, 8-II-2011, 29-XI-2014, 10-XI-2017 & 1-I-2019, ca 500 m asl.

***Clitocybe umbilicata*** P. Kumm.

Reported by Viney (2005) from Panagra, Dec. 2001.

***Clitopaxillus alexandri*** (Gillet) G. Moreno, Vizzini, Consiglio & P. Alvarado

A distinctive species recently transferred to the new genus *Clitopaxillus* G. Moreno et al. (Alvarado et al. 2018a), appearing gregariously in both Calabrian and black pine ecosystems sometimes forming fairy rings: e.g., Trimíklini, 1-XII-2007, 9-XII-2011, ca 650 m asl; Moniátis, 13-XII-2007, 800 m asl; Méssa Potamós, 18-XII-2007, ca 800 m asl; Kélefos, 28-XI-2009, ca 500 m asl; Platánia, 26-XII-2009, ca 1100 m asl; Péra Pedí, 14-I-2017, ca 550 m asl. Also reported by Viney (2005) from Áyios Amvrósios, Dec. 1998, and Loizides et al. (2011) from collections cited above.

**\**Clitopilus daamsii*** Noordel.

One collection fruiting on a fallen *P. brutia* log in Amíantos, 6-I-2014, ca 1100 m asl, matching the description of this rarely reported taxon. This species is morphologically close to *C. hobsoni* (Berk.) P.D. Orton, from which it differs by larger spores, reported as  $(7-8-11.5(-12.5) \times 4.8-6.6(-7) \mu\text{m}$  in the type collection (Noordeloos 1984), and measuring  $(7.5-8-10.5(-11.5) \times (4-4.5-6(-7) \mu\text{m}$  in the Cypriot specimens.

***Clitopilus geminus*** (Paulet) Noordel. & Co-David *sensu lato*

This widely reported taxon was previously placed in *Rhodocybe* Maire, but transferred to genus *Clitopilus* (Fr. ex Rabenh.) P. Kumm., based on phylogenetic inferences (Co-David et al. 2009). Reported in Cyprus by Viney (2005) as “*Rhodocybe gemina*”, from pine woods in Panagra, Dec. 2001, and later confirmed by the author from Calabrian pine woods in Platánia, 20-XI-2008 & 25-XI-2009, ca 1100 m asl, and Akámas, 14-XII-2014, 200 m asl. A couple of variants seem to occur in Cyprus, whose exact phylogenetic and taxonomic status are not yet clear. Collections from *Cistus* matorral are generally smaller, mild scented and feature white mycelial threads, matching the concept of *C. geminus* var. *subvermicularis* (Maire) Noordel. & Co-David, originally described from Mauretania (Maire 1924).

***Conocybe albipes*** Hauskn.

Perhaps better known as “*C. apala* (Fr.) Arnolds”, with one collection from Pissouri, 25-I-2009, ca 200 m asl, among manured grass, in a *P. brutia* forest opening. First reported by Viney (2005) as “*Bolbitius tener*”, fruiting in manure-rich grass in Kalni Dec. 1998.

**\**Conocybe semiglobata*** Kühner & Watling

One collection from Calabrian pine woods in Péra Pedí, 2-III-2014, ca 550 m asl. Distribution unclear.

**\**Coprinellus disseminatus*** (Pers.) J.E. Lange

A handful of records from mixed forests in Plátres, 20-X-2007, ca 900 m asl; Moniátis, 20-XII-2010 & 14-X-2012, ca 800 m asl; and Platánia, 25-XI-2013, ca 1100 m asl. Uncommon.

***Coprinellus domesticus*** (Bolton) Vilgalys, Hopple & Jacq. Johnson

Just a couple of collections, one from a burned *P. brutia* forest near Koúrdali, 15-III-2017, ca 800 m asl. Previously reported by Viney (2005) from Karmi, Nov. 1997, and Loizides et al. (2011). Apparently rare.

***Coprinopsis cortinata*** (J.E. Lange) Gminder

Two collections, one among *P. brutia/Cistus* litter in Kelláki, 15-III-2012, ca 650 m asl. Also seen in *Cistus* debris (Loizides 2016). Apparently rare, but can be easily overlooked.

***Coprinus comatus*** (O.F. Müll.) Pers.

Only sporadically seen in Cyprus, mostly in high elevation *P. nigra* subsp. *pallasiana* forest clearings and along forest paths, with a couple of sightings of from a *P. brutia*, *Platanus orientalis* L. and *Q. infectoria* subsp. *veneris* forest in Plátres, 20-X-2007 and 17-X-2008, ca 900 m asl. Also reported by Viney (2005), and Loizides et al. (2011).

***Coprinus ovatus*** (Schaeff.) Fr.

Sparingly seen in late winter and spring, with one record from a mixed forest clearing at Platánia, 27-V-2018, ca 1100 m asl. Also reported by Viney (2005) at Mándres, Feb. 2001. Uncommon.

***Coprinus spadiceusporus*** Bogart

Occasionally encountered in and out of forests, with a couple of collections from open *P. brutia* forests in Pissouri, 30-I-2011, ca 200 m asl; and Souíni, 26-III-2012, ca 400 m asl. Also reported by Loizides et al. (2011) from thermo-Mediterranean matorral at Konia, 12-XII-2009.

**\**Cortinarius anthracinus*** Fr.

One collection from Mávro Dásos, 5-XII-2012, ca 1100 m asl. Distribution not yet understood.

**\**Cortinarius decipiens*** (Pers.) Fr.

One collection from Mávro Dásos, 1-XII-2012, ca 1100 m asl, matching the description of *C. atrocoeruleus* M.M. Moser ex M.M. Moser (1967). However, in a revision of sections *Hydrocybe* and *Fraternii*, sequenced collections identified as “*C. atrocoeruleus*”, including the type collection, nested in the same clade as *C. decipiens* (Pers.) Fr. (Suárez-Santiago et al. 2009). Until the situation is further clarified, the latter binomial is here tentatively adopted as a priority synonym of the former.

***Crinipellis scabella*** (Alb. & Schwein.) Murrill

A couple of collections on fallen twigs and herbal residue, one in a mossy *P. brutia* forest in Kélefos, 31-XII-2008, ca 500 m asl. Also reported by Viney (2005) from Geunelyi, Nov. 1997. Rare.

***Cuphophyllus virgineus*** (Wulfen) Kovalenko

Reported by Viney (2005) from pine forests in Áyios Amvrósios, without date.

**\**Cystoderma carcharias*** (Pers.) Fayod

Frequently encountered in Calabrian and black pine forests with collections from Kannaviou, 15.XII-2009, ca 800 m asl; Mávro Dáso 1-XII-2012, ca 1100 m asl; Plátres 1-XII-2017, ca 1200 m asl.

**\**Cystoderma fallax*** A.H. Sm. & Singer

Numerous sightings in both Calabrian and black pine forests, e.g., Plátres, 23-XII-2009, 26-XII-2009 & 19-I-2015, ca 1400 m asl; Platánia, 7-XII-2009, 9-XII-2012 & 2-I-2015, ca 1100 m asl; Mésa Potamós, 2-XII-2017, ca 750 m asl; Karvounás, 3-XI-2015 & 14-XI-2018, ca 1300 m asl. Collections from Haléfka (Jan. 1998) reported by Viney (2005) as “*Cystoderma amianthinum*”, probably also belong to this widespread species.

***Cystodermella cinnabarina*** (Alb. & Schwein.) Harmaja

A couple of collections from Platánia, 2-XII-2008 & 9-XII-2009, ca 1100 m asl. Also reported by Viney (2005), as “*Cystoderma terreyi*”, from Haléfka and Syrianóchori, Dec. 1998. Occasional or uncommon.

**\**Cystodermella granulosa*** (Batsch) Harmaja

Occasionally seen Calabrian pine forests, e.g., Moniátis, 13-XII-2007, ca 700 m asl; Péra Pedí, 26-XII-2007, 6-I-2011 & 10-I-2017, ca 550 m asl; Plátres, 1-XII-2017, ca 1200 m asl.

***Cystolepiota cystophora*** (Malençon) Bon

One collection from a mossy Calabrian pine forest at Platánia, 27-XI-2009, ca 1100 m asl. Also reported by Viney (2005) from Haléfka, Jan. 1999. Distribution not yet understood.

**\**Cystolepiota seminuda*** (Lasch) Bon

Just one collection from Platánia, 27-XI-2009, ca 1100 m asl. Apparently rare.

**\**Entoloma atromadidum*** A.M. Ainsw. & B. Douglas

Two collections from a mixed *P. brutia*/*Q. alnifolia* forest at Kannaviou, 13-XII-2009 & 15-XII-2009, ca 800 m asl, previously reported as “*E. bloxamii* (Berk. & Broome) Sacc.” (Loizides 2011). Cypriot collections are more likely to represent the recently described *E. atromadidum* (Ainsworth et al. 2018), which produces darker basidiomes with somewhat smaller spores than the epitype of *E. bloxamii* as reported in Morgado et al. (2013). Rare.

***Entoloma cinereo-opacum*** (Noordel.) Vila, Català & Noordel.s

Sparingly encountered in mossy forest clearings and matorral, such as Moniátis, 9-XII-2007, ca 800 m asl; and Kélefos, 9-XII-2015, ca 500 m asl. Cypriot collections were previously reported as “*E. sericeum* var. *cinereo-opacum* Noordel.” in Loizides (2016). However, as shown by Vila et al. (2013), collections previously ascribed to this variant are phylogenetically distinct and have since been elevated to species rank.

**\**Entoloma fuscohebes*** Vila, J. Carbó & F. Caball.

One collection matching the description of this seldomly reported species from Kélefos, 23-XII-2011, ca 500 m asl. Distribution not yet understood.

***Entoloma hirtipes*** (Schumach.) M.M. Moser *sensu lato*

A couple of collections keying out as this highly variable taxon, likely to represent a species-complex: Lysós, 18-I-2009, ca 600 m a.s.l.; Kélefos, 8-II-2011, ca 500 m asl. Collections from the pine woods of Haléfka were also reported by Viney (2005) as “*Entoloma* aff. *hirtipes*”, without dates.

**\**Entoloma incanum*** (Fr.) Hesler

Two collections from Plátres, 16-X-2012, ca 1250 m asl; and Platánia, 19-VI-2018, ca 1100 m asl. Rare.

***Entoloma jubatum*** (Fr.) P. Karst.

Reported by Viney (2005) from pine woods near Halefka, Jan. 1998, but not verified by the author.

**\**Entoloma mougeotii*** (Fr.) Hesler

Two collections matching the description of this taxon, one from a mixed *P. brutia*/*P. orientalis*/*Q. infectoria* subsp. *veneris* forest in Plátres, 21-XII-2012, ca 900 m asl. Rare.

**\**Entoloma pleopodium*** (Bull.) Noordel.

Three collections of this scented species, two of them from mixed Calabrian pine forests in Plátres, 18-IV-2011 & 1-V-2017, ca 900 m asl. Rare.

**\**Entoloma rusticoides*** (Gillet) Noordel.

One collection in Pissouri, 25-I-2009, ca 200 m asl, matching the description of this taxon. Distribution unclear.

***Faerberia carbonaria*** (Alb. & Schwein.) Pouzar

Reported by Viney (2005) near Áyios Ilarion, Dec. 2000, but not seen during this 12-y inventory.

**\**Galerina badipes*** (Pers.) Kühner

One identified collection from Platánia, 30-XII-2011, ca 1100 m asl. Perhaps widespread but overlooked, as large numbers of similar-looking *Galerina* Earle species occur in Cyprus late in the season.

***Galerina marginata*** (Batsch) Kühner

This deadly poisonous fungus inhabits decomposing logs of *P. brutia* in the thermo- and supra-Mediterranean belts, but sometimes also found among wooden debris on the ground: Plátres, 24-XI-2008, 6-XI-2011 & 10-XI-2012, ca 800 m asl; Kélefos, 2-XI-2009, ca 500 m asl; Platánia, 10-I-2014 & 2-I-2015, ca 1150 asl; Plátres, 15-XII-2018, 1300 m asl. Also reported by Loizides et al. (2011), and by Viney (2005) north of Haléfka, Jan. 2002. Occasional.

***Galerina vittiformis*** (Fr.) Singer

Reported by Viney (2005) as “*G. vittaeformis*”, under pine and *Cistus*, Dec. 1999, without locality. Yet to be verified.

**\**Gamundia leucophylla*** (Gillet) H.E. Bigelow

A couple of collections from *P. brutia* stands in Kelláki, 25-I-2011, ca 600 m asl; and Politikó, 9-I-2012, ca 400 m asl. Distribution not yet understood.

***Geastrum berkeleyi*** Masee

Reported by Viney (2005) among pine litter at Sirianochóri, Dec. 2001, and by Loizides (2012) from Prastió, 5-III-2011, ca 550 m asl; and Péra Pedí, 25-III-2011, ca 530 m asl. Probably uncommon.

***Geastrum campestre*** Morgan

Known from a handful of collections under *Cistus* (Loizides 2012 & 2016), and two collections under *P. brutia* from Platánia, 3-XII-2009 & 16-XI-2014, ca 1100 m asl. Occasional.

***Geastrum fimbriatum*** Fr.

Frequently seen in mixed forests, such as Platánia, 22-XII-2007, 7-XII-2009 & 20-XI-2011, ca 1100 m asl; or Plátres, 18-XII-2010, ca 1250 asl. Also reported by Viney (2005) under pines between Áyios Amvrósios and Sirianochóri, without date, and by Loizides (2012) from collections cited above. Widespread.

***Geastrum elegans*** Vittad.

Sparingly encountered in *Cistus* matorral (Loizides 2012 & 2016) and open *P. brutia* forests, such as Kélefos, 21-I-2010 & 8-I-2011, ca 500 m asl.

**\**Geastrum michelianum*** (Sacc.) W.G. Sm.

Previously reported as “*G. triplex*” by Viney (2005), from pine woods north of Haléfka, Jan. 1999; and by Loizides (2012) from *P. brutia* woods in Trimiklini, 24-III-2009, ca 650 m asl; and Prastió, 25-II-2011, ca 600 m asl. Genetic studies revealed that “collared” collections previously identified as “*G. triplex*” constitute a species complex, with European collections corresponding to *G. michelianum* instead (Kasuya et al. 2012; Zamora et al. 2014). Uncommon.

**\**Gymnopus androsaceus*** (L.) Della Magg. & Trassin.

Sparingly seen in black- and Calabrian pine forests, with a couple collections from Moniátis, 23-XI-2007, in riparian *P. brutia*, *A. orientalis*, *P. orientalis* and *Q. alnifolia* forest, ca 900 m asl; and Episkopi, 26-I-2018, in an open *P. brutia*/*C. sempervirens*/*J. phoenicea* forest, ca 150 m asl. Might be widespread but overlooked.

***Gymnopus brassicolens*** (Romagn.) Antonín & Noordel.

A number of morphologically diverse collections from various habitats currently key out as this taxon, including collections from mixed Calabrian pine forests in Saittás, 9-XII-2007 & 6-I-2017, ca 600 m asl; Stavros tis Psókas, 25-X-2008, ca 1200 m asl; and Kakomállis, 2-XI-2009, ca 900 m asl. Also reported by Viney (2005), as “*Micromphale brassicolens*”, from the pine woods of Haléfka, Nov. 2000. More than one species might be involved, but available sequences of this widely reported taxon are surprisingly scant in public databases.

***Gymnopus dryophilus*** (Bull.) Murrill

A common and widespread species, with collections e.g., from Trimiklini 9-XII-2007, ca 650 m asl; Saittas 1-X-2009, 30-XII-2010 & 29-IX-2011; Kakomállis 31-X-2009, ca 800 m asl; Pera Pedí 10-I-2017, ca 550 m asl. Reported by Viney (2005), as “*Collybia dryophila*”, without date and locality.

**\**Gymnopus hybridus*** (Kühner & Romagn.) Antonín & Noordel.

Not often reported in literature but frequently seen in Cyprus, mostly in mixed *P. brutia*/*Q. alnifolia* forests in Plátres, 10-XII-2009 & 11-XII-2012, ca 1200 m asl; Cedar Valley, 27-XII-2010 & 22-XI-2011, ca 1200 m asl; or Platánia, 20-XI-2011 & 16-XI-2014, ca 1100 m asl.

***Hebeloma crustuliniforme*** (Bull.) Quéf.

One of several *Hebeloma* (Fr.) P. Kumm. species occurring on the island, frequently encountered in all kinds of forests, e.g., Mávro Dásos, 1-XII-2012, ca 1200 m asl. See Beker et al. (2016) for sequenced collections.

***Hebeloma cylindrosporum*** Romagn.

Known from just one collection from Platánia 3-XII-2012, ca 1100 asl (Beker et al. 2016). Rare.

***Hebeloma sinapizans*** (Paulet) Gillet

Perhaps the most widespread *Hebeloma* species on the island, seen in large numbers in *P. nigra* subsp. *pallasiana* forests, but also in mixed *P. brutia*/*Q. alnifolia* forests: e.g., Kyperóunda, 3-XII-2012, ca 1200 m asl; Platánia, 9-XII-2012, 1100 m asl; Mávro Dásos, 20-XI-2015, ca 1200 m asl (for further collection details and a full description see Beker et al. 2016).

***Hebeloma subtortum*** P. Karst.

Perhaps better known as “*H. sordidum* Maire”, this ecologically versatile fungus was reported by Beker et al. (2016) and further collected by the author in mixed *P. brutia* forests in Platánia, 25-XI-2013, ca 1100 m asl; and Plátres, 3-XII-2017, ca 1200 m asl. Occasional.

**\**Hemimycena lactea*** (Pers.) Singer

Few collections, e.g., Platánia, 25-XI-2009 & 20-XI-2011, ca 1100 m asl; Amíantos, 2-X-2009, ca 1300 m asl. Probably widespread but overlooked.

**\**Hemimycena pseudogracilis*** (Kühner & Maire) Singer

Two collections from Kélefos, 8-I-2011, ca 450 m asl; and Platánia, 25-X-2012, ca 1100 m asl key out as this poorly known and variously interpreted taxon, although neither the macro- nor micromorphological features are a perfect fit. Cypriot collections might represent an undescribed Mediterranean lookalike.

***Hydnellum dianthifolium*** Loizides, Arnolds & P.-A. Moreau

A new collection and locality of this very rare species, seen in Kélefos, 5-III-2019, ca 500 m asl, leg. C. Hobart. Previously known only from three collections in Cyprus and one collection in southern Italy (Puglia). See Loizides et al. (2016) for a detailed description and previous collections' details.

***Hydnellum ferrugineum*** (Fr.) P. Karst. *sensu lato*

Common in *P. nigra* subsp. *pallasiana* forests in years with early rainfall, but sometimes also seen in mixed *P. brutia/Q. alnifolia* forests, e.g., Karvounás, 13-X-2011, ca 1300 m asl; and once documented in a *P. brutia/Q. coccifera* subsp. *calliprinos* forest in Kélefos, 2-XI-2012, ca 500 m asl (Loizides 2011). Multiple phylogenetic lineages are currently identified as this taxon in public databases (Loizides et al. 2016; Larsson et al. 2019), which are currently the object of a dedicated study (Loizides et al. in prep.).

**\**Hygrocybe calciphila*** Arnolds

One collection from a mossy *P. brutia* forest clearing at Kélefos, 23-XII-2012, ca 450 m asl. A rare species, proposed for conservation in the Global Fungal Red List Initiative.

***Hygrocybe conica*** (Schaeff.) P. Kumm. *sensu lato*

This widely applied binomial currently lumps multiple phylopecies yet to be taxonomically resolved. Several species of this complex are apparently present in Cyprus, one of them regularly occurring in black- and Calabrian pine forests e.g., in Platánia, 2-XII-2008 & 23-XII-2018, ca 1150 m asl; or Madarí, 30-XI-2015, ca 1000 m asl.

**\**Hygrocybe konradii*** R. Haller Aar.

One collection matching the concept of this species from a mixed forest in Kannavióú, 13-XII-2009, ca 900 m asl.

**\**Hygrophorocybe nivea*** (Velen.) Vizzini & Contu

A couple of collections from *P. brutia/Q. alnifolia* forests at Platánia, 27-XI-2009 & 16-XI-2012, ca 1100 m asl. The monotypic genus *Hygrophorocybe* Vizzini & Contu was proposed to accommodate *Clitocybe nivea* Velen. (Vizzini 2014), a striking species with ellipsoid to sublacriform spores and hygrophoroid basidia. Spores measure 8–10 × 4.5–5.5 µm in the Cypriot collections. Rare, known only from one locality.

***Hygrophorus meridionalis*** Loizides, P.-A. Moreau, Athanassiou & Athanasiades

Numerous sightings of this common Mediterranean species, described as new to science in 2018. See Moreau et al. (2018) for a detailed description and extensive collection details.

***Infundibulicybe costata*** (Kühner & Romagn.) Harmaj

A couple of collections from Calabrian pine forests in Kélefos, 31-XII-2008 & 29-XI-2014, ca 500 m asl. Previously reported by Viney (2005), as “*Clitocybe costata*”, under pines between Haléfka and Syriánóchori, Dec. 2000; and by Loizides et al. (2011, also as “*C. costata*”) from collections cited above. Uncommon.

***Infundibulicybe geotropa*** (Bull.) Harmaja

Occasionally appearing late in the autumn and winter in wet riparian forests and mixed forest clearings, with few collections from Plátres, e.g., 9-XII-2007 & 21-XI-2012, ca 900 m asl; and Platánia, 20-XI-2007, 3-XII-2009 & 30-XII-2011, ca 1100 m asl. *Infundibulicybe gigas* (Harmaja) Harmaja, a taxon described from Finland (as “*Clitocybe gigas*”, Harmaja 1978), is reported to have a deeply infundibuliform pileus, denser lamellae, a squat stipe and ±lacrymoid spores, and does not appear to occur in Cyprus. The phylogenetic and taxonomic status of *Clitocybe maxima* (P. Gaertn., G. Mey. & Scherb.) P. Kumm., sometimes considered a synonym of either *I. geotropa* or *I. gibba*, is as yet unclear.

**\**Infundibulicybe mediterranea*** Vizzini, Contu & Musumeci

A widespread species commonly seen in high-altitude *P. nigra* subsp. *pallasiana* forests, but frequently also in meso- and supra-Mediterranean *P. brutia* forests, e.g., Stavros tis Psókas, 25-X-2008, ca 1200 m asl; Platánia, 30-XII-2011, ca 1100 m asl; Cedar Valley, 29-XI-2017, ca 1100 m asl; and Plátres, 30-XII-2017, ca 1200 m.

**\**Infundibulicybe meridionalis*** (Bon) Pérez-De-Greg.

Frequently encountered in Calabrian pine forests, such as Plátres, 21-XI-2007, ca 1200 m asl; Moniátis, 28-XI-2008 &

26-I-2009, ca 900 m asl; Mávro Dásos, 5-XII-2012, ca 1000 m asl; Péra Pedí, 14-I-2017, ca 600 m asl. Very similar to *I. squamulosa* but with considerably larger spores, measuring  $7\text{--}9 \times 4.5\text{--}6 \mu\text{m}$  in the Cypriot collections.

**\**Infundibulicybe squamulosa*** (Pers.) Harmaja

A handful of collections from Platánia, 30-XII-2011 & 6-I-2014, ca 1100 m asl; Pýrgos Tyllirias, 10-I-2011, ca 350 m asl; and Plátres, 19-XI-2011 & 1-XII-2017, ca 1250 m asl. Distribution not quite clear, as a number of morphologically very similar species co-occur on the island, difficult to distinguish in the field.

***Inocybe flocculosa*** Sacc. *sensu lato*

A number of collections from diverse habitats match descriptions of this taxon, currently encompassing multiple phylopecies: e.g., Péra Pedí, 29-XI-2011, ca 450 m asl; and Plátres, 21-XI-2012, ca 900 m asl. Previously reported by Viney (2005), Loizides & Kyriakou (2011), Loizides et al. (2011), and Loizides (2016). It is unclear whether a collection reported by Viney (2005) as "*I. flocculosa* var. *crocifolia*" corresponds to the same taxon or not.

**\**Inocybe fuscidula*** Velen.

One tentatively identified collection from a mossy bank in a *P. brutia* forest in Péra Pedí, 18-III-2011, ca 600 m asl. Distribution unclear.

***Inocybe geophylla*** (Bull.) P. Kumm. *sensu lato*

This widely applied binomial is polyphyletic and yet to be taxonomically resolved (Ryberg et al. 2008). More than one species of this complex are present in Cyprus, with collections from, e.g. Calabrian pine forests in Moniátis, 25-XI-2009, ca 900 m asl; Platánia, 27-XI-2009, ca 1100 m asl; or Kélefos, 2-XI-2009, 29-XI-2009 & 9-XII-2014, ca 450–500 m asl. A lilac counterpart also occurs on the island, previously reported as "*I. geophylla* var. *lilacina* (Peck) Gillet" in Loizides et al. (2011), e.g., from Amiantos, 10-X-2009, ca 1300 m asl. The latter variant, however, was recently recombined as a distinct species following sequencing the holotype and appears to be restricted to the American continent (Matheny & Swenie 2018). Large-scale genetic studies are needed to ultimately clarify this difficult species-complex in Europe.

**\**Inocybe griseolilacina*** J.E. Lange

One collection from a *P. brutia/Q. coccifera* subsp. *calliprinos* forest in Kélefos, 19-XI-2009, ca 450 m asl.

***Inocybe griseovelata*** Kühner

Reported by Viney (2005) under pines near Mýrtou, Jan. 2000, but not so far confirmed by the author.

**\**Inocybe hirtella*** Bres.

Several collections of this bitter-almond scented species, equally frequent in Calabrian and black pine forests, such as Plátres, 23-XII-2009, ca 1300 m asl; Souíni, 28-VI-2010, ca 400 m asl; Pýrgos Tyllirias, 10-I-2011, ca 350 m asl; or Pissouri, 2-I-2012, ca 200 m asl. Widespread.

***Inocybe lacera*** (Fr.) P. Kumm. *sensu lato*

A couple of collections key out as this variously interpreted taxon, e.g., from Calabrian pine forests at Kélefos, 2-I-2009, ca 450 m asl. Also reported by Viney (2005) from pine woods west of Haléfka, Feb. 1998. Several forms and varieties have been described in literature, whose systematic position are not yet clarified.

**\**Inocybe langei*** R. Heim

Few late winter or early spring sightings in thermo-Mediterranean Calabrian pine forests, e.g., Prastió, 22-III-2011, ca 600 m asl; and Pissouri, 2-I-2012, ca 200 m asl. Occasional or locally frequent in some years.

**\**Inocybe muricellata*** Bres.

One collection found in a mixed *P. brutia/Q. coccifera* subsp. *calliprinos* forest in Kélefos, 23-XII-2012, ca 500 m asl. Likely rare.

**\**Inocybe obscura*** (Fr.) Quél. *sensu auct.*

One record on a mossy bank under *P. brutia* and *P. pinea* L. near Yiólou, ca 300 m asl. This collection fits the invalidly published taxon "*I. obscura* Gillet" *ss. auct.*, tentatively treated as a synonym of *I. cincinnata*. Taxonomy within this group of violet-stiped *Inocybes* is in need of phylogenetic revision. Distribution unclear.

***Inocybe obscurobadia*** (J. Favre) Grund & D.E. Stuntz

Reported by Viney (2005) from pine woods near Mýrtou, Jan. 2000, but basidiomes depicted in this photograph resemble rather *I. furfurea* Kühner, erroneously regarded as a synonym in the past. It is also unclear whether collections matching the description under *Cistus* (Loizides 2016), sometimes reported as "*I. tenuicystidiata* E. Horak & Stangl" (e.g., Esteve-Raventós et al. 2002), are conspecific or distinct from *I. obscurobadia* *ss. str.*, as nomenclature within this cluster has not yet been resolved.

**\**Inocybe phaeoleuca*** Kühner

One collection from a mossy *P. brutia/P. orientalis* forest in Plátres, 21-XI-2012, ca 900 m asl. Distribution unclear.

***Inocybe posterula*** (Britzelm.) Sacc.

Several collections from Calabrian and black pine forests, e.g., Saittás, 4-XII-2008, ca 700 m asl; Kélefos, 27-XII-2008, ca 450 m asl; and Platánia, 27-XII-2009 & 2-I-2015, ca 1100 m asl, previously reported in Loizides et al. (2011).

Widespread.

**\**Inocybe tarda*** Kühner

Three collections from mixed woodlands at Kélefos, 21-XI-2011, ca 450 m asl; Ayía Paraskeví, 23-XI-2011, ca 600 m asl; and Plátres, 21-XI-2012, ca 900 m asl, match the description of this species. It is unclear whether a collection labelled as “*Inocybe* aff. *nitidiuscula*” by Viney (2005) corresponds to the same species, since some authors (e.g., Kuyper 1986; Stangl 1999) consider the two taxa as synonymous, and others (e.g., Kühner R. 1955; Eyssatier & Roux 2011) as distinct.

**\**Inocybe tenebrosa*** Quéf.

Just two collections of this distinctive species, notable for its unusual banana odour, one from a *P. brutia* forest opening at Platánia, 27-XI-2009, ca 1100 m asl. Rare.

***Inocybe vulpinella*** Bruyl.

Occasionally seen in thermo-Mediterranean pine forests and matorral, such as Klirou, 5-II-2012, ca 400 m asl. Previously reported by Loizides (2016) from collections under *Cistus*.

***Inosperma bongardii*** (Weinm.) Matheny & Esteve-Rav.

Recently transferred from *Inocybe* (Fr.) Fr. to genus *Inosperma* (Kühner) Matheny & Esteve-Rav., based on multigene phylogenies (Matheny et al. 2020). One collection from Archimandrita, 2-VI-2011, ca 450 m asl, leg. T. Alexandridis, previously reported as “*Inocybe bongardii*” in Loizides et al. (2011). A collection from pine forests in Haléfka, Feb. 1999, was reported by Viney (2005) as “*Inocybe* aff. *bongardii*”. Rare.

**\**Inosperma cervicolor*** (Pers.) Matheny & Esteve-Rav.

A number of ecologically diverse collections currently key out as this species, originating from mixed *P. brutia/Q. alnifolia* forests in Plátres, 2-I-2010, 1200 m asl; a grassy *P. brutia/Ceratonia siliqua* forest opening in Pissouri, 30-I-2011, ca 200 m asl; as well as mixed *P. brutia/Q. coccifera* subsp. *calliprinos* forests in Kélefos, 8-II-2011, ca 550 m asl; and Prastió, 25-II-2011, ca 600 m asl. Distribution not yet understood.

***Lacrymaria lacrymabunda*** (Bull.) Pat.

The “weeping widow” is rarely seen in Cyprus, with one collection originating from a recently burned *P. brutia* forest in Pelendri, 11-III-2010, ca 800 m asl. Also reported by Viney (2005) as “*Psathyrella lacrymabunda*”, among pine litter in Karmi, Dec. 2000.

***Lactarius deliciosus*** (L.) Gray

One of the most widespread and commonly occurring fungi in Cyprus, frantically collected for the table by the locals and sold in markets throughout the country. Fruiting prolifically on serpentine and acidic substrates in high-altitude *P. nigra* subsp. *pallasiana* forests, but is also locally frequent in lower altitudes under *P. brutia*, e.g. in Moniáti, 13-XII-2007, ca 700 m asl; Millomeri, 13-XI-2008, ca 800 m asl; Méssa Potamós, 24-XII-2008, 17-IX-2009 & 20-XII-2009, ca 900 m asl; Amíantos, 3-X-2009, ca 1300 m asl; Plátres, 20-XI-2007, 23-XII-2009, 17-XII-2011, 17-XI-2012, 19-I-2015, 1-XII-2017 & 17-X-2018, ca 1200 m asl; Stavróis tis Psókas, 22-XI-2011, ca 1200 m asl; Mávro Dásos, 1-XII-2012, 28-XI-2015 & 3-XII-2015, ca 1200 m asl; Platánia, 1-XII-2009, 21-XII-2011 & 26-XII-2018, ca 1100 m asl; Karvounás, 14-XI-2018, ca 1300 m asl. First reported in Cyprus by Natrass (1937), and subsequently by Viney (2005), Loizides (2008), and Loizides et al. (2011).

***Lactarius sanguifluus*** (Paulet) Fr.

Mostly occurring in *P. nigra* subsp. *pallasiana* ecosystems in Cyprus, with only rare sightings in *P. brutia* forests, such as Platánia, 9-XII-2012, ca 1150 m asl; and Plátres, 17-XII-2012, ca 1200 m asl. Common in some years.

***Lactarius semisanguifluus*** R. Heim & Leclair

More widespread than *L. deliciosus*, growing prolifically in a variety of calcareous habitats in the thermo-, meso- and supra-Mediterranean belts, typically (but not exclusively) in the presence of *P. brutia*: e.g. Kélefos, 23-X-2007, 29-X-2007, 29-XI-2009, 9-II-2011, 2-XII-2014, 24-XI-2017 & 1-I-2019, ca 450 m asl; Péra Pedí, 20-XI-2007, 13-X-2008, 7-I-2016, 10-I-2017 & 19-I-2019, ca 600 m asl; Kakomállis, 29-X-2009, ca 700 m asl; Pareklisiá, 11-I-2011, ca 150 m asl; Mosfilotí, 23-I-2011, ca 250 m asl; Mávro Dásos, 1-XII-2012, ca 1100 m asl; Akámas, 14-XII-2014, ca 200 m asl; Akrotíri, 17-I-2015, ca 20 m asl. Very common.

**\**Lentinellus cystidiosus*** R.H. Petersen

Frequently seen on fallen *P. brutia* twigs and branches, such as Péra Pedí, 24-XII-2008, 7-XI-2009 & 10-I-2017, ca 550 m asl; Akámas, 14-I-2009, ca 200 m asl; Kakomállis, 2-XI-2009, ca 900 m asl.

**\**Lepiota alba*** (Bres.) Sacc.

Documented in Kélefos, 10-XI-2017, ca 500 m asl. It is as yet uncertain whether *L. erminea* (Fr.) P. Kumm., often segregated on the basis of a raphanoid odour and longer spores (e.g., Huijsman 1943), is a synonym of this taxon. Collections from high altitude *P. nigra* subsp. *pallasiana* forests in Troodos were previously reported under the latter binomial (Loizides et al. 2011) and appear to be morphologically distinct.

***Lepiota brunneoincarnata*** Chodat & C. Martín

This deadly poisonous species is not occasionally seen in Cyprus, with collections from various habitats (Loizides et

al. 2011) including *P. brutia* forests in Platánia, 27-XI-2008 & 7-XII-2009, ca 1100 m asl; and Kélefos, 29-X-2012, ca 500 m asl.

***Lepiota castanea*** Quél.

Also a deadly poisonous species, with few records from Calabrian pine woods in Moniátis, 13-XII-2007, ca 700 m asl; Plátres, 24-XI-2007, ca 900 m asl; Platánia, 20-XI-2008 & 27-XI-2008, ca 1100 m asl; and Mosfilotí, 23-I-2011, ca 250 m asl. Occasional.

***Lepiota clypeolaria*** (Bull.) P. Kumm. *sensu lato*

Few collections match this frequently reported taxon, which presently occupies more than one clade in phylogenetic analyses (Caballero et al. 2015; Vizzini et al. 2019). Found in a variety of habitats in Cyprus, mostly mixed Calabrian pine forests in Platánia, 3-XII-2009 & 16-XI-2014, ca 1100 m asl; and Karvounás, 16-X-2011, ca 1200 m asl. A collection north of Haléfka, Jan. 2002, was also reported as "*Lepiota* aff. *clypeolaria*" by Viney (2005).

***Lepiota cristata*** (Bolton) P. Kumm.

Sparingly appearing in black- and Calabrian pine forests, including a collection from Platánia, 27-XI-2008, ca 1100 m asl. Quite rare.

***Lepiota echinella*** Quél. & G.E. Bernard

A couple of collections from Calabrian pine woods in Ayía Paraskeví, 11-XI-2009, ca 550 m asl; and Péra Vása, 7-XI-2012, ca 700 m asl. Also seen once in black pine forests, but generally uncommon or rare.

**\**Lepiota forquignoni*** Quél.

Known only from one collection at Mosfilotí, 23-I-2011, ca 250 m asl. Rare.

***Lepiota griseovirens*** Maire

Reported by Loizides et al. (2011) from two collections in different localities at Kélefos, both on 20-XI-2009 in *P. brutia*/*Platanus orientalis* L. forests, ca 450 m asl. Rare.

**\**Lepiota lepida*** Guinb. & M. Bodin

Two collections of this rarely reported species from Platánia, 1-XII-2009 & 3-X-2018, in mixed *P. brutia* forest opening, ca 1100 m asl. The spores of the Cypriot collections measure 6–7 × 3–4 µm.

**\**Lepiota pseudohelveola*** Kühner

A couple of collections match the concept of species from Kélefos, 28-XI-2009, in mixed *P. brutia*/*Q. coccifera* subsp. *calliprinos* forest, ca 500 m asl; and Péra Pedí, 14-I-2017, in *P. brutia* forest, ca 600 m asl. More than one species of this cluster are present in Cyprus, but it is yet unclear whether *L. pseudolilacea* is a synonym of this taxon.

***Lepiota pseudolilacea*** Huijsman

Seen in a grassy *P. brutia* forest clearing in Saittás, in 5-X-2008, 7-X-2009, 30-XII-2010, 29-IX-2011 and 16-X-2012. *Lepiota lilacea* Bres. also occurs in Cyprus and is very similar, but has smaller spores and is typically found outside of forests (Loizides et al. 2011).

***Lepiota subgracilis*** Kühner

Previously reported by Loizides et al. (2011) from a couple of collections in mixed *P. brutia*/*Q. coccifera* subsp. *calliprinos* forests in Kélefos, ca 500 m asl; and Péra Pedí, 28-XI-2009, ca 550 m asl. *Lepiota kuehneri* Huijsman ex Hora, *L. kuehneriana* Locq., *Lepiota latispora* (Kühner ex Wasser) Bon, and *L. wasseri* Bon are probably all synonyms of this taxon (Vellinga 2001). Infrequently seen.

***Lepiota subincarnata*** J.E. Lange

An occasionally encountered woodland dweller, with collections from Kélefos, 27-XI-2007, 29-XI-2009 & 8-I-2011, in a riparian *P. brutia*/*Platanus orientalis* forest, ca 450 m asl; Platánia, 5-XII-2009, in *P. brutia* forest, ca 1200 m asl; and Stavros tis Psókas, 20-XI-2017, 1100 m asl in mixed *P. brutia* forest. Deadly poisonous.

***Lepiota sublaevigata*** Bon & Boiffard

Occasionally seen in thermo-Mediterranean *P. brutia* forests and *Cistus* matorral, e.g., Péra Pedí, 7-XI-2009, ca 550 m asl; Kélefos, 10-XI-2017, ca 500 m asl.

***Lepista nuda*** (Bull.) Cooke *sensu lato*

A common and widespread woodland dweller found in various habitats in Cyprus, with numerous collections from *P. brutia* forests in Plátres, 21-XI-2007, 1-XII-2009, 24-XI-2012 & 3-XII-2018, ca 1100 m asl; Moniátis, 9-XII-2009, ca 900 m asl; Platánia, 20-XI-2008, 23-XI-2009, 27-XI-2009, 30-XII-2014, 20-XI-2015, 26-XII-2018, ca 1100 m asl; Stavros tis Psókas, 18-XI-2009, ca 1200 m asl; Saittás, 6-I-2017, ca 700 m asl. Also reported by Viney (2005) from pine woods around Kyrenia and Haléfka. See further notes under *L. sordida*.

**\**Lepista panaeolus*** (Fr.) P. Karst.

Just two collections of this rare species in Cyprus, both from grassy *P. brutia* forest openings in Akámas, 4-I-2011 & 14-XII-2014, ca 200 m asl.

***Lepista sordida*** (Schumach.) Singer *sensu lato*

Very common in a variety of habitats, especially grassy, low-elevation Calabrian pine wood openings: e.g., Pissouri,

12-II-2007, 30-I-2011 & 2-I-2012, ca 200 m asl; Saittás, 13-XII-2007, 700 m asl; Mosfilotí, 6-I-2009 & 23-I-2011, ca 250 asl; Péra Vása, 8-II-2015, ca 600 m asl. Multiple lineages identified as *L. nuda* and *L. sordida* seem to be present in phylogenetic trees, therefore these two widely applied binomials might further split in the future and taxonomic revisions are to be expected (Alvarado et al. 2015).

\****Leucoagaricus georginae*** (W.G. Sm.) Candusso

One collection from Platánia, 25-X-2012, in a mossy *P. brutia*/*C. sempervirens* forest clearing, ca 1100 m asl. Rare.

***Leucoagaricus melanotrichus*** (Malençon & Bertault) Trimbach

One collection from a *P. brutia* forest in Ayía Paraskeví, 11-XI-2009, ca 600 m asl. Also reported in Loizides (2016) from a collection under *Cistus* in a *P. brutia*/*C. brevifolia* forest at Tripilos, 18-XI-2009, ca 1100 m a.s.l. Rare.

***Leucopaxillus gentianeus*** (Quél.) Kotl.

Among the commonest fungi in Cyprus, occurring abundantly in a variety of habitats including mixed *P. brutia* forests in Platánia 3-XII-2009, 3-XII-2012 & 26-I-2018, ca 110 m asl; Plátres, 23-XII-2009, 7-XII-2012, 11-XII-2012, 17-XII-2012 & 1-XII-2017, ca 1200 m asl; Stavró tis Psókas, 18-XI-2009 & 22-XI-2011, ca 1200 m asl; or Mávro Dásos, 5-XII-2012, ca 1000 m asl.

***Leucopaxillus malenconii*** Bon

Two collections fit the description of this Mediterranean species previously reported in Loizides et al. (2011): one from a riparian *P. orientalis*, *Alnus orientalis* and *P. brutia* forest in Moniátis, 9-XII-2007, ca 850 m asl; and one from a *P. brutia* forest in Platánia, 5-XII-2009, ca 1200 m asl. Rare.

***Limacella illinita*** (Fr.) Maire

Few sightings in Plátres 15-XI-2007 & 25-XI-2009, ca 1150 m asl; Trimiklini, 20-XII-2008, ca 650 m asl; Saittás, 10-I-2017, ca 700 m asl, all in *P. brutia* forests, with some collections corresponding to “f. ochracea” characterized by ochraceous tinges on the pileus. Also reported by Viney (2005) from pine woods near Áyios Ilaríon, Dec. 2000.

***Limacella subfurnacea*** Contu *sensu auct.*

Occasionally seen in and out of forests, with one collection from a *P. brutia* forest edge in Finikária, 20-I-2011, ca 200 m asl. Previously reported by Viney (2005) from pine woods in Haléfka (Dec. 1998), and Ayía Iríni (Dec. 2000). *Limacella grisea* Singer (1989) might be an earlier name for this species.

***Lycoperdon atropurpureum*** Vittad.

One collection in a mossy *P. brutia* forest in Kélefos, 31-X-2012, ca 500 m asl. Also reported from Áyios Mámas, 10-III-2012, ca 500 m asl, among *Cistus* litter in a *P. brutia* forest clearing (Loizides 2016). Distribution unclear.

***Lycoperdon excipuliforme*** (Scop.) Pers.

One collection from an open *P. brutia* forest in Pareklisiá, 14-II-2009, ca 200 m asl. Probably rare.

\****Lycoperdon lividum*** Pers.

Occasionally encountered, such as in open *P. brutia* forests at Kélefos, 10-XI-2017, ca 500 m asl.

***Lycoperdon molle*** Pers.

A couple of collections from *P. brutia* forests in Saittás, 30-XII-2010 & 28-X-2011, ca 700 m asl. Distribution not quite understood, since its distinction from *L. umbrinum*, *L. subumbrinum* and *L. umbrinoides* is not straight forward.

***Lycoperdon perlatum*** Pers.

Frequently encountered in black- and Calabrian pine forests, e.g., Saittás, 13-XII-2007, ca 700 m asl; Plátres, 27-X-2008, ca 1200 m asl; Trimiklini, 9-XII-2008, ca 650 m asl; Kélefos, 29-XI-2014 & 24-XI-2017, ca 500 m asl. Also reported by Viney (2005), without date, from the pine woods of Haléfka; by Loizides et al. (2011) from collections cited above; and by Loizides (2016) from *Cistus matorral* in Kalavasyós.

***Lycoperdon pratense*** Pers.

Previously reported by Viney (2005) as “*Vascellum pratense*”, this puffball is usually found in fields or woodland edges. A couple of sightings from *P. brutia* forest clearings in Prastió, 5-III-2011, ca 550 m asl; and Akámas, 18-XII-2014, ca 200 m asl.

\****Lycoperdon umbrinum*** Pers.

A couple of collections from a mixed *P. brutia*/*Q. coccifera* subsp. *calliprinos* forest in Kelefos, 2-XI-2012, ca 500 m asl; and a *P. brutia* forest in Prastio 6-III-2012, ca 550 m asl. Distribution not yet understood.

***Lyophyllum fumosum*** (Pers.) P.D. Orton

A morphologically variable and ecologically versatile species found in diverse ecosystems in Cyprus, including *P. brutia* forests in, e.g., Saittás, 25-XI-2007, 1-XII-2011 & 12-XII-2011, ca 700 m asl; Amiantos, 10-X-2009, ca 1300 m asl; and Plátres, 20-XII-2009 & 11-XII-2012, ca 1200–1300 m asl. Previously reported by Loizides et al. (2011) from collections cited above, and Loizides (2016) from *Cistus matorral*. *Lyophyllum cistophilum* Vila & Llimona, *L. phaeophyllum* Vila & Llimona, and *L. subglobisporum* Consiglio & Contu, might be synonyms of this taxon. Collections previously reported by Viney (2005) as “*Lyophyllum decastes* (Fr.) Singer”, probably also correspond to this widespread species.

**\**Lyophyllum loricatum*** (Fr.) Kühner

Just three collections all late in the season, two of them from mixed *P. brutia*/*P. orientalis* forests at Platánia, 25-XI-2013 & 26-XII-2018, ca 1100 m asl. Apparently rare.

**\**Macrocystidia cucumis*** (Pers.) Joss.

The “cucumber cap” is sparingly seen in black- and Calabrian pine forests: Platánia, 9-XII-2009, ca 1100 m asl; Ayía Paraskeví, 18-II-2011, ca 550 m asl; Akámas, 15-I-2016, ca 200 m asl; Plátres, 1-XII-2017, ca 1200 m asl.

***Macrolepiota excoriata*** (Schaeff.) Wasser

Frequently encountered in thermo-Mediterranean Calabrian pine wood edges and grassy wood openings, e.g., in Kélefos, 3-XII-2008, ca 500 m asl; Akámas, 14-I-2009, 200 m asl; Kalavastos, 14-II-2011, ca 180 m asl; Péra Pedí, 10-I-2017, ca 600 m asl (Loizides et al. 2011).

**\**Macrolepiota mastoidea*** (Fr.) Singer

So far only seen in Calabrian pine forests of the Akámas Peninsula where it appears in large numbers locally, e.g., 28-XI-2009, ca 200 m asl. Rare or altogether absent elsewhere on the island.

**\**Macrolepiota procera* f. *permixta*** (Barla) Vizzini & Contu

Just one collection from a *P. brutia* forest opening in Karvounás, 20-XI-2015, ca 1200 m asl. This form, characterised by the vinaceous-red bruising of basidiomes, was previously regarded as a distinct species (Pacioni 1979; Breitenbach & Kränzlin 1991; Vellinga EC. 2001). However, as shown by Vizzini et al. (2011), this character has no phylogenetic basis and collections identified as this species (including the epitype collection), nest in the *M. procera* (Scop.) Singer clade. Evidently very rare in Cyprus, not a species to go unnoticed.

**\**Macrolepiota subsquarrosa*** (Locq.) Bon

Several collections match the description of this species, e.g., from *P. brutia* forests in Plátres, 20-XI-2007 & 27-X-2012, ca 1000–1300 m asl; *P. brutia*/*Q. coccifera* subsp. *calliprinos* forests in Kélefos, 20-XI-2009 & 21-I-2015, ca 500 m asl; and *P. brutia* forests at Kykkos, 29-XI-2017, ca 1200 m asl. Perhaps widespread, but the phylogenetic identity of this taxon has not yet been fully clarified and is often difficult to distinguish from the similar *M. excoriata* and *M. mastoidea*.

***Mallocybe dulcamara*** (Pers.) Vizzini, Maggiora, Tolaini & Ercole. *sensu auct.*

A variously interpreted spring taxon whose taxonomic identity is yet to be fully resolved (Matheny et al. 2020). Reported by Viney (2005) from Karmi as “*Inocybe dulcamara*”, May 2000. Collections from a mixed *P. brutia*/*A. andrachne*/*Q. coccifera* subsp. *calliprinos* forest in Prastió, 22-III-2011, ca 550 m asl, match the description of this taxon, but the current combination might be invalid as per Art. 41(1) of ICN (Turland et al. 2018).

***Marasmius wynneae*** Berk. & Broome

Very common and widespread, found in various habitats and elevations including *P. brutia* forests in, e.g., Pissouri, 15-I-2008 & 2-I-2012, ca 200 m asl; or Pareklisiá, 14-II-2009 & 25-I-2011, ca 200 m asl. Also reported by Viney (2005) from Haléfka, Dec. 1998.

***Melanoleuca excissa*** (Fr.) Singer

Often seen in grassy areas at lower elevations, with at least one collection in a *P. brutia* wood opening in Péra Pedí, 1-III-2013, ca 550 asl. Previously reported by Viney (2005) from Panagra, Dec. 2004. Possibly widespread, but the morphological identification of *Melanoleuca* Pat. species is far too complicated to draw reliable conclusions.

**\**Melanoleuca iris*** Kühner

One collection from a grassy *P. brutia* forest in Pareklisiá, 18-II-2009, ca 200 m asl. Distribution unclear.

***Mycena amicta*** (Fr.) Quéf.

Commonly seen among pine litter, or on logs, pine cones and wooden debris, e.g., in Calabrian pine woods in Saittás, 29-X-2008, ca 700 m asl; Akámas, 4-I-2011, ca 200 m asl; or Moniátis, 12-XII-2011, ca 700 m asl. Also reported by Viney (2005) from Kyrenia, Jan. 2000.

***Mycena arcangeliana*** Bres.

Reported by Viney as “*M. oortiana*” (2005) and occasionally seen on fallen logs and tree stumps, e.g., in a mixed *Cedrus brevifolia*/*P. brutia*/*Q. alnifolia* forest in Cedar Valley, 27-XII-2010, ca 1100 m asl; or in mixed *P. brutia*/*Q. alnifolia*/*A. andrachne* forests in Platánia, 9-XII-2012, ca 1100 m asl.

**\**Mycena capillaripes*** Peck

Many sightings from mixed Calabrian pine forests, e.g., in Saittás, 24-XII-2010, ca 650 m asl; Akámas, 4-I-2011, ca 200 m asl; and Amíantos, 19-XI-2013, ca 1200 m asl. Common and widespread.

**\**Mycena clavicularis*** (Fr.) Gillet

Appearing in vast numbers in wet *P. brutia* forests during the autumn and winter months, such as: Moniátis, 22-XII-2010, ca 900 m asl; Kannavióu, 27-XII-2010, ca 900 m asl; Kelláki, 25-I-2011, ca 600 m asl; or Plátres, 11-XII-2012, 26-XI-2014 & 1-XII-2017, ca 1200 m asl. Very common and widespread.

\**Mycena epipterygia* (Scop.) Gray *sensu lato*

Several varieties of this fungus have been described in literature, whose phylogenetic and taxonomic status remain unclear. Few collections corresponding to some of these variants originate from *P. brutia* forests in Cyprus, such as Mésa Potamós, 20-XII-2007, 7-I-2009 & 17-XII-2009, ca 700 m asl; Platánia, 7-XII-2009, 9-XII-2009 & 30-XII-2011, ca 1100 m asl; and Plátres, 6-I-2017, ca 1200 m asl.

\**Mycena flavescens* Velen.

One collection in a mixed *P. brutia*/*Q. alnifolia*/*P. orientalis* forest in Platánia, 30-XII-2011, ca 1100m asl. Distribution unclear.

*Mycena galopus* (Pers.) P. Kumm.

Reported by Viney (2005), without dates or localities, and only sparingly seen by the author: Trimiklini, 30-XII-2007, in *P. brutia* forest, ca 650 m asl; Kélefos, 21-XI-2011, in a riparian *P. brutia*/*P. orientalis*/*A. orientalis* forest, ca 450 m asl. Distribution unclear, as several forms and varieties are described in literature.

\**Mycena haematopus* (Pers.) P. Kumm.

Rare, known only from two collections, one in a riparian *P. brutia*/*P. orientalis*/*A. orientalis* forest at Kélefos, 21-XI-2011, ca 450 m asl.

\**Mycena mirata* (Peck) Sacc.

One collection keying out as this species, albeit with larger spores than those mentioned in literature, measuring 11–15 × 5.5–7.5 µm in the Cypriot specimens. Found in a mixed *P. brutia*/*Q. alnifolia*/*A. andrachne* forest in Platánia, 21-XII-2011, ca 1100 m asl. Distribution unknown.

\**Mycena pseudopicta* (J.E. Lange) Kühner

One collection from Kélefos, 2-I-2009, in a mossy *P. brutia* forest, ca 550 m asl. Apparently rare.

*Mycena pura* (Pers.) P. Kumm. *sensu lato*

Numerous collections belonging to this species-cluster, shown by Harder et al. (2010, 2013) to encompass multiple phylopecies yet to be taxonomically resolved. More than one species of this complex are present in Cyprus, with numerous collections from Calabrian pine forests in Kélefos, 2-I-2009, 20-XI-2009, 25-XI-2009 & 28-XI-2009, ca 500 m asl; Platánia, 3-XII-2009, ca 1100 m asl; Karvounás, 21-X-2011, 1200 m asl; Kouka, 29-XI-2011, ca 600 m asl; Madarí, 3-XII-2012, ca 1300 m asl; Mésa Potamós, 10-I-2017, ca 800 m asl; Kannavióú, 29-XI-2017, ca 900 m asl. Also reported by Viney (2005) in Larnaka tis Lapithou, Dec. 1998.

\**Mycena renati* Quéf.

This striking species was only seen once on a *P. brutia* log at Stavrós tis Psókas, 18-XI-2009, ca 1200 m asl. Rare.

\**Mycena rosea* Gramberg

Occasionally seen in a variety of habitats: Plátres, 27-X-2008, in *P. brutia* forest, ca 1200 m asl; Péra Pedí, 28-X-2009, in *P. brutia*/*Q. coccifera* subsp. *calliprinos* forest, ca 550 m asl; Platánia, 21-XII-2011, in *P. brutia*/*Q. alnifolia* forest, ca 1100 m asl. Uncommon or rare.

*Mycena sanguinolenta* (Alb. & Schwein.) P. Kumm.

Few sightings, one among *P. brutia*/*Crataegus azarolus*/*Cistus* litter in Saittás, 24-XII-2010, ca 650 m asl. Previously reported by Viney (2005) from Haléfka, Dec. 2001. Probably widespread but often unnoticed due to its tiny size.

*Mycena seynii* Quéf.

One of the commonest basidiomycetes in Cyprus, fruiting throughout the island where fallen *P. brutia* cones are present. Hundreds of sightings, from Trimiklini, 29-XI-2007, 17-XII-2011 & 31-XII-2013, ca 650 m asl; to Saittás, 30-XI-2007, 24-XII-2011 & 30-XII-2013, ca 700 m asl; Kélefos, 2-I-2009, 2-XI-2009, 25-XI-2009, 8-I-2011 & 9-XII-2015, ca 550 m asl; Stavrós tis Psókas, 18-XI-2009, ca 1200 m asl; Moniátis, 20-XII-2010, ca 800 m asl; Pissouri, 2-I-2011, ca 200 m asl; Kelláki, 25-XI-2011, ca 600 m asl; Kannavióú, 28-XII-2016, ca 900 m asl; or Plátres, 1-XII-2017, ca 1200 m asl.

\**Mycena* cf. *stipata* Maas Geest. & Schwöbel

A couple of collections keying out as this species, both found on carbonized *P. brutia* logs and twigs in Asgata, 24-XII-2011 & 26-XII-2011, ca 200 m asl. Cypriot collections feature partially encrusted and considerably larger cystidia than those reported in literature, measuring 70–115 × 13–16 µm, while the spores measure (7–)8–11 × 4.5–5.5 µm. Either a highly variable taxon, or a Mediterranean counterpart to be clarified by future DNA sequencing.

\**Panaeolus acuminatus* (P. Kumm.) Quéf.

Sparingly encountered in and out of forests, with one collection originating from a grassy *P. brutia* forest clearing in Platánia, 21-XII-2011, ca 1100 m asl. Occasional.

\**Phaeoclavulina myceliosa* (Peck) Franchi & M. Marchetti

Few collections key out as this species, from a mixed riparian forest in Plátres, 23-IX-2008, 5-X-2009 & 10-XI-2012, ca 900 m asl; as well as calcareous Calabrian pine forests in Kélefos, 23-XII-2012, ca 500 m asl; and Péra Vása, 29-XII-2012, ca 700 m asl. Probably widespread, though presently unclear whether European collections identified as this

taxon are conspecific to the North American ones.

***Phallus impudicus* L.**

The notorious “stinkhorn” is only sparingly encountered in Cyprus with some sightings originating from Calabrian pine forests in Saittás, 20-XII-2009 & 12-XII-2011, ca 700 m asl; and Péra Vása, 9-XII-2012, ca 700 m asl.

***Pholiota gallica* Holec & M. Kolařík**

This species was previously known as “*P. lubrica* var. *obscura* Bon & Chevassut”, “*P. highlandensis* var. *citriosquamulosa* Maire ex Bidaud & Borgarino”, and occasionally misidentified as “*Pholiota brunnescens* A.H. Sm. & Hesler”, before it was recombined under its current name (Holec & Kolařík 2014). In Cyprus, it has already been reported in *Cistus* matorral in Asgata (Loizides 2016), but was also collected in *P. brutia* forests in Akámas, 23-II-2016, ca 200 m asl.

***Pholiota mixta* (Fr.) Kuyper & Tjall.-Beuk.**

Reported by Viney (2005) on buried conifer wood, beside the Buffavento dirt road, Jan. 2001. Not seen by the author.

***Pholiotina filaris* (Fr.) Singer**

Reported from Kaló Chorió by Viney (2005), but this may correspond to the recently described *P. mediterranea* Siquier & Salom (Siquier & Salom 2017).

**\**Pisolithus tinctorius* (Pers.) Coker & Couch**

A couple of sightings by a dirt road in Calabrian pine forests at Kélefos, 19-X-2008 & 4-XII-2016, ca 450–500 m asl; a grassy *P. brutia* forest clearing in Kato Plátres, 21-X-2008, ca 800 m asl; and a *P. brutia/Q. alnifolia* forest in Spília, 3-XII-2015, ca 1100 m asl. Less common than *P. arrhizus* (Scop.) Rauschert, the latter typically found outside of forests and lacking a well-defined stalk (Loizides et al. 2011). A couple of the images identified as “*P. arrhizus*” in Viney (2005) also seem to depict *P. tinctorius*. The two taxa were widely regarded as synonymous in the past, but in recent years have shown to be genetically distinct (e.g., Phosri et al. 2012).

***Psathyrella spadiceogrisea* (Schaeff.) Maire**

Reported by Viney (2005) east of Haléfka, Jan. 2001, in mixed tree litter.

**\**Psathyrella tephrophylla* (Romagn.) Bon**

A couple of collections match the description of this species, one of them from a grassy *P. brutia* forest opening in Kelláki, 25-I-2011, ca 600 m asl. Distribution unclear.

***Psilocybe crobula* (Fr.) Singer**

Rarely encountered in Cyprus, with just a handful of collections from *P. brutia* forests in Péra Pedí, 7-XI-2009, ca 550 m asl; Madarí, 28-XI-2015, ca 1300 m asl; and Kykkos, 29-XI-2017, ca 1200 m asl. Also reported in Áyios Ilaríon, Dec. 2000, on fallen pine bark (Viney 2005).

**\**Ramaria apiculata* (Fr.) Donk**

A couple of collections from mixed *P. brutia/Q. alnifolia/Cistus* forests in Ayía Paraskeví, 14-XI-2009, ca 600 m asl; and Amíantos, 23-X-2011, ca 1200 m asl. Distribution not yet understood.

**\**Ramaria rubella* (Schaeff.) R.H. Petersen**

One collection on a decorticated *P. brutia* log at Kélefos, 23-XII-2012, ca 500 m asl. A somewhat faded collection from Ayía Paraskeví, 28-III-2009, previously reported as “*Ramaria bataillei* (Maire) Corner” in Loizides et al. (2011), may also represent this taxon. Rare.

***Ramaria sanguinea* (Pers.) Quél.**

One collection of strongly rufescent basidiomes matching the description of this species, found in a mixed *P. brutia/Q. alnifolia* forest at Stavros tis Psókas, 25-X-2008, ca 1150 m asl (Loizides et al. 2011). Distribution unclear.

**\**Ramariopsis subtilis* (Pers.) R.H. Petersen**

Two collections from Kannaviou matching the descriptions of this taxon on 13-XII-2009 & 15-XII-2009, found in mixed Calabrian pine forests, 900 m asl. Rare.

***Rhizocybe vermicularis* (Fr.) Vizzini, P. Alvarado, G. Moreno & Consiglio**

Possibly the most widespread basidiomycete appearing in spring, fruiting in large numbers in Calabrian pine forests at, e.g. Trimiklini, 3-III-2008, 4-III-2009, 24-II-2010, 1-III-2010, 21-III-2011, 1-III-2013 & 28-II-2019, ca 600 m asl; Péra Pedí, 15-III-2008, 4-III-2009, 15-III-2009, 19-III-2009, 22-III-2009, 12-III-2015 & 2-III-2019, ca 550 m asl; Ayía Paraskeví, 3-IV-2011, 3-III-2013, ca 550 m asl; Pareklisiá, 8-III-2012 & 25-II-2015, ca 200 m asl; Souni, 13-III-2012, 5-III-2013, 7-III-2015 & 10-III-2018, ca 400 m asl; Prastió, 25-II-2-15, ca 600 m asl; Kélefos, 5-III-2014 & 5-III-2019, ca 500 m asl; Episkopí, 28-II-2015, ca 150 m asl; Agrós, 30-III-2015 & 16-III-2019, ca 1000 m asl. Also reported by Viney (2005) as “*Clitocybe vermicularis*”, above Haléfka, Mar. 1997.

**\**Rhizopogon graveolens* f. *pomaceus* Vaček**

A sequenced collection from a *P. brutia* forest in Kélefos, 28-I-2010, ca 500 m asl, nested with the isotype of this poorly known taxon (det. & pers. comm. M. Martín), which according to Martín & García (2009) probably corresponds to *R. rubescens* (Tul. & C. Tul.) Tul. & C. Tul. ss. str. Distribution unclear.

**\**Rhizopogon occidentalis*** Zeller & C.W. Dodge

Few collections matching the description of this taxon, characterized by prominent rhizomorphs engulfing the entire exoperidium. Seen in both black- and Calabrian pine forests at Kélefos, 6-II-2011 & 12-II-2011, ca 450m asl; and Péra Pedí, 10-XI-2012, ca 550 m asl.

***Rhizopogon vulgaris*** (Vittad.) M. Lange *sensu auct.*

An ambiguous and variously interpreted taxon, sometimes regarded as a synonym of *R. roseolus* (Corda) Th. Fr. Collections identified as the latter in Cyprus, however, appear to be morphologically distinct and restricted to the higher elevations of Troodos, found in strict association with *P. nigra* subsp. *pallasiana*. There are numerous tentatively identified collections of *R. vulgaris sensu auct.* from *P. brutia* forests in Trimíklini, 17-II-2010, ca 600 m asl; Péra Pedí, 1-III-2014, ca 550 m asl; Akrotíri, 24-XI-2014, ca 20 m asl; or Soúni, 9-III-2014, ca 400 m asl. Further reported by Viney (2005) in Kharcha, Nov. 1997, and by Loizides (2016) from *Cistus* matorral. A collection under *Cistus* in Kormakitis reported by Natrass (1937) as “*R. luteolus* Fr.”, also likely belongs to this species. A difficult complex in need to be resolved by dedicated phylogenetic investigations.

**\**Rhodocollybia butyracea*** (Bull.) Lennox

Common and widespread in Cyprus, frequently seen in black- and Calabrian pine forests. Numerous sightings from, e.g., Kélefos, 27-XI-2007, 29-XI-2009 & 10-XI-2017, ca 450–500 m asl; Platánia, 7-XI-2008, 20-XI-2008, 3-XII-2009, 5-XII-2011 & 5-I-2012, ca 1100 m asl; or Méssa Potamós, 10-I-2017, ca 800 m asl.

**\**Rhodocybe matesina*** Picillo & Vizzini

One collection of this recently described species (Crous et al. 2017), until now known only from Italy: Platánia, 26-XII-2018, ca 1100 m asl, among *P. brutia* and *C. sempervirens* litter. The spores of the Cypriot collection measure 5–7 × 4–5 µm. Rare.

**\**Rimbachia neckerae*** (Fr.) Redhead

This minute cyphelloid basidiomycete was documented once growing among mosses, in a *P. brutia* forest at Kélefos, 22-XII-2012, ca 500 m asl. Distribution unclear, but probably overlooked.

***Rugosomyces onychinus*** (Fr.) Raithehl.

Occasionally seen in black and Calabrian pine ecosystems, with collections from Moniátis, 13-XII-2007, ca 800 m asl; Platánia, 23-XI-2009, ca 1100 m asl; Plátres, 26-XII-2009, ca 1300 m asl; and Péra Pedí, 10-I-2017, ca 550 m asl.

***Russula acrifolia*** Romagn.

Fruiting prolifically in *P. nigra* subsp. *pallasiana* forests, but occasionally also seen in mixed *P. brutia* forests, such as Amíantos, 15-X-2008, ca 1300 m asl; Madarí, 20-XI-2015, ca 1200 m asl; Troodítissa, 11-VI-2018, ca 1300 m asl. Very common.

**\**Russula atropurpurea*** (Krombh.) Britzelm.

Occasionally seen, with a couple of collections from *P. brutia/Q. alnifolia* forests in Plátres, 17-XI-2011, ca 1200 m asl; and Platánia, 2-XII-2012, ca 1100 m asl.

***Russula aurea*** Pers.

Widespread in *P. nigra* subsp. *pallasiana* forests in years with early rainfall (Loizides et al. 2011), but occasionally also seen in mixed *P. brutia/Q. alnifolia* forests in, e.g., Platánia, 20-XI-2009 & 25-VI-2018, ca 1150 m asl.

**\**Russula badia*** Quéél.

One collection in a pure *P. brutia* forest in Saittás, 21-XI-2012, ca 700 m asl. Distribution not yet understood.

***Russula chloroides*** (Krombh.) Bres.

Very common, appearing prolifically in mixed black- and Calabrian pine forests, typically at altitudes above 1000 m. Numerous sightings, e.g., from Amíantos, 15-X-2008, ca 1300 m asl; Troodítissa, 8-IX-2009, 25-X-2011, 31-X-2011, 16-XI-2014 & 14-VI-2018, ca 1300 m asl; Platánia, 25-VI-2018, ca 1150 m asl; Madarí, 20-XI-2015, ca 1350 m asl.

***Russula delica*** Fr.

One of the most common and ecologically versatile fungi on the island, fruiting in vast numbers from ~200 m asl to the peaks of Troodos. Equally abundant on both calcareous and serpentine soil, with hundreds of sightings from mixed or pure Calabrian pine forests e.g. in Plátres, 21-XI-2007, 15-X-2008, 19-XI-2011, 1-XII-2017 & 16-X-2018 ca 1100–1300 m asl; Péra Pedí, 21-XI-2007, ca 600 m asl; Saittás, 25-XI-2007, 29-IX-2011, 16-X-2011 & 20-X-2018 ca 700 m asl; Cedar Valley, 18-XI-2009, 29-XI-2017 & 6-XII-2019, ca 1100 m asl; Méssa Potamós, 9-XII-2007, 6-I-2017, 2-XII-2017 & 1-XII-2019, ca 700–850 m asl; Amíantos, 19-X-2008, 10-X-2009, 16-X-2011 & 21-X-2011, ca 1200–1300 m asl; Troodítissa, 12-VIII-2010 & 16-VI-2014, ca 1300 m asl; Karvounás, 13-X-2011 & 13-XI-2018, ca 1250 m asl; Platánia, 23-X-2011 & 19-VI-2018, ca 1100–1200 m asl; Stavros tis Psókas, 22-XI-2011, ca 1200 m asl; Germasógeia, 9-XI-2012, ca 200 m asl; Mávro Dásos, 1-XII-2012 & 3-XII-2012, ca 1000 m asl. Also reported in Syrianóchori, Nov. 2000 (Vibey 2005).

***Russula foetens*** Pers.

Occasional in mixed forests, with a couple of collections from a *P. brutia/Q. coccifera* subsp. *calliprinos* forest in Trimíklini, 25-XI-2012, ca 650 m asl; and *P. brutia/Q. alnifolia* forest in Platánia, 25-VI-2018, ca 1150 m asl.

**Russula hobartiae** Loizides & J.M. Vidal

This sequestrate endemic species was recently described from the peaks of Troodos, where it occurs in almost exclusive association with *P. nigra* subsp. *pallasiana* (Vidal et al. 2019). Seen only once under *P. brutia* in Platánia, 16-VI-2014, ca 1100 m asl, leg. M. Tordelli & C. Hobart.

**Russula sanguinea** Fr.

Sparingly encountered, seen in Calabrian pine forests at Péra Pedí, 8-XII-2007 & 10-I-2017, ca 550 m asl; Mávro Dásos, 5-XII-2012, ca 1000 m asl; Plátres, 17-X-2018, ca 1250 m asl; and Péra Vása, 7-XI-2012, ca 600 m asl. Previously reported by Viney (2005) from Syrianóchori, Dec. 1998, by Loizides et al. (2011) from collections cited above, and by Loizides (2016) from *Cistus* matorral.

**Russula torulosa** Bres. *sensu lato*

Several collections match various interpretations of this taxon, most likely encompassing more than one phylopecies. The phylogenetic and taxonomic status of some satellite taxa such as *R. fuscorubra* (Bres.) J. Blum, or *R. fuscorubroides* Bon, also remains unclear, therefore this complex needs to be resolved by molecular phylogenetics and the appointment of neo/epitypes. Few collections from Calabrian pine forests in Mandriá, 25-XI-2007, ca 700 m asl; Péra Pedí 8-XII-2007 & 10-I-2017, ca 550 m asl; Saittás, 15-XI-2007 & 30-XII-2010, ca 700 m asl; Platánia, 10-X-2009 & 25-XI-2013, ca 1100 m asl. Also reported by Viney (2005), without localities given.

**\*Russula wernerii** Maire

Few collections from *P. brutia* forests match the concept of this rare taxon described from Morocco (Maire & Werner 1938): Saittás, 17-XI-2007 & 5-X-2008, ca 700 m asl; Trimiklini, 10-XI-2012 & 21-XI-2012, ca 650 m asl.

**Sarcodon leucopus** (Pers.) Maas Geest. & Nannf.

Frequently encountered in Cyprus but very rare elsewhere, and considered extinct in large parts of western and central Europe. Mostly appearing in high-altitude *P. nigra* subsp. *pallasiana* forests (Loizides et al. 2011) in years with early rainfall, but seen only once under *P. brutia* in the Platánia picnic area, 19-VI-2018, ca 1100 m asl.

**Scleroderma polyrhizum** (J.F. Gmel.) Pers.

Occasionally encountered in *P. brutia* forest clearings and road edges, such as Plátres, 2-X-2007, ca 1150 m asl; Moniátis, 13-XII-2007, ca 750 m asl; Trypilos, 8-XI-2009, ca 1250 m asl (Loizides et al. 2011).

**Scleroderma verrucosum** (Bull.) Pers.

An uncommon species first reported by Viney (2005) in Karmi, Nov. 1997. Mostly seen in mixed forests and cultivated land, with collections from a riparian *P. brutia*/*P. orientalis* forest in Moniátis, 29-X-2008, ca 900 m asl; a *P. brutia* forest edge in Agrós, 12-III-2012, ca 1000 m asl; a *P. brutia*/*Q. coccifera* subsp. *calliprinos* forest in Kélefos, 23-XII-2012, ca 500 m asl; and a grassy *P. brutia* forest opening also in Kélefos, 29-XII-2014, ca 450 m asl.

**\*Singerocybe phaeophthalma** (Pers.) Harmaja

Previously placed in *Clitocybe*, this species has been transferred to back to genus *Singerocybe* Harmaja based on phylogenetic data (Qin et al. 2014; Alvarado et al. 2015, 2018a, 2018b). Just a couple of records in Cyprus, one from a *P. brutia* forest clearing at Platánia, 5-XII-2011, ca 1100 m asl. Uncommon or rare.

**Sparassis crispa** (Wulfen) Fr.

The “cauliflower fungus” is rare and highly localised in Cyprus (Loizides et al. 2011), largely restricted to the western provinces of the island, particularly the Paphos forest: Cedar Valley, 18-XI-2009, ca 1100 m asl; Stavros tis Psókas, 22.XI.2011, ca 1250 m asl; Kannavióu, 28-XII-2016, ca 800 m asl.

**Stropharia aeruginosa** (Curtis) Quéf.

Rarely encountered, with one of the collections coming from a mixed Calabrian pine forest in Moniátis, 9-XII-2009, ca 800 m asl. Also reported by Viney (2005) in Lapithos, Dec. 2000.

**Suillus bellinii** (Inzenga) Kuntze

One of the most prolifically occurring fungi on the island, fruiting in huge numbers in black- and Calabrian pine forests throughout the autumn and winter months. Hundreds of sightings, e.g. in Saittás, 15-XI-2007, 30-XII-2010, 29-IX-2011 & 6-I-2017, ca 700 m asl; Moniátis, 13-XII-2007, 25-XI-2009 & 6-I-2017, ca 700 m asl; Méssa Potamós, 23-XII-2007, 12-XII-2011 & 10-I-2017, ca 800 m asl; Kélefos, 25-XI-2009, 6-XII-2013, 21-I-2015, 9-XII-2015, 10-I-2017, 14-I-2017 & 3-I-2019, ca 450–500 m asl; Platánia, 10-X-2009, 3-XII-2009, 20-XII-2014, 20-XI-2015 & 16-XI-2018, ca 1100 m asl; Plátres, 26-XII-2009, 2-I-2010, 8-XII-2015, 1-XII-2017, 26-X-2018 & 3-XII-2018, ca 1200 m asl; Pýrgos Tyllirías, 10-I-2011, ca 200 m asl; Amíantos, 1300 m asl; 21-X-2011; Akámas, 18-XII-2014, ca 200 m asl; Karvounás, 13-XI-2018, ca 1300 m asl. Also reported by Viney (2005) in Áyios Amvrósios, Nov. 1999 & Jan. 2000, and Loizides et al. (2011) from collections cited above. A collection reported by Nattrass (1937) as “*Boletus boudieri* Quéf.”, from Kórnos, 1931, probably also corresponds to this species.

**Suillus collinitus** (Fr.) Kuntze

Extremely common throughout the island, found in association with various pine species from the dunal zone, to the peaks of Troodos. Dozens of sightings in Saittás, 17-XI-2007, 18-XII-2009, 28-X-2011, 18-XI-2016 & 3-XII-2018, ca 700 m asl; Kélefos, 11-XI-2007, 20-X-2009, 25-XI-2009, 2-XI-2012, 31-XII-2012, 2-XII-2014, 21-I-2015 & 1-I-2019,

ca 450–550 m asl; Plátres, 21-XI-2011, ca 1100–1200 m asl; Platánia, 10-X-2009, 16-XI-2014, 2-I-2015 & 16-XI-2018, ca 1100 m asl; Aphrodite’s Rock, 2-II-2009, ca 100 m asl; Péra Pedí, 4-X-2009, ca 550 m asl; Amíantos, 10-X-2009, ca 1300 m asl; Pýrgos Tyllirias, 10-I-2011, ca 200 m asl; Trimíklini, 10-XI-2012, ca 650 m asl; Souíni, 9-III-2014, ca 400 m asl; Akrotíri, 24-XI-2014, ca 20 m asl; Akámas, 14-XII-2104 & 19-XII-2104, ca 200 m asl.

***Tapinella panuoides*** (Fr.) E.-J. Gilbert

Reported by Loizides et al. (2011) as “*Paxillus ionipus* Qué!.”. Occasionally seen on logs of *P. nigra* subsp. *pallasiana* and *P. brutia*, with collections from Péra Pedí, 12-III-2008, ca 550 m asl; and Archimandrita, 16-II-2013, ca 450 m asl.

**\**Tephrocycbe striipilea*** (Fr.) Donk

Two collections matching descriptions of this taxon in Cedar Valley, 18-XI-2009, ca 1000 m asl, in *P. brutia* and *C. brevifolia* forest; and Platánia, 21-XII-2011, ca 1100 m asl, in *P. brutia* and *C. brevifolia* forest clearing. Rare.

**\**Tephroderma fuscopallens*** Musumeci & Contu

The monotypic genus *Tephroderma* Contu & Musumeci, was in recently proposed to accommodate *T. fuscopallens*, a species originally collected from North France (Musumeci & Contu 2014) and subsequently documented in Turkey (Sesli & Topçu Sesli 2016). One collection found among lichens in a mixed *P. brutia*/*C. sempervirens*/*Cistus* forest in Episkopí, 26-I-2018, ca 150 m asl. Distribution unclear.

***Tricholoma batschii*** Gulden ex Mort. Chr. & Noordel.

Previously reported by its synonym “*T. fracticum* (Britzelm.) Kreisel” in Viney (2005), and Loizides et al. (2011), this widespread species appears in large numbers in Calabrian pine forests, e.g. Mandriá, 25-XI-2007, ca 700 m asl; Péra Pedí, 31-XII-2007 & 10-I-2017, ca 550 m asl; Lysós, 20-I-2008, ca 600 m asl; Plátres, 22-XII-2009, 26-XII-2009, 2-I-2010, 8-XII-2015, 1-XII-2017 & 3-XII-2018, ca 1200 m asl; Platánia, 3-XII-2012, ca 1100 m asl; Akámas, 14-XII-2012, ca 200 m asl; Kélefos, 2-XII-2014, ca 450 m asl. See “Discussion” for further notes.

***Tricholoma caligatum*** (Viv.) Ricken

A typically Mediterranean species, considered a delicacy and widely collected for pickling by the locals (Loizides 2008, 2011; Loizides et al. 2011). Found in various habitats across the Troodos mountain range, including mixed Calabrian pine forests in Saittás, 20-XII-2007, ca 700 m asl; Plátres, 22-XII-2009, 26-XII-2009, 2-I-2010, 8-XII-2015, 1-XII-2017 & 3-XII-2018, ca 1200 m asl; Platánia, 1-XII-2009, 3-XII-2009, 9-XII-2009, 30-XII-2011 & 16-XI-2018, ca 1100 m asl; Mésa Potamós, 20-XII-2009, 2-XII-2017 & 20-XII-2018, ca 800–900 m asl; Mávro Dásos, 1-XII-2012, ca 1000 m asl; Moniátis, 20-XII-2012, ca 800 m asl; Karvounás, 14-XI-2018, ca 1300 m asl. Common.

**\**Tricholoma chrysophyllum*** A. Riva, C.E. Hermos. & Jul. Sánchez

A handful of sightings matching the profile of this rarely reported Mediterranean taxon (Riva 1998), including a collection from a mixed *P. brutia*/*Q. alnifolia*/*A. andrachne* forest in Platánia, 1-XII-2009, ca 1000 m asl; and collections from *P. brutia* forests at Péra Pedí, 10-I-2017, ca 550 m asl. Less common than its lookalike *T. equestre* (L.) P. Kumm., which is mostly seen in *P. nigra* subsp. *pallasiana* forests in Cyprus (Loizides et al. 2011).

***Tricholoma squarrulosum*** Bres.

Previously regarded a variety of *T. atrosquamosum* Sacc. (and reported as such in Loizides 2011), this has now been shown to be a phylogenetically distinct species (Heilmann-Clausen et al. 2017). Common in mixed *P. brutia*/*Q. alnifolia* forests, e.g., in Platánia, 1-XII-2009, 3-XII-2009, 9-XII-2009 & 30-XII-2014, ca 1100 m asl; Plátres, 23-XII-2009, 26-XII-2009, 17-XII-2012 & 12-XII-2015; or Mávro Dásos, 1-XII-2012, ca 1000 m asl.

***Tricholoma sulphureum*** (Bull.) P. Kumm. *sensu lato*

Collections identified as this taxon formed multiple clades in the phylogenies of Heilmann-Clausen et al. (2017). Probably more than one species of this cluster occur in Cyprus, including a collection from a mixed *P. brutia*/*Q. alnifolia*/*A. andrachne* forest at Mésa Potamós, 10-I-2017, ca 800 m asl. A collection from a *Q. alnifolia*/*P. brutia*/*A. orientalis* riparian forest reported under this name in Loizides (2011), appears to be morphologically distinct, as is an odorless collection from a *P. brutia* forest in Kélefos, 20-XI-2019, ca 450 m asl. Widespread DNA sequencing and appointment of neo/epitypes for *T. sulphureum* ss. str. are necessary before any new taxa can be proposed.

***Tricholoma terreum*** (Schaeff.) P. Kumm.

Common in Cyprus, fruiting abundantly from the thermo-Mediterranean belt (Viney 2005; Loizides 2016) to the subalpine peaks of Troodos (Loizides et al. 2011). Seen in Calabrian pine forests e.g. in Mandriá, 21-XI-2017, ca 700 m asl; Saittás, 29-XI-2007, 30-XII-2013 & 6-I-2017, ca 700 m asl; Péra Pedí, 31-XII-2007, 6-I-2011 & 10-I-2017, ca 550 m asl; Platánia, 22-XII-2007, 1-XII-2009, 3-XII-2009, 9-XII-2009 & 15-XII-2018, ca 1100 m asl; Plátres, 23-XII-2009, ca 1200 m asl; Stavros tis Psókas, 22-XI-2011, ca 1200 m asl; Mávro Dásos, 5-XII-2012, ca 1000 m asl; Panayía, 23-I-2013, ca 1000 m asl; Kannavióu, 29-XII-2016, ca 900 m asl; Moniátis, 10-I-2017, ca 800 m asl.

**\**Tricholomopsis rutilans*** (Schaeff.) Singer

Known from a single basidiome found on a *P. brutia* stump at Platánia, 9-XII-2012, ca 1150 m asl. Rare.

***Xerocomellus redeuilhii*** A.F.S. Taylor, U. Eberh., Simonini, Gelardi & Vizzini

Occasional, with several collections from lowland *P. brutia* forests. See Loizides et al. (2019) for collection details.

***Xerocomellus chrysenderon*** (Bull.) Šutara

Just a handful of collections from *P. nigra* subsp. *pallasiana* forests, and a single collection from a mixed *P. brutia*/*C. brevifolia*/*Abies* sp. forest at Cedar Valley, 4-IV-2016, ca 1100 m asl (Loizides et al. 2019). Rare in Cyprus.

***Xerocomellus cisalpinus*** (Simonini, H. Ladurner & Peintner) Klofac

A widespread species in Europe but rare in Cyprus, known from a single collection in a mixed *P. brutia*, *C. brevifolia* and *Abies* sp. stand at Cedar Valley, 15-VII-2012, ca 1000 m asl (Loizides et al. 2019).

***Xeromphalina fellea*** Maire & Malençon *sensu lato*

Reported by Viney (2005) from Haléfka, Jan. 1999, but several *Xeromphalina* Kühner & Maire species are present on the island, whose exact taxonomic position is not entirely clear and needs to be resolved by DNA sequencing.

## Discussion

Clearly, the basidiomycete diversity present in *P. brutia* ecosystems is substantial, with 95 of the 231 taxa included in the present checklist reported from Cyprus for the first time. Considering that an additional 22 aphyllporaceous basidiomycetes were associated with *P. brutia* in a previous checklist (Loizides 2018), but also that ascomycetes and several dozens of unidentified collections have been excluded, it becomes apparent that the macromycete diversity in Calabrian pine ecosystems amounts to at least several hundreds of species. Interestingly, only few taxa seem to exhibit a transcontinental distribution and have been molecularly verified in more than one continent. These, include mostly opportunistic saprotrophs and wood decomposers such as *Agaricus bisporus*, *Coprinus comatus*, *Cystodermella cinnabarina*, *C. granulosa*, *Galerina marginata*, *Phallus impudicus*, or *Rhodocollybia butyracea*. *Lepista nuda* and *L. sordida* have also been reported from several countries and continents, but appear to be polyphyletic and occupy multiple clades in phylogenetic trees (Alvarado et al. 2015). Among ectomycorrhizal taxa, *Tricholoma batschii* has been molecularly confirmed in both ends of the Atlantic and is widespread in Cyprus, but a number of lookalikes also occur in mixed pine/oak ecosystems, whose exact taxonomic position is not yet entirely clear. Brown-capped *Tricholoma* species have not been adequately sampled in Mediterranean ecosystems and the phylogenetic status of taxa like *T. cedretorum* Bon ex A. Riva, *T. ezcarayense* C.E. Hermos. & Jul. Sánchez, *T. striatum* (Schaeff.) Quél., and *T. tridentinum* Singer, is yet to be fully clarified (Heilmann-Clausen et al. 2017). The widespread distribution and ecological plasticity of several *Hebeloma* species present in Cyprus is also notable, particularly *H. sinapizans* and *H. crustuliniforme*, which display a pan-European distribution and are associated with dozens of tree-hosts, as is *H. subtorum* whose distribution extends to North Africa (Beker et al. 2016). Few taxa of *Inocybe* are reported from different continents (e.g., *I. flocculosa*, *I. geophylla*), but these probably involve multiple biological species (Ryberg et al. 2008; Matheny & Sweney 2018). Similarly, extra-European reports of some *Russula* Pers. taxa originally described from Europe (e.g., *R. acrifolia*, *R. atropurpurea*, *R. foetens*, *R. sanguinea*), are in need of molecular verification.

Other than the few widely distributed species, the majority of taxa documented exhibit continental endemism and some are even regional endemics narrowly restricted to the Mediterranean basin. At least one species, the sequestrate *Russula hobartiae*, appears to be narrowly endemic in Cyprus and to the Troodos massif, where it exclusively occurs at elevations above 1000 m (Vidal et al. 2019). The recently described *Clavulina iris* and *Hygrophorus meridionalis* are apparently common and widespread, but again are confined to southern latitudes and are both strongly associated with Mediterranean flora (Moreau et al. 2018; Crous et al. 2019). Other typically Mediterranean species documented are *Amanita gioiosa*, *A. ovoidea*, *A. proxima*, *Leucopaxillus malenconii*, *Russula wernerii*, *Suillus bellinii*, *Tricholoma caligatum* and *T. chrysophyllum*, in addition to the recently described *Rhodocybe matesina* and *Tephroderma fuscopallens*, whose phylogeographical distribution is here extended to their second and third countries, respectively. Few other taxa, such as *Clitopilus daamsii*, *Hygrocybe calciphila*, *Hygrophorocybe nivea*, *Lepiota lepida*, *Leucoagaricus georginae* and *Tephrocybe striaepileta* are rare, and seldom appear in published literature.

A number of previous reports are considered doubtful or spurious and have been excluded. *Chroogomphus rutilus* (Schaeff.) O.K. Mill., previously reported by both Viney (2005) and Loizides et al. (2011), does not appear to occur on the island and most sequenced collections from Cyprus have turned out to belong to *C. mediterraneus* (Scambler et al. 2018). A second species of *Chroogomphus* (Singer) O.K. Mill., *C. subfulmineus* Niskanen et al., is indeed present on the island, but appears to be confined to the higher elevations of Troodos

and is so far known only from *P. nigra* subsp. *pallasiana* ecosystems. A collection previously reported as “*Ramaria bataillei*” in Loizides et al. (2011), is now thought to represent a faded collection of *R. rubella* and is also excluded, as is *Entoloma bloxamii* (Loizides 2011), whose collections from Kannaviou likely represent the recently described *E. atromadidum*. A collection reported by Viney (2005) as “*Suillus mediterraneensis* (Jacquet. & J. Blum) Redeuilh”, from Syrianóchori, Jan. 2001, is probably misidentified, since the image provided appears to depict a typical *S. bellini*. Although the presence of *S. mediterraneensis* on the island has been molecularly verified (unpubl. data), this species is rare and so far confined within coastal *P. halepensis* plantations suggesting an anthropogenic introduction. *Suillus granulatus* (L.) Roussel, on the other hand, reported by Viney (2005) from the same locality (Syrianóchori), does not occur on the island and the image provided for this collection again appears to depict the widespread *S. bellini*. A collection from Áyios Amvrósios, Dec. 2000, reported by Viney (2005) as “*Hygrophorus latitabundus* Britzelm.”, depicts a pale, dry and probably unrelated fungus, while collections identified as “*Rugosomyces chrysenderon* (Bull.) Bon” are more likely to represent its Mediterranean lookalike *R. fallax* Bon. Other doubtful records include *Clitocybe ditopa* (Fr.) Gillet, *Cystoderma amianthinum* (Scop.) Fayod, *Lyophyllum decastes*, *Macrolepiota konradii* (Huijsman ex P.D. Orton) M.M. Moser, *Ripartites tricholoma* (Alb. & Schwein.) P. Karst., *Sericeomyces serenus* (Fr.) Heinem., and *Tricholoma portentosum* (Fr.) Quéél., whose published images by Viney (2005) do not resemble these species, nor have they been subsequently verified on the island during this 12-y-survey.

Although by no means exhaustive, the present inventory provides the first comprehensive account of basidiomycete diversity in *P. brutia* ecosystems and a basis on which future phylotaxonomic investigations and conservation policies can build. Since the majority of the taxa reported here are yet to be genetically tested and several species-clusters remain unresolved, it is likely that the taxonomic status of some collections will change in the future. Generic and infrageneric revisions are thus to be expected, particularly within critical genera such as *Clitocybe s.l.*, *Lepista s.l.*, or *Lyophyllum s.l.*, which in their current circumscription are not monophyletic (Alvarado et al. 2015, 2018a & 2018b; Bellanger et al. 2015; Bellanger 2016). Clarification of old binomials through DNA sequencing of type material or appointment of epitypes, is also necessary for clarifying critical taxa currently encompassing multiple phylopecies. These include species-clusters currently lumped under *Amanita mairei*, *Clavulina coralloides*, *C. rugosa*, *Clitopilus geminus*, *Entoloma hirtipes*, *Hydnellum ferrugineum*, *Hygrocybe conica* and *Tricholoma sulphureum*, to name but a few (Olariaga et al. 2009; Lodge et al. 2015; Heilmann-Clausen et al. 2017; Loizides et al. 2018). More importantly, documenting and understanding fungal diversity in neglected but ecologically important Mediterranean ecosystems has in recent years become an urgent priority (Richard et al. 2011; Büntgen et al. 2015; Loizides et al. 2019a). Given the accelerated climate warming and aridification trends in the eastern Mediterranean region (Giorgi and Lionello 2008; Hoerling et al. 2012; Lelieveld et al. 2012; Zittis et al. 2015, 2018 & 2019; Lionello & Scarascia 2018), an enhanced understanding of the full spectrum of fungal diversity and plant-fungi interactions in Mediterranean ecosystems will greatly improve our ability to predict shifts in biodiversity, identify urgent conservation priorities and draft effective conservation policies. Towards this end, the documentation of fungal diversity in other priority habitats in Cyprus, such as *Pinus nigra* subsp. *pallasiana*, *Quercus alnifolia*, and *Cedrus brevifolia* ecosystems, as well as coastal dunes and halophytic wetlands, will follow in future dedicated checklists.

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Figure 1:

- (A) *Agaricus brunneolus* (B) *Agaricus impudicus* (C) *Agaricus pampeanus* (D) *Macrolepiota mastoidea*  
 (E) *Macrolepiota procera* f. *permixta* (F) *Macrolepiota subsquarrosa* (G) *Macrolepiota excoriata* (H) *Lepiota subincarnata*  
 (I) *Lepiota clypeolaria* (J) *Lepiota pseudolilacea* (K) *Lepiota pseudohelveola* (L) *Lepiota lepida* (M) *Lepiota alba*  
 (N) *Lepiota forquignoni* (O) *Cystoderma carcharias* (P) *Cystoderma fallax* (Q) *Cystodermella granulosa* (R) *Cystodermella cinnabarina*



Figure 2:

- (A) *Amanita ovoidea* (B) *Amanita proxima* (C) *Limacella illinita* (D) *Limacella subfurnacea* (E) *Entoloma atomadidum*  
(F) *Entoloma mougeotii* (G) *Entoloma pleopodium* (H) *Entoloma incanum* (I) *Entoloma hirtipes* (J) *Entoloma rusticoides*  
(K) *Entoloma cinereo-opacum* (L) *Rhodocybe matesina* (M) *Clitocella fallax* (N) *Clitopilus daamsii* (O) *Hygrophorocybe nivea*  
(P) *Lepista nuda* (Q) *Lepista sordida* (R) *Lepista panaeolus*



Figure 3:

- (A) *Gymnopus brassicolens* (B) *Gymnopus dryophilus* (C) *Gymnopus hybridus* (D) *Macrocyttidia cucumis* (E) *Baeospora myosura*  
 (F) *Mycena capillaripes* (G) *Mycena mirata* (H) *Mycena arcangeliana* (I) *Mycena flavescens* (J) *Mycena clavicularis*  
 (K) *Cortinarius decipiens* (L) *Inocybe phaeoleuca* (M) *Inocybe tarda* (N) *Inocybe langei* (O) *Inocybe fuscidula*  
 (P) *Inocybe muricellata* (Q) *Inocybe hirtella* (R) *Inocybe vulpinella*



Figure 4:

- (A) *Lyophyllum fumosum* (B) *Lyophyllum loricatum* (C) *Tephroclype striipilea* (D) *Tephroderma fuscopallens* (E) *Clitocybe lituus*  
(F) *Clitocybe metachroa* (G) *Singerocybe phaeophthalma* (H) *Atractosporocybe inornata* (I) *Infundibulicybe costata*  
(J) *Infundibulicybe squamulosa* (K) *Infundibulicybe meridionalis* (L) *Infundibulicybe geotropa* (M) *Clitopaxillus alexandri*  
(N) *Leucopaxillus malenconii* (O) *Tricholoma batschii* (P) *Tricholoma chrysophyllum* (Q) *Tricholoma sulphureum* (R) *Tricholoma terreum*



**Figure 5:**

- (A) *Suillus bellini* (B) *Suillus collinitus* (C) *Chalciporus amarellus* (D) *Rhizopogon graveolens* f. *pomaceus* (E) *Rhizopogon vulgaris*  
 (F) *Rhizopogon occidentalis* (G) *Ramariopsis subtilis* (H) *Clavulina iris* (I) *Phaeoclavulina myceliosa* (J) *Ramaria apiculata*  
 (K) *Ramaria sanguinea* (L) *Ramaria rubella* (M) *Russula atropurpurea* (N) *Russula sanguinea* (O) *Russula torulosa*  
 (P) *Russula badia* (Q) *Russula foetens* (R) *Russula wernerii*

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