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Contribution to the knowledge of hypogeous fungi from Sicily (S-Italy)

Abstract

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Distributive and ecological data on thirty-five hypogeous and semi-hypogeous fungi from Sicily (southern Italy) are reported here. Nineteen taxa are new for the Sicilian mycobiota. The presence of *Radiigera atrogleba* and *Setchelliogaster tenuipes* var. *rheophyllus* is noteworthy.

Introduction

Distributive and ecological data on hypogeous fungi are usually very limited in mycological studies. In fact, the possibility to detect the presence of such fungi is strictly linked to the availability of trained dogs. Besides only a low number of semi-hypogeous fungi could be easily found by moving the superficial layer of litter. The first data on hypogeous fungi from Sicily (southern Italy) were reported by Taranto & Gerbino (1845) and Inzenga (1865-1869). They pointed out the presence of *Tuber aestivum* Vittad. in some territories of eastern Sicily and in mould of vases containing oaks in it cultivated in the Botanical Garden of Palermo. Besides, Inzenga also reported *Melanogaster ambiguus* (Vittad.) Tul. & C. Tul. (sub: *M. ambiguus* Tul.) and *Terfezia arenaria* (Moris) Trappe (sub: *T. leonis* Tul.) from the Sicilian territory. Afterwards, Scalia (1900) reported some findings of *T. arenaria*, *T. boudieri* Chatin and *Tuber lacunosum* Mattiolo from eastern Sicily and the Etna volcano, too.

At the beginning of the 20th century, Pasquale Baccharini and Ugolino Martelli, working at that time in Sicily, sent many specimens of hypogeous fungi to Oreste Mattiolo, Professor at the University of Turin (northern Italy). Mattiolo identified sixteen hypogeous fungi such as *Balsamia vulgaris* Vittad., *Elaphomyces citrinus* Vittad., *Genea verrucosa* Vittad., *Hydnocystis clausa* (Tul. & C. Tul.) Ceruti (sub: *H. beccarii* Mattiolo), *Hymenogaster albus* (Klotzsch) Berk. & Br. (sub: *H. klotzschii* Tul.), *H. citrinus* Vittad., *H. muticus* Berk. & Br. (sub: *H. muticus* Berk.), *H. niveus* Vittad. (sub: *H. arenarius* Tul.), *Hysterangium clathroides* Vittad. (sub: *H. siculum* Mattiolo), *Martellia mistiformis* Mattiolo, *Sclerogaster compactus* (Tul. & C. Tul.) Sacc. (sub: *S. lanatus* Hesse), *T. arenaria* (sub: *T. leonis*), *T. leptoderma* Tul. & C. Tul. (sub: *T. fanfani* Mattiolo), *Tuber*

borchii Vittad., *T. lacunosum* and *T. rufum* Pico : Fr. (Mattiolo, 1900). Mattei & Serra (1905) and Zodda (1905-1906) confirmed the presence of *T. arenaria* (sub: *T. leonis*) in Sicily, while Catanzaro (1962, 1971) reported the presence of *Rhizopogon roseolus* (Corda) Th. M. Fr., *H. clathroides* [sub: *H. cistophilum* (Tul.) Zeller & Dodge] and *Melanogaster variegatus* (Vittad.) Tul. & C. Tul. in the island of Pantelleria (Egadi Archipelago, southwestern Sicily). Battiato & al. (1987) reported *Rhizopogon luteolus* Fr. & Nordh. and *R. roseolus* for western Sicily, while La Rocca & Anastase (1997) pointed out the presence of *Setchelliogaster tenuipes* (Setch.) Pouzar in the Ficuzza wood, a protected area located in the Sicilian inland.

Recently, Venturella & al. (2001) confirmed the presence of *S. tenuipes* in the same investigated area and, in addition, they reported *M. variegatus*, *T. aestivum*, *T. rufum*, *R. luteolus*, *R. vulgaris* (Vittad.) M. Lange and *Hyemenogaster vulgaris* Tul. & C. Tul. Besides *Choiromyces meandriiformis* Vittad., *Melanogaster tuberiformis* Corda, *M. variegatus*, *R. luteolus*, *R. roseolus*, *S. tenuipes*, *T. aestivum*, *T. excavatum* Vittad. and *T. rufum* were included by Venturella & al. (2000) in the checklist of Madonie Park (northern Sicily) mycobiota. Bencivenga & Venturella (2001) reported new localities for *T. rufum* as well as the first finding of *Tuber panniferum* Tul. & C. Tul. in Sicily.

A new record for the Italian mycobiota was *Gymnomyces ferruginascens* Singer & A. H. Smith, recorded in the province of Siracusa (southeastern Sicily) by Montecchi & Sarasini (2001). Venturella & Contu (2001) pointed out the presence of *Hysterangium inflatum* Rodway, *Labyrinthomyces donkii* Malençon and *S. tenuipes* in *Eucalyptus* and *Pinus* reafforestations on sandy dunes located along the western coastline of Sicily. In addition, La Rocca & Bazan (2002, 2003) reported other Sicilian localities for the above mentioned taxa together with some new findings of *H. albus* [sub: *Descomyces albus* (Klotzsch) Bougher & Castellano] and *R. vulgaris*.

Materials and Methods

In the framework of research projects funded by different local administrations in Sicily, a number of forays were carried out in order to increase the knowledge on the mycobiota of Sicily with special emphasis on the presence of hypogeous species. Two research teams accompanied by dogs trained in the search of hypogeous fungi, have been active: one in April 2000 composed of Lamberto Gori, Amer Montecchi, Mario Sarasini, Vincenzo Poggiani and Marco Maletti explored the Sicilian territory, and the other in January 2004 composed of Lamberto Gori, Mario Sarasini, Vincenzo Poggiani, Giampaolo Bernardini, Alessandro Saitta and Giuseppe Venturella. A number of different forest ecosystems, located at different altitudinal levels, were investigated.

The identification of collected specimens was carried out on fresh ascomata and basidiomata, and the microscopic features were observed in an aqueous solution with a Leica microscope. The scientific binomials of recorded taxa were referred to the monography of Montecchi & Sarasini (2000) and to the Bioscience Database (www.indexfungorum.org/Names/NAMES.ASP). For each recorded taxon the date and localities of collection, cartographic references, habitats, and altitudes were reported. Distributive data were referred to the grid map 1: 50,000 of the Official Map of the Italian State, following the methodol-

ogy proposed in Italy by Padovan (1994) for the checklist of macromycetes. The herbarium specimens are kept in the *Herbarium Mediterraneum* (PAL).

Data recorded

***Balsamia vulgaris* Vittad.**

Caltagirone: Contrada Vaccarizzo (Bosco di Santo Pietro), 644133, 14 Jan 2004, glades of *Quercus suber* L. woods, at the base of plants of *Cistus monspeliensis* L. and *C. creticus* L.; **Castelbuono:** Contrada Barraca, 610432-610423, 12 Jan 2004, mixed wood of *Quercus ilex* L. and *Castanea sativa* Miller; **Cefalù:** Piano delle Fate (Gibilmanna), 610444, 02 Apr 2000, woods of *Quercus pubescens* Willd. s. l.; **Corleone:** Crocifisso (Bosco della Ficuzza), 608342, 11 Jan 2004, woods of *Q. ilex*; **Palazzolo Acreide:** Contrada Cardinale, 645214, 14 Jan 2004, mixed woods of *Q. ilex* and *Q. virgiliana* (Ten.) Ten.; **Pollina:** Pizzeria Oasi (near Valtur village), 597322, 12 Jan 2004, reafforestation of *Pinus halepensis* Miller and *P. pinea* L. with small plants of *Q. ilex* and *Q. virgiliana* in the shrubby layer.

***Elaphomyces anthracinus* Vittad.**

Castelbuono: Contrada Barraca, 610432-610423, 12 Jan 2004, mixed woods of *Q. ilex* and *C. sativa*.

***Endogone flammicorona* Trappe & Gerd.**

Tortorici: Portella Castagnera, 612141, 13 Jan 2004, mixed woods of *F. sylvatica*, *C. sativa* and *Pinus nigra* Arnold.

***Genea fragrans* (Wallroth) Paoletti**

Longi: Crocetta, 599323, 13 Jan 2004, mixed woods of *Q. ilex*, *Q. virgiliana*, *Ostrya carpinifolia* Scop., *Acer campestre* L. and *Fraxinus ornus* L.; **Palazzolo Acreide:** Contrada Cardinale, 14 Jan 2004, mixed woods of *Q. ilex* and *Q. virgiliana*; **Piazza Armerina:** Sorgente di Cannarozzo, 632332, 15 Jan 2004, mixed woods of *P. pinea*, *Q. ilex*, *Q. virgiliana* and *Eucalyptus camaldulensis* Dehnh.; **Tortorici:** Portella Castagnera, 612141, 13 Jan 2004, mixed woods of *F. sylvatica*, *C. sativa* and *P. nigra*.

***Genea hispidula* Berk. & Br.**

Godrano: Galleria Roccazzo (Bosco della Ficuzza), 608341, 11 Jan 2004, mixed woods of *Q. suber* and *Q. ilex*.

***Genea sphaerica* Tul. & C. Tul.**

Castelbuono: Contrada Barraca, 610432-610423, 12 Jan 2004, mixed woods of *Q. ilex* and *C. sativa*.

***Genea verrucosa* Vittad.**

Castelbuono: Contrada Barraca, 610432-610423, 03 Apr 2000, 12 Jan 2004, mixed woods of *Q. ilex* and *C. sativa*; woods of *Q. ilex*; **Cefalù:** Piano delle Fate (Gibilmanna), 610444, 02 Apr 2000, 06 Apr 2000, woods of *Q. pubescens*; **Collesano:** Casa Lo Curto, 609122, 06 Apr 2000, mixed woods of *Q. suber* and *Q. pubescens*.

***Hydnangium carneum* Wallroth**

Piazza Armerina: Sorgente di Cannarozzo, 632332, 15 Jan 2004, reafforestations of *E. camaldulensis*.

***Hymenogaster hessei* Soehner**

Castronuovo di Sicilia: Riserva Monte Carcaci, 620133, 16 Jan 2004, mixed woods of *Q. ilex* and *Q. virgiliana*; **Godrano:** Cima Cucco (Bosco della Ficuzza), 608342, 11 Jan 2004, mixed woods of *Quercus leptobalanos* Guss. and *Q. ilex*; **Palazzolo Acreide:** Contrada Cardinale, 645214, 14 Jan 2004, mixed woods of *Q. ilex* and *Q. virgiliana*.

***Hymenogaster luteus* Vittad.**

Cinisi: Bosco Santo Canale, 594422, 10 Jan 2004, woods of *Q. ilex*; **Palazzolo Acreide:** Contrada Cardinale, 645214, 14 Jan 2004, mixed woods of *Q. ilex* and *Q. virgiliana*.

***Hymenogaster lycoperdineus* Vittad.**

Alcamo: Bosco d'Alcamo, 606112, 10 Jan 2004, mixed woods of *Q. ilex*, *Q. virgiliana*, *P. pinea*, *F. ornus* and *Cupressus sempervirens* L.; **Cinisi:** Bosco Santo Canale, 594422, 10 Jan 2004, woods of *Q. ilex*; **Corleone:** Crocifisso (Bosco della Ficuzza), 608342, 11 Jan 2004, woods of *Q. ilex*; La Guglia (Bosco della Ficuzza), 608344, 608341, 04 Apr 2000, mixed woods of *Fraxinus oxycarpa* Bieb. and *Q. pubescens*; **Godrano:** Cima Cucco (Bosco della Ficuzza), 608342, 11 Jan 2004, mixed woods of *Q. leptobalanos* and *Q. ilex*; **Longi:** Crocetta, 599323, 13 Jan 2004, mixed woods of *Q. ilex*, *Q. virgiliana*, *O. carpiniifolia*, *A. campestre* and *F. ornus*; **Santo Stefano di Quisquina:** Bosco Buonanotte, 629141, 16 Jan 2004, reafforestation of *P. halepensis* and *P. pinea* with small plants of *Q. ilex* and *Q. virgiliana* in the shrubby layer.

***Hymenogaster olivaceus* Vittad.**

Santo Stefano di Quisquina: Bosco Buonanotte, 629141, 16 Jan 2004, reafforestation of *P. halepensis* and *P. pinea* with small plants of *Q. ilex* and *Q. virgiliana* in the shrubby layer.

***Hymenogaster populutorum* Tul. & C. Tul.**

Cinisi: Bosco Santo Canale, 594422, 10 Jan 2004, woods of *Q. ilex*; **Godrano:** Cima Cucco (Bosco della Ficuzza), 608342, 11 Jan 2004, mixed woods of *Q. leptobalanos* and *Q. ilex*; Galleria Roccazzo (Bosco della Ficuzza), 608341, 11 Jan 2004, mixed woods of *Q. suber* and *Q. ilex*; **Santo Stefano di Quisquina:** Bosco Buonanotte, 629141, 16 Jan 2004, reafforestation of *P. halepensis* and *P. pinea* with small plants of *Q. ilex* and *Q. virgiliana* in the shrubby layer.

***Hymenogaster rehsteineri* Bucholtz**

Godrano: Cima Cucco (Bosco della Ficuzza), 608342, 11 Jan 2004, mixed woods of *Q. leptobalanos* and *Q. ilex*.

***Hymenogaster thwaitesii* Berk. & Br.**

Cinisi: Bosco Santo Canale, 594422, 10 Jan 2004, woods of *Q. ilex*.

***Hymenogaster vulgaris* Tul. & C. Tul.**

Cefalù: Piano delle Fate (Gibilmanna), 610444, 02 Apr 2000, woods of *Q. pubescens*;
Corleone: La Guglia (Bosco della Ficuzza), 608344, 608341, 04 Apr 2000, mixed woods of *F. oxycarpa* and *Q. pubescens*;
Geraci Siculo: Bosco Sugheri, 610311-610422, 07 Apr 2000, woods of *Q. suber*.

***Hysterangium inflatum* Rodway**

Buseto Palizzolo: Bosco di Scorage, 606414, 10 Jan 2004, reafforestation of *E. camaldulensis*.

***Hysterangium stoloniferum* Tul. & C. Tul.**

Godrano: Cima Cucco (Bosco della Ficuzza), 608342, 11 Jan 2004, mixed woods of *Q. leptobalanos* and *Q. ilex*.

***Labyrinthomyces donkii* Malençon**

Caltagirone: Contrada Vaccarizzo (Bosco di Santo Pietro), 644133, 11 Jan 2004, litter of *E. camaldulensis*;
Piazza Armerina: Borgo San Giacomo, 639444, 15 Jan 2004, reafforestations of *E. camaldulensis*;
Sorgente di Cannarozzo, 632332, 15 Jan 2004, reafforestations of *E. camaldulensis*.

***Melanogaster ambiguus* (Vittad.) Tul. & C. Tul.**

Piazza Armerina: Sorgente di Cannarozzo, 632332, 15 Jan 2004, mixed woods of *P. pinea*, *Q. ilex*, *Q. virgiliana* and *E. camaldulensis*.

***Melanogaster variegatus* (Vittad.) Tul. & C. Tul.**

Castronuovo di Sicilia: Riserva Monte Carcaci, 620133, 16 Jan 2004, mixed woods of *Q. ilex* and *Q. virgiliana*;
Cinisi: Bosco Santo Canale, 594422, 10 Jan 2004, woods of *Q. ilex*.

***Radiigera atrogleba* Zeller**

Piazza Armerina: Borgo San Giacomo, 639444, 15 Jan 2004, reafforestations of *E. camaldulensis*.

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

Pollina: Pizzeria Oasi (near Valtur village), 597322, 12 Jan 2004, reafforestation of *P. halepensis* and *P. pinea* with small plants of *Q. ilex* and *Q. virgiliana* in the shrubby layer.

Setchelliogaster tenuipes* (Setch.) Pouzar var. *tenuipes

Buseto Palizzolo: Bosco di Scorace, 606414, 10 Jan 2004, litter of *E. camaldulensis*.; **Cefalù:** Santuario (Gibilmanna), 610444, 02 Apr 2000, litter of *E. camaldulensis*.; **Corleone:** La Guglia (Bosco della Ficuzza), 608344, 608341, 04 Apr 2000, litter of *E. camaldulensis*.; Lago Scanzano, 608433, 608432, 04 Apr 2000, litter of *E. camaldulensis*.; **Godrano:** Bivio Lupotto, (Bosco della Ficuzza), 608314, 04 Apr 2000, litter of *E. camaldulensis*.; Santa Barbara, (Bosco della Ficuzza), 608341, 11 Jan 2004, litter of *E. camaldulensis*.; **Piazza Armerina:** Borgo San Giacomo, 639444, 15 Jan 2004, litter of *E. camaldulensis*.; Sorgente di Cannarozzo, 632332, 15 Jan 2004, litter of *E. camaldulensis* in a mixed woods of *P. pinea*, *Q. ilex*, *Q. virgiliana* and *E. camaldulensis*.

***Setchelliogaster tenuipes* var. *rheophyllus* (Bertault & Malençon) G. Moreno & M. P. Martín**

Buseto Palizzolo: Bosco di Scorace, 606414, 10 Jan 2004, litter of *E. camaldulensis*.

***Tuber aestivum* Vittad.**

Godrano: Cima Cucco (Bosco della Ficuzza), 608342, 11 Jan 2004, mixed woods of *Q. leptobalanos* and *Q. ilex*.; **Santo Stefano di Quisquina:** Bosco Buonanotte, 629141, 16 Jan 2004, reafforestation of *P. halepensis* and *P. pinea* with small plants of *Q. ilex* and *Q. virgiliana* in the shrubby layer.

***Tuber borchii* Vittad.**

Alcamo: Bosco d'Alcamo, 606112, 10 Jan 2004, mixed woods of *Q. ilex*, *Q. virgiliana*, *P. pinea*, *F. ornus* and *C. sempervirens*.; **Caltagirone:** Contrada Vaccarizzo (Bosco di Santo Pietro), 644133, 11 Jan 2004, glades of *Q. suber* woods, at the base of plants of *C. monspeliensis* and *C. creticus*.; **Castelbuono:** Contrada Barraca, 610432, 610423, 03 Apr 2000, mixed woods of *Q. ilex* and *C. sativa*.

***Tuber brumale* Vittad.**

Godrano: Cima Cucco (Bosco della Ficuzza), 608342, 11 Jan 2004, mixed woods of *Q. leptobalanos* and *Q. ilex*.; **Longi:** Crocetta, 599323, 13 Jan 2004, mixed woods of *Q. ilex*, *Q. virgiliana*, *O. carpinifolia*, *A. campestre* and *F. ornus*.; **Palizzolo Acreide:** Contrada Cardinale, 645214, 14 Jan 2004, mixed woods of *Q. ilex* and *Q. virgiliana*.; **Tortorici:** Contrada Scteti, 599321, 13 Jan 2004, hazel-tree cultivations.

***Tuber excavatum* Vittad.**

Alcamo: Bosco d'Alcamo, 606112, 10 Jan 2004, mixed woods of *Q. ilex*, *Q. virgiliana*, *P. pinea*, *F. ornus* and *C. sempervirens*.; **Godrano:** Cima Cucco (Bosco della Ficuzza), 608342, 11 Jan 2004, mixed woods of *Q. leptobalanos* and *Q. ilex*.; **Longi:** Crocetta, 599323, 13 Jan 2004, mixed woods of *Q. ilex*, *Q. virgiliana*, *O. carpinifolia*, *A. campestre* and *F. ornus*.

***Tuber foetidum* Vittad.**

Castelbuono: Casa Liccia, 610423, 03 Apr 2000, reafforestation of *P. nigra*.; Contrada Barraca, 610432, 610423, 03 Apr 2000, woods of *Q. ilex* and *C. sativa*.; **Cefalù:** Piano delle Fate (Gibilmanna), 610444, 06 Apr 2000, woods of *Q. pubescens*.; Villa Lanza

(Gibilmanna), 610444, 06 Apr 2000, woods of *Q. suber*; **Collesano**: Casa Lo Curto, 609122, 06 Apr 2000, mixed woods of *Q. suber* and *Q. pubescens*; **Godrano**: Galleria Roccazzo (Bosco della Ficuzza), 608341, 11 Jan 2004, mixed woods of *Q. suber* and *Q. ilex*; Gorgo del Drago (Bosco della Ficuzza), 608432, 04 Apr 2000, woods of *Q. suber*; Santa Barbara (Bosco della Ficuzza), 608341, 11 Jan 2004, reforestation of *E. camaldulensis* mixed with *Q. ilex* and *Fraxinus oxycarpa*; **Isnello**: Bevaio del Faggio, 609211, 610344, 06 Apr 2000, reforestation of *P. nigra*; Mandria Castiglia, 610344, 02 Apr 2000, reforestation of *C. atlantica* and *P. nigra*; **Polizzi Generosa**: Vallone Madonna degli Angeli, 610334, 06 Apr 2000, reforestation of *C. atlantica* and *P. nigra*.

***Tuber mesentericum* Vittad.**

Palazzolo Acreide: Contrada Cardinale, 645214, 14 Jan 2004, along a path near plants of *Q. ilex*.

***Tuber oligospermum* (Tul. & C. Tul.) Trappe**

Caltagirone: Contrada Vaccarizzo (Bosco di Santo Pietro), 644133, 11 Jan 2004, glades of *Q. suber* woods, at the base of plants of *C. monspeliensis* and *C. creticus*.

***Tuber panniferum* Tul. & C. Tul.**

Godrano: Cima Cucco (Bosco della Ficuzza), 608342, 11 Jan 2004, mixed woods of *Q. leptobalanos* and *Q. ilex*; **Palazzolo Acreide**: Contrada Cardinale, 645214, 14 Jan 2004, along a path near plants of *Q. ilex*.

***Tuber puberulum* Berk. & Br.**

Alcamo: Bosco d'Alcamo, 606112, 10 Jan 2004, mixed woods of *Q. ilex*, *Q. virgiliana*, *P. pinea*, *F. ornus* and *C. sempervirens*; **Castronuovo di Sicilia**: Riserva Monte Carcaci, 620133, 16 Jan 2004, mixed woods of *Q. ilex* and *Q. virgiliana*; **Palazzolo Acreide**: Contrada Cardinale, 645214, 14 Jan 2004, mixed woods of *Q. ilex* and *Q. virgiliana*; **Piana degli Albanesi**: Riserva della Pizzuta, 607114, 16 Jan 2004, mixed woods of *Q. ilex* and *Q. virgiliana*, mixed reforestations of *P. halepensis* and *C. sempervirens*; **Piazza Armerina**: Sorgente di Cannarozzo, 632332, 15 Jan 2004, mixed woods of *P. pinea*, *Q. ilex*, *Q. virgiliana* and *E. camaldulensis*; **Pollina**: Pizzeria Oasi (near Valtur village), 597322, 12 Jan 2004, reforestation of *P. halepensis* and *P. pinea* with small plants of *Q. ilex* and *Q. virgiliana* in the shrubby layer; **Santo Stefano di Quisquina**: La Donna, 620233, 16 Jan 2004, reforestation of *P. halepensis* and *P. pinea* with small plants of *Q. ilex* and *Q. virgiliana* in the shrubby layer; Serra Quisquina, 620233, 16 Jan 2004, mixed reforestation of *C. atlantica* and *P. nigra*.

***Tuber rufum* Pico : Fr.**

Alcamo: Bosco d'Alcamo, 606112, 10 Jan 2004, mixed woods of *Q. ilex*, *Q. virgiliana*, *P. pinea*, *F. ornus* and *C. sempervirens*; **Corleone**: Crocifisso (Bosco della Ficuzza), 608342, 11 Jan 2004, woods of *Q. ilex*; **Godrano**: Galleria Roccazzo (Bosco della Ficuzza), 608341, 11 Jan 2004, mixed woods of *Q. suber* and *Q. ilex*; **Linguaglossa**: Pineta di Linguaglossa, 613323, 13 Jan 2004, woods of *Pinus laricio* Poiret; **Palazzolo Acreide**: Contrada Cardinale, 645214, 14 Jan 2004, mixed woods of *Q. ilex* and *Q. vir-*

gilians; **Piazza Armerina**: Sorgente di Cannarozzo, 632332, 15 Jan 2004, mixed woods of *P. pinea*, *Q. ilex*, *Q. virgiliana* and *E. camaldulensis*; **Santo Stefano di Quisquina**: Bosco Buonanotte, 629141, 16 Jan 2004, reafforestation of *P. halepensis* and *P. pinea* with small plants of *Q. ilex* and *Q. virgiliana* in the shrubby layer.

Discussion and Conclusions

Thirty-five hypogeous and semi-hypogeous fungi, eighteen Ascomycetes and seventeen Basidiomycetes, were recorded during the forays carried out in the years 2000 and 2004 in the Sicilian territory. Nineteen of them, i.e., *Elaphomyces anthracinus*, *Endogone flammi-corona*, *Genea fragrans*, *G. hispidula*, *G. sphaerica*, *Hymenogaster hessei*, *H. luteus*, *H. lycoperdineus*, *H. olivaceus*, *H. populetorum*, *H. rehsteineri*, *H. thwaitesii*, *Radiigera atrogleba*, *Setchelliogaster tenuipes* var. *rheophyllus*, *Tuber brumale*, *T. foetidum*, *T. mesentericum*, *T. oligospermum* and *T. puberulum* are new for the mycobiota of Sicily. If these new records are added to those reported in literature for hypogeous fungi from Sicily, the total number of hypogeous taxa, increases to fifty-two taxa, assigned in nineteen genera.

Considering that during last summer (2003), a very low amount of rainfalls was registered in Italian territory on the whole, the number of taxa reported here is noteworthy. Most of the ascomata belonging to the genus *Tuber* F. H. Wigg., were characterized by a low number of ripe asci containing well colored and ornamented ascospores. Sometimes the asci were totally lacking ascospores or containing ascospores with hyaline content not differentiated yet. The absence of ripe ascospores was probably related to the low amount of rainfalls during the autumnal season and, consequently, to the recent formation of ascomata. On the contrary, a number of species, which produce ascomata after the beginning of the rain period, were found during the forays. This is the case of *Hymenogaster* species, which represents the 26.5 % of the recorded taxa. Among the recorded taxa, *T. oligospermum*, *T. panniferum* and *R. vulgaris* are typically linked to the Mediterranean environment. These taxa as well as all the other hypogeous fungi strictly related to *Eucalyptus* plantations are very frequent in the Sicilian territory, but absent northward of the Apennine mountains (central Italy).

The remaining taxa collected in the woods of the Sicilian territory, and located over 500 m, are quite frequent in other Italian regions too. An explanatory example arises from the recent surveys of Cerone & al. (2000) and Marino & al. (2003) which reported for Basilicata (southern Italy) a list of hypogeous fungi very similar in content with the present one. By comparing these two lists, it can be noted that *Tuber melanosporum* Vittad. and *T. magnatum* Pico have not been reported in Sicily, while there are no records of *Terfezia* species in Basilicata. In addition, the hypogeous fungi which are associated with *Eucalyptus* species were not detected in Basilicata. The record of *Radiigera atrogleba* in Sicily contributes to the known distribution range of this taxon, which it was until now limited along the coastline of the province of Ravenna (north Italy).

Finally the presence of *S. tenuipes* var. *rheophyllus* under the litter of *E. camaldulensis* is noteworthy. The contemporary presence of *S. tenuipes* var. *tenuipes* and *S. tenuipes* var. *rheophyllus* in *Eucalyptus* stands of Sicily confirmed the report of Lago & al. (2001) on

the ecology of these taxa. In fact these fungi are mycorrhizal associate with *Eucalyptus* species and it frequently appears under leaves and bark or partially emerging above the ground.

The differences reported by Martin & Moreno (2001) among the two taxa i.e., the white-edged gills and the presence of abundant tibiiform cheilocystidia in *S. tenuipes* var. *rheophyllus* are partially confirmed after examining the specimens collected in Sicily. In fact, the tibiiform cheilocystidia are evident in *S. tenuipes* var. *rheophyllus* but they are completely absent in *S. tenuipes* var. *tenuipes*. For this reason the interpretation of Martin & Moreno (2001) to separate *S. tenuipes* var. *tenuipes* and *S. tenuipes* var. *rheophyllus* seems to be more suitable than the interpretation of Lago & al. (2001) which considered the two taxa as synonyms.

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References

- Battiato, A., Napoli, M. & Signorello, P. 1987: Macromiceti della Sicilia: secondo contributo. — Bollettino Accademia Gioenia Scienze Naturali Catania **20**(330):185-195.
- Bencivenga, M. & Venturella G. 2001: Contribution to the knowledge of the genus *Tuber* (*Tuberaceae*) in Sicily. — *Bocconea* **13**: 301-304.
- Catanzaro, F. 1962: Funghi macroscopici di Pantelleria. — *Lavori Istituto Botanico Giardino Coloniale Palermo* **18**: 91-96.
- 1971: Funghi macroscopici di Mazara del Vallo. — *Informatore Botanico Italiano* **3**: 119-120.
- Cerone, G., Marino, R. & Rana, G. L. 2000: Studi sui funghi ipogei e sulla tartuficoltura della Basilicata. — *Rivista di Micologia* **XLIII** (4): 333-346.
- Inzenga, G. 1865-1869: Funghi Siciliani. Studi. Centuria I, II. — Palermo.
- Lago, M., Bougher, N. L. & Castro M. L. 2001: Morphological variability and implication for definition of taxa in the *Descolea-Setchelliogaster-Descomyces* complex. — *Mycotaxon* **LXXVI-II**: 37-57.
- La Rocca, S. & Anastase, A. 1997: Un interessante gasteromicete agaricoide in Sicilia: *Setchelliogaster tenuipes* (Setchell.) Pouzar. — *Atti delle 4^e Giornate della Confederazione Europea di Micologia Mediterranea*, pp. 21-22.
- & Bazan, G. 2002: Contributo alla conoscenza della micoflora delle dune costiere della Sicilia: i macromiceti di Contrada “Le Macchie” (Balestrate, Palermo). — *Quaderni di Botanica Ambientale ed Applicata* **12**: 3-12.
- & Bazan, G. 2003: Distribution of five hypogeous macromycetes strictly linked to *Eucalyptus camaldulensis* and *Acacia saligna* reforestations in Sicily. — *Bocconea* **16**(2): 1067-1082.
- Marino, R., Cerone, G. & Rana, G. L. 2003: Studi sui funghi ipogei della Basilicata, II contributo. — *Rivista di Micologia* **XLVI** (1): 53-62.
- Martin, M. P. & Moreno, G. 2001: Molecular data confirm *Setchelliogaster tenuipes* and *S. rheophyllus* as *Cortinariales*. — *Mycotaxon* **LXXVIII**: 257-263.
- Mattei, G. E. & Serra, A. 1905: Ricerche storiche e biologiche sulla *Terfetia leonis*. — *Bollettino Orto Botanico Regia Università Napoli* **2** (1): 153-164.

- Mattiolo, O. 1900: Gli ipogei di Sardegna e Sicilia. — *Malpighia* **14**: 39-110.
- Montecchi, A. & Sarasini, M. 2000: Funghi ipogei d'Europa. — Associazione Micologica Bresadola, Fondazione Centro Studi Micologici Trento, pp. 714 .
- & Sarasini, M. 2001: Alcune *Elasmomycetaceae* (*Russulales*) trovate in Italia. — *Rivista di Micologia* **XLIV**(2): 143-149.
- Padovan, F. 1994: Mappatura dei macromiceti in Italia (Problemi cartografici). — *Rivista di Micologia* **37**(1): 59-69.
- Scalia, G. 1900: I funghi della Sicilia orientale e principalmente della regione etnea. I. — *Atti Accademia Gioenia Scienze Naturali Catania*, ser. 4, **13**(20): 1-55.
- Taranto, E. & Gerbino, X. 1845: *Catalogus plantarum in agro calata-hieronensi collectarum*. — Catania, 50 pp.
- Venturella, G. & Contu, M. 2002: Contribution to the knowledge of sand dunes mycological flora from Sicily (South Italy). — *Documents Mycologiques* **30**(123): 51-55.
- , Saitta, A. & La Rocca, S. 2000: A check-list of the mycological flora of Madonie Park (North Sicily). — *Mycotaxon*, Ltd., pp. 246.
- , Saitta, A., La Rocca, S. & Onofri, S. 2001: The mycological flora of the Ficuzza Wood-Rocca Busambra territory (North Sicily, Italy). — *Mycotaxon*, Ltd., pp. 66.
- Zodda, G. 1905-1906: Entità nuove o importanti della flora sicula. — *Memorie Classe Scienze Reale Accademia Zelanti* ser. 3, **5**: 99-162.

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