

## An annotated checklist of *Volvariella* in the Iberian Peninsula and Balearic Islands

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**Abstract** — Species of *Volvariella* reported from the Iberian Peninsula (Spain, Portugal) and Balearic Islands (Spain) are listed, with data on their distribution, ecology and phenology. For each taxon a list of all collections examined and a map of its distribution is given. According to our revision 12 taxa of *Volvariella* occur in the area.

**Key words** — Agaricales, Agaricomycetes, Basidiomycota, biodiversity, *Pluteaceae*

### Introduction

*Volvariella* Speg. is a genus traditionally classified in the family *Pluteaceae* Kotl. & Pouzar (*Agaricales*, *Basidiomycota*), but recent molecular research has challenged its monophyly and taxonomic position within the *Agaricales* (Moncalvo et al. 2002, Matheny et al. 2006). Its main characteristics are the pluteoid basidiomes (i.e. free lamellae; context of pileus and stipe discontinuous), universal veil present in mature specimens as a saccate volva at stipe base, brownish-pink spores in mass and mainly the inverse lamellar trama. It comprises about 50 species (Kirk et al. 2008) and is widely distributed around the world (Singer 1986).

Monographic studies of the genus have been mostly carried out in Europe (Kühner & Romagnesi 1956, Orton 1974, 1986; Boekhout 1990) North America (Shaffer 1957) and Africa (Heinemann 1975, Pegler 1977).

In the Iberian Peninsula (Spain, Portugal) and Balearic Islands (Spain) the records of *Volvariella* are scattered, as they are often included in general checklists and prior to our study the only taxonomic paper on this genus, in this area, was an article by Vila et al. (1999), where the new taxon *Volvariella nigrovolvacea* var. *dunensis* was described. Regional studies on *Volvariella* within the Iberian Peninsula have been published in recent years, as a part of the Flora Mycologica Iberica project (Justo & Castro 2004, Justo et al. 2005).

We present a catalogue of the 12 taxa of *Volvariella* recorded in the Iberian Peninsula and Balearic Islands. For each taxon the following information is given: a list of all collections examined; a map of its distribution in our area and some brief comments on its ecology and phenology.

The catalogue is arranged alphabetically. If not stated otherwise, taxonomic concepts are the same as the ones presented by Boekhout (1990).

### Collections examined

We have studied the collections of *Volvariella* gathered by members of the Mycology Lab at Vigo University from 1991 to 2008. The collections deposited in several recognized Iberian herbaria (AH, ARAN, COFC-F; GDA-GDAC; JA-CUSSTA; LEB; LOU-Fungi; MA-Fungi) have been examined and revised. Collections from other personal herbaria, of independent mycologists and associations, have also been revised and these herbaria are listed and abbreviated as follows: Agustín Caballero (ACAB); Asociación Micológica de Barakaldo (Barakaldo); Associação Micológica A Pantorra (AMP); Carlos Hermosilla (CEH); Centro de Estudios Forestales de Valonsadero (VALON); Francisco Tejedor (PT); Josep Siquier (JLS); Luis Alberto Parra (LAP); Societat Catalana de Micologia (SCAT).

### Distribution data

The provinces of the Iberian Peninsula and Balearic Islands are shown in fig. 1. Abbreviations for province names are given in table 1.

For each taxon a distribution map, containing the following information, is given:

**Grey provinces:** collections of this taxon have been studied

**Provinces with a dot:** bibliographic references about the occurrence of the taxon in the area exist, but no collections have been studied

**Provinces with the letter “D” (doubtful):** bibliographic references about the occurrence of the taxon in the area exist, but possibly they do not correspond to the taxon or, at least, to our taxonomic concept.

### Catalogue

#### 1. *Volvariella bombycina* (Schaeff. : Fr.) Singer, Lilloa 22: 401. 1951 **var. bombycina**

On angiospermous wood, both in living trees or dead stumps, mostly *Populus* and *Ulmus* but also on *Aesculus*, *Celtis*, *Fagus*, *Fraxinus* and *Quercus*. Rarely on straw.

Fruiting from spring (April) to autumn (November).

COLLECTIONS EXAMINED—**SPAIN:** **Ávila:** La Adrada, habitat unknown, 28.X.1986, JM Felter, MA-Fungi 19489; Navaluenga, on dead trunk of *Populus*, 10.VI.1989, FD Calonge, MA-Fungi 22530; *idem*, 16.XI.1989, MA-Fungi 24336; Puerto de Mijares, on trunk of *Fraxinus angustifolia*, 12.XI.1976, M. Tellería, MA-Fungi 4760; **La Rioja:** Calahorra, on *Populus nigra* stump, 8.XI.1996, A. Caballero, ACAB 1963; **Lugo:** Carballedo, at the base of *Aesculus hippocastanum*, 2.XI.2001, J. Rodríguez-Vázquez & S. Padín, LOU-Fungi 16644; **Lleida:** Alins, Ainet de Cardós, on *Populus* trunk, ?IX.1991, M. Tabarés, SCAT 1922; **Granada:** Alhambra de Granada, habitat unknown, 25.IX.1986, L. Cabo, LOU-Fungi 3904; Baza, on *Populus nigra* trunk, 16.X.1973, X. Llimona & G. Malençon, MA-Fungi 43434; Huenejar, on *Ulmus* stump, 19.IV.1996, A. Capilla, GDAC 44888; Proximidades de Baza, on *Ulmus* stump, 16.X.1997, G. Malençon & X. Llimona, GDAC 1134; **Guadalajara:** Alea de Beleña, on *Populus* trunk, 24.VI.1979, B. Moreno, MA-Fungi 4979; **Jaén:** Cambil, en bosque con *Populus nigra*, 27.IV.2003, F. Jiménez, JA-CUSSTA 2125; Orcera, La Nava, in mixed forest of *Populus nigra*, *Pinus halepensis* and *Pinus nigra*, on unidentified wood, 22.XI.2003, J. Reyes-García, JA-CUSSTA 4067; Santa Elena, Ribera de la Aliseda, in mixed forest of *Alnus glutinosa*, *Populus nigra*, *Salix*, *Ulmus minor* and *Pinus pinaster*, on unidentified wood, 20.X.2003, J. Reyes-García, JA-CUSSTA 3342; **Huelva:** Doñana, Encinillas Bajas, in *Quercus suber* forest, on wood, 26.V.1977, M. Pastrana & FD Calonge, MA-Fungi 108; **Madrid:** Alcalá de Henares, Finca La Oruga, on *Populus* stump, 26.IX.1986, M. Heykoop, AH 10248; *idem*, 10.X.1986, C. Illana, AH 10342; Alcalá de Henares, Nueva Alcalá, on *Populus* stump, 5.X.1986, M. Heykoop & C. Illana, AH 10249; Daganzo, Río Torote, on *Populus* trunk, 25.X.1981, JC Segura AH 2217; El Plantío, on dead *Populus* trunk, 12.VII.1978, L. Gil, MA-Fungi 4346; Madrid, Real Jardín Botánico, on *Populus* trunk, 12.VII.1976, A. Martínez, AH 1165; *idem* AH 1268; *idem* MA-Fungi 15017; *idem*, on *Celtis australis* stump, 4.VII.1983, FD Calonge, MA-Fungi 5644; **Navarra:** Baztan, on *Fagus sylvatica* trunk, 6.VII.2002, JM Lekuona, ARAN 5003005; Urdiain, on *Fagus sylvatica* trunk, 12.IX.1998, JM Lekuona, ARAN 5040092; **Sevilla:** Constantina, Cortijo de los Holguirres, on *Quercus suber*, 16.V.2003, N. Rodríguez-Ramos, COFC-F 2948; **Soria:** Almazán, on *Ulmus* trunk, ?X.1987, AM de Azagra, MA-Fungi 21250; Cuevas de Ayllón, on *Ulmus* trunk, 26.VIII.1987, AM de Azagra, MA-Fungi 21246; Lubia, on straw, 26.V.2003, JA Tube, CRI-Fungi 35 (VALON); Ocenilla, on *Fraxinus angustifolia* trunk, 7.VII.1991, F. Martínez-Peña, VALON 604; **Valladolid:** Finca Casasola, on *Populus* stump, 1.IX.1998, A. García-Blanco & al., MA-Fungi 54714; Valladolid, on *Populus* stump, 6.VIII.1994, A. García-Blanco & al., MA-Fungi 54373; Villalba de los Alcores, on straw, 20.IV.2002, A. García-Blanco & al., MA-Fungi 54990

**2. *Volvariella bombycina* var. *flaviceps*** (Murrill) Shaffer, Mycologia 49: 560. 1957.

On angiosperm wood (*Aesculus*).

Collected in March, September and December.

We agree with Shaffer (1957) and treat this taxon as a variety of *V. bombycina* rather than a separate species.

COLLECTIONS EXAMINED—**SPAIN: Girona:** Espinelves, on *Aeusculus hippocastanum* trunk, 5.IX.2002, M. Tabarés, SCAT 4691; **Pontevedra:** Vigo, on unidentified wood, 14.XII.1992, L. Freire, LOU-Fungi 8748; **Valladolid:** Mucientes, habitat unknown, 15.III.2003, A. García-Blanco & al., MA-Fungi 55458.

**3. *Volvariella caesiotincta*** P.D. Orton, Bull. Mens. Soc. Linn. Lyon 43: 319. 1974.

On wood of angiosperms (*Eucalyptus*, *Populus*, *Quercus*) or conifers (*Abies*, *Cedrus*, *Pinus*). Commonly on dead remnants.

Fruiting throughout the year.

COLLECTIONS EXAMINED—**SPAIN: Barcelona:** Collserola, Riera de la Sargantana, on *Populus nigra* wood, 13.IV.2002, M. Tabarés, SCAT 4690; **Gipuzkoa:** Astigarraga, under *Pinus radiata*, on unidentified stump, 18.XI.2002, JM Lekuona, ARAN 3004061; **Madrid:** Madrid, Parque del Oeste, under *Cedrus atlantica*, on wood remnants, 6.VII.2005, L.Parra, LOU-Fungi 18924; **Málaga:** Parque Natural Sierra de las Nieves, Yunquera, on *Abies pinsapo* wood, 3.XII.2003, A. González-Prieto, AH 34633; **Navarra:** Larran, on *Fagus sylvatica* stump, 12.X.2000, PM Pasabán, ARAN 5037215; idem ARAN s.n.; Saldise, on wood remnants, 28.X.1998, ARAN s.n.; **Pontevedra:** Vigo, A Guía, on *Eucalyptus* wood, 11.XI.1992, J. Fernández-Pérez, LOU-Fungi 7000; **Toledo:** La Iglesiasuela, on stump of *Quercus ilex* subsp. *ballota*, 20.XI.1996, F. Esteve-Raventós & al., AH 24545; **Valladolid:** Sieteiglesias de Trabanco, on *Populus* stump, 14.VI.1999, A. García-Blanco & al., MA-Fungi 54718; Valladolid, on *Populus* stump, 8.IX.1993, A. García-Blanco & al., MA-Fungi 54374.

**4. *Volvariella dunensis*** (Vila, Àngel & Llimona) Justo & M.L. Castro, Mycotaxon 112: 262. 2010

In open dunes.

Recorded in February.

For a full description and comments see Justo & Castro (2010) and Vila et al. (1999).

COLLECTIONS EXAMINED—**SPAIN: Barcelona:** Viladecans (Baix Llobregat), platja del Remolar, in open dunes, 5.II.1998, J. Vila & F. Àngel, SCAT 3512 [Holotype]; El Prat de Llobregat, El Pinar, in open dunes, 8.II.1997, F. Àngel, SCAT 3513.

**5. *Volvariella earlei*** (Murrill) Shaffer, Mycologia 49: 550. 1957.

Terrestrial, in gardens.

Collected during summer (July–August).

The doubtful records in the map were made under the names "*Volvaria media*" or "*Volvariella media*" and may or may not correspond to our concept of *V. earlei*. For a full description and comments see Justo & Castro (2010).

COLLECTIONS EXAMINED—**SPAIN: Madrid:** Móstoles, Urbanización Parque Coímbra, in garden, 7.VIII.1986, FD Calonge, MA-Fungi 16324; *idem*, 7.VII.1987, MA-Fungi 19490; *idem*, 20.VIII.1989, MA-Fungi 22816.

**6. *Volvariella gloiocephala* (DC. : Fr.) Boekhout & Enderle, Beitr. Kennt. Pilze MittlEur. 2: 78. 1986.**

Terrestrial, in gardens, parks, grassy fields, etc, in or outside woods.

Fruiting throughout the year but more commonly recorded during autumn (October–December). This is the most common species of *Volvariella* in the area.

COLLECTIONS EXAMINED—**SPAIN: A Coruña:** Corcubión, Finisterre, in grassy field, 12.XI.1983, M. Pérez-Froiz & L. Freire, LOU-Fungi 6349; **Álava:** Fontecha, in cereal field, 7.XI.1999, CE Hermsilla & al., MA-Fungi 42062; **Almería:** Cobdar, habitat unknown, 1.XII.1983, FD Calonge, MA-Fungi 5864; Tahal, Pinar de la Zanja, in grassy field, 22.XI.2003, E.Gallego-Arjona, JA-CUSSTA 5283; **Badajoz:** Auraga, Dinca Zurrón, in grassy field, 6.XI.1988, J. R. García, MA-Fungi 33548; **Barcelona:** Barcelona, Jardins Vila Olímpica, in grassy field, 5.VIII.1993, A. Rocabrúna & J. Vila, SCAT 2169; Gavà (Baix Llobregat), Les Maioles, in fixed dunes, among grass, 28.X.1990, F. Àngel, SCAT 3761; Premià de Mar (el Maresme), in garden, 22.VII.1998, A. Rocabrúna, SCAT 3431; *idem*, in cultivated field, 1.II.1995, SCAT 2495; **Cáceres:** Plasencia, habitat unknown, 10.XII.1978, Rivas Alberdi & F. Calonge, MA-Fungi 5315; **Cádiz:** Grazalema, in mixed forest of *Cupressus* and *Olea europaea*, in humus, 1.XI.2003, A. González-Cruz & F. Prieto-García, JA-CUSSTA 2522; Jimena de la Frontera, Loma La Peña, in mixed forest of *Quercus suber*, *Q. canariensis*, *P. lentiscus*, in humus, 29.XI.2003, A. González-Cruz, JA-CUSSTA 2809; Villaluenga del Rosario, La Covezuela, in grassy field, under *Quercus suber*, 20.X.2002, A. Castro, MA-Fungi 59827; **Ciudad Real:** Manzanares, in garden, XI.1978, M. Peinado, AH 1457; **Córdoba:** Cerro Muriano, embalse de Guadalupe, on straw, 26.XI.2000, A. Castro, MA-Fungi 55274; Córdoba, in mixed forest of *Pinus halepensis*, *Quercus rotundifolia*, *Pinus pinaster*, *Cistus*, 11.XI.2003, J.C. Prieto-Baena, JA-CUSSTA 1305; Hornachuelos, Cuesta de los Chinos, in forest of *Quercus suber* & *Q. ilex*, 3.XI.2003, T. Illescas, JA-CUSSTA 5436; Montoro, Casilla del Jurado, in mixed forest of *Quercus rotundifolia*, *Cistus*, *Eucalyptus*, 6.XI.2003, O. Sánchez-Escamilla, JA-CUSSTA 4208; **Granada:** Granada, Jardín de la Facultad de Ciencias, in grassy field, 13.I.1979, A. Ortega, GDAC 11337; Urbanización Monteoliva, on the ground, 15.XI.1992, D. Sousa, GDAC 36390; **Guadalajara:** Trillo, habitat unknown, 4.V.1986, V. Salazar,

MA-Fungi 15801; **Huelva:** Aracena, in field rich in nitrogen, 6.XII.1989, A. Ortega, GDAC 38118; Aracena, Finca Valbono, in grassy field, 4.XI.2003, L. Parra & A. Justo, LOU-Fungi 18247; Aracena, La Galbana, in mixed forest of *Quercus ilex* subsp. *ballota*, *Q. suber*, *Olea europaea*, on the ground, 18.X.2003, L. Romero de la Osa, JA-CUSSTA 3005; Carretera de El Rocío a Almonte, habitat unknown, 19.XI.1976, F.D. Calonge & al., MA-Fungi 76; El Talenque, in grassy field, 5.XI.2003, A. Justo, LOU-Fungi 18244; *idem*, LOU-Fungi 18246; Las Chinas, Galaroza, in field rich in nitrogen, 22.XI.1990, A. Ortega, GDAC 38119; Navahermosa, among fallen leaves, 5.XI.2003, A. Justo, LOU-Fungi 18245; Playa de Cerro Gordo, in field rich in nitrogen, 24.I.1978, A. Ortega, GDAC 11336; **Jaén:** Andujar, Zona del Jabalí, in forest of *Quercus rotundifolia*, 11.XI.2003, F. Jiménez, JA-CUSSTA 3398; Santa Elena, Umbria. Collado de Los Jardines, in forest of *Quercus ilex*, on the ground, 7.XII.2002, J. Reyes-García, JA-CUSSTA 2329; Santiago-Pontones, Cañada Hermosa, in grassy field with *Populus nigra*, 25.X.2003, J. Reyes-García, JA-CUSSTA 3795; **La Rioja:** Santa Lucía, in grassy field, 3.XI.1984, A. Caballero, ACAB 410; Villarroja, in grassy field, 26.IV.1987, A. Caballero, ACAB 710; Calahorra, on straw, 19.I.2005, A. Caballero, ACAB 3012; **Madrid:** Alcalá de Henares, Campus Universitario, in cultivated nitrified field, 15.XI.1984, AH 3769; *idem*, 10.III.1979, C. Lado, AH 1282; Alcalá de Henares, Facultad de Farmacia, habitat unknown, 8.XI.1979, G. Moreno, GDAC 11798; *idem*, MA-Fungi 1834; *idem*, MA-Fungi 46045; Alcalá de Henares, "La Oruga", among leaves of *Alianthus*, 28.X.1986, C. Illana & M. Heykoop, AH 10247; *idem*, under *Populus*, 15.X.1986, AH 10255; *idem*, habitat unknown, 21.X.1986, M. Heykoop, AH 10343; Alcalá de Henares, Parque Bomberos, in grassy field, 11.X.1986, C. Illana & M. Heykoop, AH 10245; Alcalá de Henares, Puente Zulema, on road verge, 12.X.1986, C. Illana & M. Heykoop, AH 10246; Alcalá de Henares, Río Henares, in grassy field, 8.XI.1979, A.A. Winzer, AH 2182; Colmenar del Arroyo, habitat unknown, 5.XII.1976, F.D. Calonge, MA-Fungi 4640; Madrid, Ciudad Universitaria, on sandy soil, V.1974, G. Moreno, AH 1167; Madrid, Real Jardín Botánico, habitat unknown, 25.X.1982, M. Pastrana, MA-Fungi 4429; *idem*, 28.IX.1976, J. Merino, MA-Fungi 14991; Móstoles, habitat unknown, XI.1986, F.D. Calonge, MA-Fungi 31240; Rascafría, Sierra de Guadarrama, habitat unknown, 9.II.1975, J.A. Alonso, AH 1168; **Málaga:** Málaga, Pocopán, in grassy field, 22.XI.2003, alumnos curso contadoras, JA-CUSSTA 5905; Motejaque, Arroyo del Cupil, habitat unknown, 13.XII.2000, A. Castro, MA-Fungi 50949; Paranta, Los Quejigares, in mixed forest of *Pinus pinaster*, *Quercus ilex* subsp. *ballota*, *Albies pinsapo*, in humus, 3.XI.2003, A. González-Cruz & F. Prieto-García, JA-CUSSTA 2924; **Navarra:** Ollo, on road verge, 18.XI.2000, Z.E. Aranzadi, ARAN 5028001; Saldise, in humus, 28.X.1998, P. Pasabán, ARAN-s.n.; **Pontevedra:** Cangas, Cabo Home, in *Pinus forest*, in dunes, 10.XI.2001, A. Justo LOU-Fungi 17310; Cangas, under *Citrus limon*, 9.XI.1997, A. Soliño, LOU-Fungi 9321; Redondela, Cesantes, on cultivated field, 13.IV.2004, J. Carlos Alonso-Lago, LOU-Fungi 18617; Vigo, A Guía, in grassy field, 22.XI.1992, L. Freire et al., LOU-Fungi 4026; Vigo, Sampaio, in cultivated field, 27.X.1994, J. Rodríguez-Vázquez, LOU-Fungi

4493; Vigo, Areal, on roadside, 25.X.1994, L. Freire, LOU-Fungi 7588; Vilagarcía de Arousa, in grassy field, 18.XI.1987, E. Valdés-Bermejo, LOU-Fungi 3013; **Sevilla**: Cazalla de la Sierra, Cortijo de la Cartuja de Cazalla, in forest of *Quercus ilex* subsp. *ballota*, 22.X.2002, N. Rodríguez-Ramos, COFC 2184; Cazalla de la Sierra, La Atalaya, in forest of *Quercus ilex* subsp. *ballota*, 29.X.2003, N. Rodríguez-Ramos, COFC 2919; El Pedroso, La Jarosa, in forest of *Quercus ilex* subsp. *ballota*, 5.XI.2002, N. Rodríguez-Ramos, COFC 2704; El Real de la Jara, La Mina, in forest of *Quercus ilex* subsp. *ballota*, 7.XI.2003, N. Rodríguez-Ramos, COFC 2947; Guadalcanal, Finca Donadio, in forest of *Quercus ilex* subsp. *ballota*, 9.I.2003, A. J. Montes-García, COFC 2185; **Soria**: Matamala de Almazán, in humus, 28.XI.2002, I. Azpilicueta, CRI.Fungi 20 (VALON); **Toledo**: Carriches, habitat unknown, 7.XI.1977, M. Jérez, MA-Fungi 5198; **Valladolid**: Herrera de Duero, on straw, 20.I.1990, A. García-Blanco & al., MA-Fungi 54375; Tudela de Duero, in forest of *Quercus ilex*, 22.XI.1992, G.M.L., LEB 996; Valladolid, in grassy field, 4.V.2003, A. García-Blanco & al., MA-Fungi 55459; **Zamora**: Puebla de Sanabria, in forest of *Quercus robur*, 19.X.1999, M. LOU-Fungi 17311; **PORTUGAL**: **Beira Litoral**: Leiría, Marinha Grande, in margin of a dune, 10.XI.2000, M. Castro, LOU-Fungi 17312; **Trás-os-Montes e Alto Douro**: Mogadouro, Trindade, on the ground, 2.XI.2002, A. Sarmiento, LOU-Fungi 18619; idem, R. Blanco, LOU-Fungi 18618.

**7. *Volvariella hypopithys* (Fr.) Shaffer, Mycologia 49: 572. 1957.**

Terrestrial, in grassy fields, in or outside woods.

Fruiting during autumn (October–December) and spring (May).

COLLECTIONS EXAMINED— **SPAIN**: **Almería**: Almería, Campus UAL, in grassy field, 24.X.2003, E. Gallego-Arjona & J. Sánchez, JA-CUSSTA 5093; **Formentera**: Es Pla del Rei, mixed forest of *Pinus halepensis* and *Juniperus phoenicea*, 15.XI.1994, J.L. Siquier, AH 16917; **Jaén**: Puente de la Sierra, under *Populus*, spring.1988, F. Jiménez, GDAC 36618; **Navarra**: Aqueñeta, on humus, under *Pinus sylvestris*, 22.X.1981, AP. Losantos, AH 13808; **Valladolid**: Aldeamayor de San Martín, 27.V.1993, in mixed forest of *Pinus* and *Populus*, A. García-Blanco & al., MA-Fungi 54377; Herrera de Duero, in grassy field under *Quercus ilex*, 11.V.1996, A. García-Blanco & al., MA-Fungi 54376, habitat unknown, 1.XII.1983, FD. Calonge, MA-Fungi 5864.

**8. *Volvariella murinella* (Qué.) M.M. Moser ex Dennis, P.D. Orton & Hora, New check list of British Agarics and Boleti: 167. 1960.**

Terrestrial, in grassy fields, in and outside woods.

Fruiting from September to November.

COLLECTIONS EXAMINED— **SPAIN**: **Cabrera (Islas Baleares)**: Serre de Ses Figueres, in *Pinus halepensis* forest, 22.XI.1994, J.L. Siquier, JLS C89B; **Mallorca**: Bunyola, Sa Comuna de Bunyola, among fallen leaves of *Quercus ilex*, 10.XI.1998, JLS 873B; **Pontevedra**: Cangas, Cabo Home, in *Pinus*

forest, 31.X.1986, S. Vieito, LOU-Fungi 4352; **Granada:** Huetor-Santillana, in grassy field, 7.IX.2001, A. Ortega, JA-CUSSTA 1679.

**9. *Volvariella pusilla* (Pers.: Fr.) Singer, Lilloa 22: 401. 1951.**

Terrestrial, in grassy fields, in and outside woods.

Fruiting during autumn (October–December) and also in spring (April–May) or summer (August).

COLLECTIONS EXAMINED— **SPAIN:** **Álava:** Aguilñiga, in grassy field, 3.XI.1978, Moreno & Pérez Moral, MA-Fungi 5317; **Asturias:** Somiedo, Éndriga, under broad-leaved trees, 5.X.2005, R. Picón, LOU-Fungi 18991; **Barcelona:** Caldes d'Estrach (el Maresme), in grassy field, 4.VIII.1998, A. Rocabrana, SCAT 3408; Cantonigros, in grassy field, 1.IX.1986, A. Rocabrana & M. Tabarés, SCAT 103; **La Rioja:** Bergasa, bajo *Populus nigra*, 17.IV.1988, A. Caballero, ACAB 968; **Murcia:** Murcia, Jardín del Malecón, habitat unknown, 26.XI.1983, M. Honrubia & F. J. Gea, MA-Fungi 44621; *idem*, 6.XI.1987, F.J. Gea, MA-Fungi 44622; Teatinos, Sierra Fuensanta, pinar de *Pinus halepensis*, 8.XII.1983, J.M. Egea, MA-Fungi 44623; **Palencia:** Frómista, Iglesia de San Pedro de Frómista, on the ground, 4.IX.2001, J. Rodríguez-Vázquez & S. Padín, LOU-Fungi 16647; **Salamanca:** La Orbada, in forest of *Quercus ilex*, 27.V.2000, A. García-Blanco & al, MA-Fungi 54716; **Sevilla:** Guadalcanal, Rivera Benalija, habitat unknown, 15.V.2002, N. Rodríguez-Ramos, COFC 2689.

**10. *Volvariella surrecta* (Knapp) Singer, Lilloa 22: 401. 1951.**

On basidiocarps of *Clitocybe nebularis* (Batsch. : Fr.) P. Kumm.

Fruiting during autumn (October–December).

COLLECTIONS EXAMINED— **SPAIN:** **Álava:** Without locality, on basidiocarps of *Clitocybe nebularis*, 17.X.1976, Olano & Manso, MA-Fungi 4808; **Burgos:** Alarcía, in *Quercus* forest, on basidiocarps of *Clitocybe nebularis*, 1.X.1997, LA Parra, LAP 14; **Navarra:** Aralar, on basidiocarps of *Clitocybe nebularis*, 21.X.1993, X. Laskibar, ARAN 5266277; **Pontevedra:** Pontevedra, Lourizán, on basidiocarps of *Clitocybe nebularis*, 10.XII.1997, JB Blanco-Dios, LOU-Fungi 9286.

**11. *Volvariella taylorii* (Berk. & Broome) Singer, Lilloa 22: 401. 1951.**

Terrestrial, in grassy fields, in and outside woods.

Fruiting from spring (April) until autumn (October).

*V. taylorii* is not considered as a variety of *V. pusilla* (Boekhout, 1990), but a separate species based on preliminary molecular data.

COLLECTIONS EXAMINED— **SPAIN:** **Barcelona:** Collserola, habitat unknown, 20.X.199, M. Tabarés, SCAT 4693; *idem*, in mixed forest of *Pinus* and *Quercus*, ?.X.1980, SCAT 4694; Sant Cugat (Vallès Occidental), in garden, 23.IX.1988, M. Tabarés, SCAT 1106; **La Rioja:** Villarroya, under *Quercus ilex*, 8.VI.1986, A. Caballero, ACAB 643; Bergasa, under *Populus nigra*,



17.IV.1988, A. Caballero, ACAB 970; Calahorra, in grassy field, 26.X.2000, A. Caballero, ACAB 2348; Anguiano, on humus, 27.IV.2002, A. Caballero, ACAB 2486; Calahorra, in grassy field, 7.IX.2004, A. Caballero, ACAB 2908; **Lleida:** Pont de Suert (Ribagorça), in grassy field, 15.X.2001, A. Rocabrúna, SCAT 3968; **Madrid:** Alcalá de Henares, Cerros de la Tabla Pintora, in xerophytic meadow, 15.V.1988, C. Illana & al., AH 10979; Madrid, Parque de El Retiro, habitat unknown, 13.VI.1982, F. Sánchez, MA-Fungi 20700; **Mallorca:** Muro, La Roca, on sandy soil, 2.XI.1994, J. L. Siquier, AH 16916; **Sevilla:** Cazalla de la Sierra, Cortijo de la Cartuja de Cazalla, under *Olea europaea*, 22.X.2002, N. Rodríguez-Ramos, COFC 2129; **Soria:** Valonsadero, in grassy field, 26.VII.1991, M. Fernández-Toirán, VAL-Fungi 615, **PORTUGAL: Algarve:** Faro, Santa Bárbara de Nexe, Goldra de Baixo, under *Quercus suber*, 15.XI.2004, A. Frutuoso, LOU-Fungi 18727.

## 12. *Volvariella volvacea* (Bull. : Fr.) Singer, Lilloa 22: 401. 1951.

On organic remnants (fallen leaves, sawdust, compost), in or outside woods.

Mostly recorded during spring and summer (April–June), more rarely during autumn (October–December).

COLLECTIONS EXAMINED— **SPAIN: Barcelona:** Olzinelles (Vallès Oriental), in mixed forest of *Alnus*, *Populus*, *Platanus*, 2.XII.2001, M. Tabarés & A. Rocabrúna, SCAT 3921; **Córdoba:** Aguilar de la Frontera, La Fuentecilla, in field with *Olea europaea*, 16.X.2003, A. Montes-Camino, JA-CUSSTA 6378; Carcabuey, Campanillas, in forest with *Olea europea*, 5.IV.2003, J. Gómez-Fernández & al., JA-CUSSTA 587; *idem*, 2.V.1998, GDAC 4281; **Granada:** Güejar, under *Populus*, on sandy soil, 4.V.1996, A. Capilla, GDAC 44889; **La Rioja:** Villarroya, under *Quercus ilex*, 18.VI.1988, A. Caballero, ACAB 1043; **León:** Villaobispo, in forest of *Populus*, 26.IV.1988, G.M.L., LEB 397; **Madrid:** Madrid, Casa de Campo, on sawdust, 12.X.1987; D. Rubio, MA-Fungi 20179; Torrelaguna, habitat unknown, 26.V.1979, B. Moreno, MA-Fungi 3071; **Soria:** Almazán, in grassy field under *Populus*, 29.IV.1998, leg. unknown, VAL-Fungi 1474; **Valladolid:** Santiago del Arroyo, habitat unknown, 20.V.1979, E. Méndez, MA-Fungi 4687; Sieteiglesias de Trabanco, habitat unknown, 1.VI.1998, A. García-Blanco & al., MA-Fungi 54717.

### Acknowledgments

Felipe Wartchow and Andrew M. Minnis are thanked for their very helpful comments on the pre-submission reviews. All persons and institutions mentioned in the "collections examined" paragraph are gratefully acknowledged for managing the loans of specimens. This work is included in the project Flora Mycologica Iberica VI (CGL2006–12732–C02–01/BOS).

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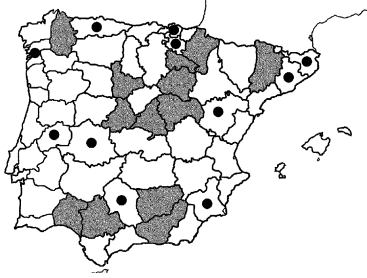
Fig. 1. Provinces of the Iberian Peninsula and Balearic Islands



Table 1. Provinces of the Iberian Peninsula and Balearic Islands

<b>ANDORRA</b>		Córdoba	Co	Palencia	P	Mallorca	Mill
Andorra	And	A Coruña	C	Pontevedra	Po	Menorca	Mn
		Cuenca	Cu	La Rioja	Lo		
<b>SPAIN</b>		Girona	Ge	Salamanca	Sa	<b>PORTUGAL</b>	
Álava	Vi	Granada	Gr	Segovia	Sg	Algarve	Ag
Albacete	Ab	Guadalajara	Gu	Sevilla	Se	Alto Alentejo	AAI
Alicante	A	Guipúzcoa	SS	Soria	So	Baixo Alentejo	BAI
Almería	Al	Huelva	H	Tarragona	T	Beira Alta	BA
Asturias	O	Huesca	Hu	Teruel	Te	Beira Baixa	BB
Ávila	Av	Jaén	J	Toledo	To	Beira Litoral	BL
Badajoz	Ba	León	Le	Valencia	V	Douro Litoral	DL
Barcelona	B	Lleida	L	Valladolid	Va	Estremadura	E
Burgos	Bu	Lugo	Lu	Vizcaya	Bi	Minho	Mi
Cáceres	Cc	Madrid	M	Zamora	Za	Ribatejo	R
Cádiz	Ca	Málaga	Ma	Zaragoza	Z	Tras-os-Montes e Alto Douro	TM
Cantabria	S	Murcia	Mu	Islas Baleares	PM		
Castellón	Cs	Navarra	Na	Formentera	Fo		
Ciudad Real	CR	Ourense	Or	Ibiza	Ib		

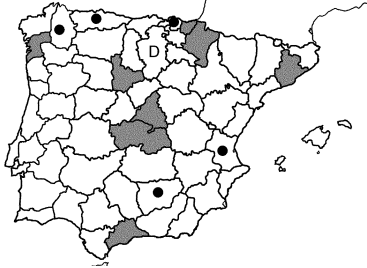
Distribution Maps



1. *Volvariella bombycina* var. *bombycina*



2. *Volvariella bombycina* var. *flaviceps*



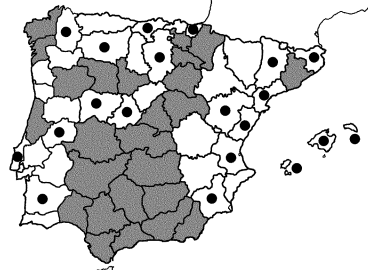
3. *Volvariella caesiotincta*



4. *Volvariella dunensis*



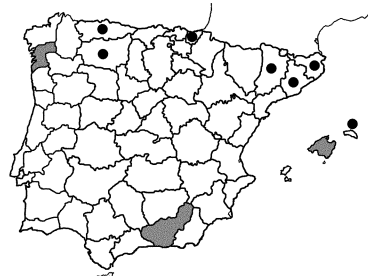
5. *Volvariella earlei*



6. *Volvariella gloiocephala*



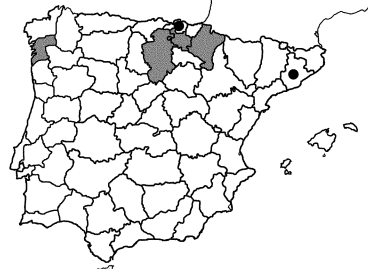
7. *Volvariella hypopithys*



8. *Volvariella murinella*



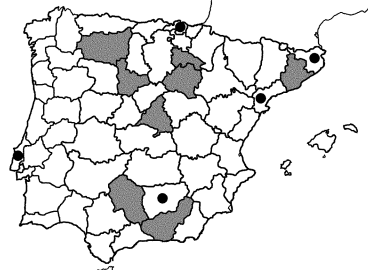
9. *Volvariella pusilla*



10. *Volvariella surrecta*



11. *Volvariella taylorii*



12. *Volvariella volvacea*