Contributions to the macrofungi of Bingöl, Turkey

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Abstract: The present study was carried out on macrofungi samples collected from Bingöl Province between 2006 and 2010. As a result of field and laboratory investigations 112 species belonging to Ascomycota and Basidiomycota were determined. Ten of them are new records for the Turkish mycobiota: Orbilia auricolor (A. Bloxam) Sacc.; Orbilia luteorubella (Nyl.) P. Karst.; Mollisia lividofusca (Fr.) Gillet; Calycina languida (P. Karst.) Baral, R. Galán & G. Platas; Vibrissa bilisporia (Bonord.) Korf & A. Sánchez; Iodophanus carneus (Pers.) Korf; Amanita Gilbertii Beausaign.; Conocybe brachypodi (Velen.) Hauskn. & Svrček; Coprinopsis cordispora (T. Gibbs) Gminder; and Paxillus vernalis Watling.

Key words: Macrofungi, new records, taxonomy, Bingöl, Turkey

1. Introduction
Scientific studies on Turkish macromycota have a history of approximately 100 years. Such studies increased considerably in the last 20 to 30 years and checklists were prepared by Sesli and Denchev (2014). Additional contributions were also made to these checklists by Sesli and Moraeu (2015), Acar et al. (2015), Akata and Doğan (2015), Akata et al. (2016), Demirel et al. (2016), and Sesli et al. (2016).

This study aims to make a contribution to the mycobiota of Turkey by determining the macrofungal diversity of Bingöl Province.

2. Materials and methods
Macrofungi samples were collected from different localities of Bingöl Province between 2006 and 2010. Bingöl is an Eastern Anatolian province of Turkey, surrounded by Erzurum and Erzincan to the north, Tunceli and Elazığ to the west, Diyarbakır to the south, and Muş to the east (Figure 1). The province falls in the Irano-Turanian phytogeographical region and a large part of it is located in B8 according to the grid square system of Davis (1965).

The majority of the forested areas are covered by oak forest; in this regard, Bingöl is one of the richest provinces of Eastern Anatolia. Pine forests are dominant, especially in southern parts of Genç district. Cedar, pine, fir, poplar, willow, alder, crab-apple, and apricot trees are some other trees related to the macrofungal growth in the region.

During field studies geographical positions and the features of samples related to morphology and ecology were recorded. Specimens were also photographed with a Canon (EOS 60D) camera equipped with Tokina 100 mm macro lens.

Microscopic studies were performed at Yüzüncü Yıl University according to Clémençon (2009). Dried specimens were sectioned with new bistouries under a Leica EZ4 stereo microscope; obtained sections were stained with Congo red, Melzer's reagent, and KOH (5 %) and examined under a Leica DM500 research microscope. Color images of microscopic characters were obtained with a Leica ICC50 HD camera and Leica Application Suite (version 3.2.0) software was used for measurements. The specimens were identified according to Breitenbach and Kränzlin (1984–2000), Kränzlin (2005), Thompson (2013), Beug et al. (2014), and Kuo and Methven (2014). All specimens were deposited in the fungarium of Yüzüncü Yıl University (VANF).

3. Results
The systematics of the species are given in accordance with Cannon and Kirk (2007), Kirk et al. (2008), and the MycoBank Database and Index Fungorum internet
sources (accessed 1 January 2017). The species are listed in alphabetical order together with their habitats, localities, collection date, and collector numbers (Uz-B. means Uzun-Bingöl). New records are marked with an asterisk and described briefly.

**ASCOMYCOTA**

**Orbiliomycetes**

**Orbiliales**

**Orbilaceae** Nannf.


On dead decorticated branch of oak, Genç, Tarlabaşı village, 38°41.473′N, 40°29.391′E, 1165 m, 14.10.2010, Uz-B. 1239.

**Macroscopic and microscopic features**

**Fruiting body** 0.3–0.9 mm diam., superficial, sessile, pale cream, smooth, plane, margin even. **Ectal excipulum** composed from base to margin of globose or subglobose cells, 6.3–12 µm diam., with thin or slightly thickened walls. **Asci** 30–45 × 3.5–5 µm in dead state, cylindrical-clavate, tapered and often forked at the base, apex rounded or truncate-rounded, 8-spored. **Ascospores** 9–12 × 1–1.5 µm, hyaline, banana-shaped or narrowly clavate, medium curved, broadest above and slightly tapered to the rounded basal end, nonseptate. **Paraphyses** hyaline, cylindrical-clavate, sejate in the lower part, 1.5–2 µm diam. (Figure 2).

3.2. *Orbilia luteorubella* (Nyl.) P. Karst.

On dead decorticated branch of willow, Bingöl, Ekipolu village, streamside, 38°54.575′N, 40°34.568′E, 1050 m, 09.11.2008, Uz-B. 1055.

**Macroscopic and microscopic features**

**Fruiting body** nearly plane, often depressed in the centre, sessile, 0.2–1.5 mm diam., smooth and waxy, semitranslucent, initially pallid, then orange, pale
yellowish red, pinkish orange or yellowish brown. **Asci** 30–40 × 4–5 μm, 8-spored, cylindrical, clavate. **Ascospores** 6–11 × 1–1.7 μm, fusoid, filiform, biseriate, hyaline, sometimes guttulate. **Paraphyses** filiform, quite slender, with distinctly swollen spherical to pear shaped tips, 2–2.5 μm at tips (Figure 3).

**Pezizomycetes**
**Helotiales**
**Dermateaceae** Fr.

3.3. *Mollisia lividofusca* (Fr.) Gillet
On dead corticated branch of oak, Genç, conifer forest, 38°44.795′N, 40°34.305′E, 1143 m, 14.10.2010, Uz-B. 1236.

**Macroscopic and microscopic features**
**Fruiting body** 0.5–2.5 mm, closed and globular at first, then saucer-shaped to irregularly disk-shaped, slightly cupuliform to subetalized at the end, resting sessile and on a dark brown subiculum, hymenium off-white to gray, margin somewhat lighter, subhymenium brown, in intricate texture, formed of parallel hyphae, loosely arranged, septate and sometimes having a bulge on either side of the septum, about 2–4 μm in diam. **Asci** 45–55 × 5–7 μm, 8-spored. **Ascospores** 7–12 × 2–3 μm, cylindrical-fusiform to fusiform, straight to slightly curved, hyaline, without septa. **Paraphyses** 55–60 × 2–3 μm, filiform,
sometimes slightly enlarged at the apex, unbranched (Figure 4).

**Hyaloscyphaceae** Nannf.

3.4. *Calycina languida* (P. Karst.) Baral, R. Galán & G. Platas
On dead branch of oak, Genç, Cumhuriyet neighborhood, 38°45.154′ N, 40°34.049′ E, 1017 m, 08.11.2008, Uz-B. 1045.

**Macroscopic and microscopic features**

Fruiting body 0.2–0.4 mm, white-yellowish pale cream, whitish when dry, generally smooth, sessile or with a stalk up to 0.4 mm. **Asci** clavate, 60–80 × 4.5–6 µm, eight-spored, pore blue in IKI. **Ascospores** biseriate, 6–7.5(–9) × 2–3 µm, cylindrical, ellipsoid-clavate, narrowed towards the base with 1–2 drops in each end. **Paraphyses** filiform, 1.5–2 µm (Figure 5).

**Lachnaceae** Raitv.

3.5. *Capitotricha bicolor* (Bull.) Baral
On dead branch of oak, Genç, Tarlabası village exit, 38°41.580′ N, 40°29.291′ E, 1276 m, 05.05.2009, Uz-B.1231.

**Vibrisseaceae** Korf

3.6. *Vibrissea filisporia* (Bonord.) Korf & A. Sánchez
On dead branch of willow, Bingöl, Aftor location, the gardens, 38°52.390′ N, 40°31.633′ E, 1049 m, 05.05.2008, Uz-B. 582.
Macroscopic and microscopic features

Fruiting body 0.4–1.5 mm, spherical at first, cup to plate-shaped with flat disk when mature, generally as tall as broad, sessile, hymenium smooth, pale grayish, margin and outer surface red-brownish to dark brown and finely granular. Asci cylindrical, 185–200 × 6–7 µm, eight-spored, spores lying parallel, no color change in IKI. Ascospores 150–185 × 1–1.5 µm, filiform, multiply septate, hyaline, smooth, ends rounded. Paraphyses cylindrical, septate, sometimes branched with clavate thickenings toward the tips (Figure 6).

Pezizales
Helvellaceae Fr.

3.7. Helvella acetabulum (L.) Quél.
Under poplar, Bingöl, Ekinayolu village, 38°54.578´N, 40°34´525´E, 1051 m, 19.05.2007, Uz-B. 282; under oak, Solhan, Yüzen island hamlet, 38°58.284´N, 40°56.667´E, 1338 m, 30.04.2009, Uz-B. 1084.

Under poplar, Bingöl, Güveçli village, streamside, 38°50.881´N, 40°31.602´E, 1046 m, 28.05.2006, Uz-B. 23; Bingöl, Ekinayolu village, 38°54.578´N, 40°34.525´E, 1051 m, 19.05.2007, Uz-B. 283; Bingöl, Aşağı Çarşı neighborhood, side of Çapakçur stream, 38°53.652´N, 40°28.621´E, 1138 m, 20.05.2007, Uz-B. 315; Bingöl, Horsan hamlet, side of Horsan stream, 38°56.071´N,
Under poplar, Bingöl, Ekinyolu village, roadside, 38°54.549′N, 40°34.573′E, 1054 m, 05.05.2007, Uz-B. 232.

3.10. *Paxina queletii* (Bres.) Stangl
Under poplar, Bingöl, Ekinyolu village, garden of Ali Atala, 38°53.056′N, 40°33.837′E, 1016 m, 01.05.2009, Uz-B. 333; under mixed willow and poplar trees, Bingöl, Ekinyolu village, garden of Ali Atala, 38°53.056′N, 40°33.837′E, 1016 m, 01.05.2009, Uz-B. 1132.

3.11. *Morchella angusticeps* Peck
Under willow, Bingöl, Abdulkadir Sari recreation site, streamside, 38°54.123′N, 40°33.219′E, 1027 m, 23.04.2008, Uz-B. 531.

Under mixed willow and poplar trees, Bingöl, Sarıçicek village, 38°53.959′N, 40°36.920′E, 1057 m, 01.05.2009, Uz-B. 1097.

Under mixed willow and poplar trees, Bingöl, Ekinyolu village, garden of Ali Atala, 38°53.056′N, 40°33.837′E, 1016 m, 01.05.2009, Uz-B. 1122a.

Among mosses, Bingöl, Sarıçicek village, streamside, 38°53.977′N, 40°36.901′E, 1056 m, 24.04.2008, Uz-B. 545.

3.15. *Verpa conica* (O.F. Müll.) Sw.
Among mosses, Bingöl, Sarıçicek village, streamside, 38°53.977′N, 40°36.901′E, 1056 m, 24.04.2008, Uz-B. 545.

3.16. *Iodophanus carneus* (Pers.) Korf
On dung, Genç, Tarlabası village, 38°41.473′N, 40°29.391′E, 1165 m, 14.10.2010, Uz-B. 1240.

Figure 5. *Calycina languida*: a) fruiting bodies, b) asci and paraphyses (KOH), c) ascus apexes (IKI), d) paraphyses (KOH), e) ascospores (living state).
Macroscopic and microscopic features

**Fruiting body** 0.5–1.5 mm wide, knoblike when young, then turbinate, resting stalkless on the substrate, hymenium rough, convex to cushion-like, pale pink to salmon-colored, brownish when old, margin uneven, outer surface the same color, growing gregariously. **Asci** 190–210 × 25–28 µm, 8-spored, spores biseriate, amyloid. **Paraphyses** slender, septate, tips thickened to 10 µm. **Ascospores** 19–23 × 11–13 µm, elliptical, hyaline, verrucose, without drops (Figure 7).

**Pyronemataceae** Corda

3.17. **Scutellinia scutellata** (L.) Lambotte

On remains of willow, Bingöl, Ekinylu village, 38°54.578′N, 40°34′525′E, 1051 m, 20.05.2008, Uz-B. 755.

**BASIDIOMYCOTA**

**Agaricales**

**Agaricaceae** Chevall.

3.18. **Agaricus bitorquis** (Quél.) Sacc.

Sandy area, near of willow, Solhan, Arakanok town, roadside, sandy area, 38°56.534′N, 41°08.794′E, 1654 m, 27.05.2006, Uz-B. 4.

3.19. **Agaricus litoralis** (Wakef. & A. Pearson) Pilát

In meadow, Bingöl, Çukurca village, 38°55.252′N, 40°31.029′E, 1248 m, 14.05.2008, Uz-B. 634.

3.20. **Agaricus macrocarpus** F.H. Møller

In meadow, Genç, Genç petrol station side, mosque garden, 38°44.929′N, 40°33.206′E, 1003 m, 03.05.2009, Uz-B. 1200.

3.21. **Agaricus moelleri** Wasser

Under poplar, Bingöl, Güveçli village, streamside, 38°50.881′N, 40°31.602′E, 1046 m, 18.10.2008, Uz-B. 917.

3.22. **Agaricus sylvicola** (Vittad.) Peck

In meadow, Bingöl, Güveçli village, streamside, 38°50.881′N, 40°31.602′E, 1046 m, 02.05.2009, Uz-B. 1156.

3.23. **Bovista plumbea** Pers.

Under oak, Bingöl, Şehitlik forest, 38°52.225′N, 40°31.001′E, 1093 m, 11.11.2006, Uz-B. 130; in meadow, Bingöl, Kaleonu, Yekmal neighborhood, 38°54.487′N, 40°31.935′E, 1075 m, 14.04.2008, Uz-B. 430b; Bingöl-Genç highway, Göynük 2 hamlet, 38°51.714′N, 40°31.921′E, 1038 m, 20.04.2008, Uz-B. 485; Bingöl, Kültür neighborhood, İnalı place, 38°52.639′N, 40°31.321′E, 1081 m, 20.05.2008, Uz-B. 769; Kiği, center, roadside, 39°18.498′N, 40°20.865′E, 1495 m, 26.05.2008, Uz-B. 811; Karlova, Karabalık village, 39°10.591′N, 40°53.477′E, 1614 m, 05.10.2008, Uz-B. 897; Genç, Yoldaşan neighborhood, 38°43.939′N, 40°30.414′E, 996 m, 19.10.2008, Uz-B. 970; Bingöl, entrance of Güveçli village, streamside, 38°51.297′N, 40°30.807′E, 1110 m, 02.05.2009, Uz-B. 1144; Genç, Genç petrol station side, 38°49.292′N, 40°33.206′E, 1003 m, 04.05.2009, Uz-B. 1201.

3.24. **Chlorophyllum agaricoides** (Czern.) Vellinga

In meadow, Bingöl, Kültür neighborhood, İnalı place, 38°52.639′N, 40°31.321′E, 1081 m, 14.05.2008, Uz-B. 593; Kiği, center, roadside, 39°18.498′N, 40°20.865′E, 1495 m, 20.09.2008, Uz-B. 825; Bingöl, Uydukent neighborhood,
Selahattin Eyyubi mosque garden, 38°54.188’N, 40°29.580’E, 1150 m, 21.09.2008, Uz-B. 833.

3.25. *Coprinus calyptratus* Peck
In meadow, Bingöl, Kardeşler village, 38°55.302’N, 40°30.474’E, 1222 m, 01.05.2009, Uz-B. 1091.

On branch of poplar, Bingöl, Güveçli village, streamside, the gardens, 38°50.872’N, 40°31.654’E, 1047 m, 18.10.2008, Uz-B. 932.

3.27. *Cystoderma cinnabarina* (Alb. & Schwein.) Harmaja
Under pine, Bingöl, behind Yeni neighborhood, 38°52.734’N, 40°28.956’E, 1227 m, 04.10.2008, Uz-B. 876.

In meadow, Bingöl-Karlıova highway, Kalencik village, 39°08.848’N, 40°52.451’E, 1726 m, 24.05.2008, Uz-B. 778.

Under poplar, Bingöl, Güveçli village, streamside, 38°50.881’N, 40°31.602’E, 1046 m, 18.10.2008, Uz-B. 915; Bingöl, Abdulkadir Sarı recreation site, streamside, 38°54.123’N, 40°33.219’E, 1027 m, 01.11.2008, Uz-B. 997; on wood remains, Bingöl, outside of Güveçli village, streamside, 38°50.950’N, 40°31.802’E, 1055 m, 18.10.2008, Uz-B. 945.

3.30. *Leucoagaricus barssii* (Zeller) Vellinga
Under willow, Bingöl, Büyüktekören village, 38°50.012’N, 40°34.466’E, 1011 m, 04.10.2008, Uz-B. 875.

**Figure 7. Iodophanus carneus:** a) fruiting bodies, b) asci (IKI), c) asci apex (IKI), d) ascospores, e) paraphyses, f) base of ascus (IKI).
3.31. *Leucoagaricus leucothites* (Vittad.) Wasser
Under willow, Solhan-Bingöl highway, Alpet petrol station back, 38°57.318′N, 40°59.020′E, 1273 m, 10.11.2006, Uz-B. 93b; in meadow, Kığı, center, roadside, 39°18.498′N, 40°20.865′E, 1495 m, 20.09.2008, Uz-B. 824; Bingöl, Uycukent neighborhood, Selahattin Eyyubi mosque garden, 38°54.188′N, 40°29.580′E, 1105 m, 21.09.2008, Uz-B. 832; under poplar, Bingöl,-Qaeda village, streamside, 38°50.881′N, 40°31.602′E, 1046 m, 18.10.2008, Uz-B. 918; Genç, Yoldaşan neighborhood, Mutar river side, 38°43.961′N, 40°30.314′E, 988 m, 19.10.2008, Uz-B. 972.

In meadow, Kığı, center, roadside, 39°18.498′N, 40°20.865′E, 1495 m, 26.05.2008, Uz-B. 815.

In meadow, Kığı, center, roadside, 39°18.498′N, 40°20.865′E, 1495 m, 26.05.2008, Uz-B. 808; Genç, Yoldaşan neighborhood, streamside, 38°45.152′N, 40°34.048′E, 1017 m, 19.10.2008, Uz-B. 954.

3.34. *Lycoperdon utriforme* Bull.
Under pine, Bingöl, Aşağı Çarşı neighborhood, side of Çapakçur stream, 38°53.652′N, 40°28.621′E, 1138 m, 04.05.2007, Uz-B. 307.

3.35. *Macrolepiota konradii* (Huismann ex P.D. Orton) M.M. Moser
Under oak, Bingöl, Şehitlik forest, 38°52.225′N, 40°31.001′E, 1093 m, 11.11.2006, Uz-B. 126.

In meadow, Karlıova, Serpmekaya village, 39°15.676′N, 41°02.735′E, 1794 m, 24.05.2008, Uz-B. 796.

Amanitaceae R. Heim ex Pouzar
3.37. *Amanita gilbertii* Beasgeijn.
Pileus 50–140 mm, pure white at first, then dirty white, slightly ocher and yellowish at the edge, covered with large, membranous, and thin patches, conical when young, then hemispherical, rarely depressed, margins rarely striate, usually hanging with whitish veil remnants, flesh thick even up to the margin. Lamellae white to cream-colored, broad, adnexed to free and rounded at the margin. Stipe 75–190 × 20–35 mm, cylindrical, smooth, whitish, base usually with a distinct bulb, turnip-like and rooting at base, membranous and large annulus on the upper third, volva remnants on the bulb form a limb as they become dry and shrink. Spores 10–15 × 9–10 μm, broadly elliptic to cylindrical, amyloid, hyaline. Basidia 45–60 × 9–12 μm, clavate, with 4 sterigmata and without basal clamp (Figure 8).

Bolbittaceae Singer
3.38. *Bolbitius titubans* (Bull.) Fr.
In meadow, Bingöl, Güveçli village, streamside, 38°50.881′N, 40°31.602′E, 1046 m, 18.10.2008, Uz-B. 920; Genç, Ham place, 38°44.564′N, 40°32.736′E, 1007 m, 04.05.2009, Uz-B. 1225.

Under poplar, Karlıova, Şerafettin mountains, 39°04.984′N, 41°10.105′E, 2114 m, 24.05.2008, Uz-B. 791; Bingöl, side of Çapakçur stream, 38°53.653′N, 40°28.671′E, 1134 m, 01.05.2009, Uz-B. 1135.

3.40. *Conocybe arrhenii* (Fr.) Kits van Wav.
In meadow, Bingöl, Aşağı Çarşı neighborhood, side of Çapakçur stream, 38°53.652′N, 40°28.621′E, 1138 m, 04.05.2008, Uz-B. 1141.

3.41. *Conocybe brachypodii* (Velen.) Hauskn. & Švěrček
Under willow, in meadow, Bingöl-Genç highway, Göynük 2 hamlet, 38°51.714′N, 40°31.921′E, 1038 m, 18.05.2008, Uz-B. 721.

Macrosopic and microscopic features
Pileus 6–15 mm, campanulate, then convex-umbonate, smooth, hygrophanous, pale clay-brown, light gray with brownish hue, darker on disk, on drying light ochraceous gray, light gray with ochraceous tinge, striate nearly to centre when fresh. Lamellae narrowly adnate, ventricose, to 2 mm broad, fairly crowded, rust brown, with paler flocculose margin. Stipe 24–50 × 0.7–1.5 mm, cylindrical, basis clavate, pale brown with gray hue, light brownish, becomes darker below, pruinose-sтратate, hollow. Spores 7.2–9.5 × 4.1–5 μm, elliptic in face-view, somewhat flattened on one side in profile, fairly thin-walled, pale honey-brown in water, light reddish brown in alkali, germ-pore central. Cheilocystidia lecythiform, 17–23 × 7–13 μm, with relatively short neck and capitula 3.5–6.0 μm wide. Stipitipellis mainly consisting of lecythiform caulocystidia, in between some cylindrical to clavate-subglobose elements. Pileipellis hymeniform consisting of spheropeduncate elements (21–40 × 14–22 μm), in between often lecythiform pileocystidia similar to cheilocystidia, but narrower and longer up to 40 μm (Figure 9).

3.42. *Conocybe rickenii* (Jul. Schäff.) Kühner
In meadow, Bingöl, Aşağı Çarşı neighborhood, side of Çapakçur stream, 38°53.652′N, 40°28.621′E, 1138 m, 04.05.2008, Uz-B. 578.

Entolomataceae Kotl. & Pouzar
3.43. *Entoloma clypeatum* (L.) P. Kumm.
In meadow, Genç, conifer forest, forest clearance, 38°44.585′N, 40°34.432′E, 1117 m, 03.05.2009, Uz-B. 1190.

3.44. *Entoloma lucidum* (P.D. Orton) M.M. Moser
Under poplar, Bingöl, side of Çapakçur stream, 38°53.635′N, 40°28.671′E, 1134 m, 01.05.2009, Uz-B. 1134.

3.45. *Entoloma politum* (Pers.) Donk
Under poplar, Bingöl, Elmalı village, roadside, 39°01.944′N, 40°44.579′E, 1244 m, 25.05.2008, Uz-B. 800.

Macroscopic and microscopic features
Pileus 6–15 mm, campanulate, then convex-umbonate, smooth, hygrophanous, pale clay-brown, light gray with brownish hue, darker on disk, on drying light ochraceous gray, light gray with ochraceous tinge, striate nearly to centre when fresh. Lamellae narrowly adnate, ventricose, to 2 mm broad, fairly crowded, rust brown, with paler flocculose margin. Stipe 24–50 × 0.7–1.5 mm, cylindrical, basis clavate, pale brown with gray hue, light brownish, becomes darker below, pruinose-sтратate, hollow. Spores 7.2–9.5 × 4.1–5 μm, elliptic in face-view, somewhat flattened on one side in profile, fairly thin-walled, pale honey-brown in water, light reddish brown in alkali, germ-pore central. Cheilocystidia lecythiform, 17–23 × 7–13 μm, with relatively short neck and capitula 3.5–6.0 μm wide. Stipitipellis mainly consisting of lecythiform caulocystidia, in between some cylindrical to clavate-subglobose elements. Pileipellis hymeniform consisting of spheropeduncate elements (21–40 × 14–22 μm), in between often lecythiform pileocystidia similar to cheilocystidia, but narrower and longer up to 40 μm (Figure 9).

Bolbittaceae Singer
3.38. *Bolbitius titubans* (Bull.) Fr.
In meadow, Bingöl, Güveçli village, streamside, 38°50.881′N, 40°31.602′E, 1046 m, 18.10.2008, Uz-B. 920; Genç, Ham place, 38°44.564′N, 40°32.736′E, 1007 m, 04.05.2009, Uz-B. 1225.
3.46. **Entoloma sepium** (Noulet & Dass.) Richon & Roze
Under apricot trees, Genç, Çukur neighborhood, the gardens, 38°45.124′N, 40°33.785′E, 1011 m, 20.04.2008, Uz-B. 512.

3.47. **Entoloma sericeoides** (J.E. Lange) Noordel
Under poplar, Bingöl, Horsan hamlet, side of Horsan stream, 38°56.071′N, 40°38.883′E, 1093 m, 20.05.2007, Uz-B. 342.

**Hymenogastraceae** Vittad.

3.48. **Hebeloma mesophaeum** (Pers.) Quél.
Under willow, Karlova center, roadside, 39°17.994′N, 41°00.645′E, 1847 m, 05.10.2008, Uz-B. 893; under apricot trees, Bingöl, Güveçli village, streamside, 38°50.881′N, 40°31.602′E, 1046 m, 02.05.2009, Uz-B. 1151.

3.49. **Hebeloma populinum** Romagn.
Under poplar, Bingöl-Genç highway, behind Koç petrol station, 38°48.004′N, 40°33.007′E, 1030 m, 12.11.2006, Uz-B. 166; Bingöl, outside of Güveçli village, streamside,
Figure 9. *Conocybe brachypodii*: a) basidiocarps, b) cheilocystidia (KOH), c) basidiospores (KOH), d) basidia (KOH), e) stipitpellis and caulocystidia, f) pileipellis.
3.50. *Hebeloma sinapizans* (Fr.) Sacc.
Under crabapple trees, Bingöl–Karlova highway, Kalencik village, the gardens, 39°08.829’N, 40°52.477’E, 1722 m, 24.05.2008, Uz-B. 779.

**Hygrophoraceae** Lülich

3.51. *Hygrocybe punicea* (Fr.) P. Kumm.
Under alder, Bingöl, side of Çapaçuk stream, 38°53.635’N, 40°28.671’E, 1134 m, 04.10.2008, Uz-B. 887.

**Inocybaceae** Jülich

3.52. *Inocybe adaequata* (Britzelm.) Sacc.
Under poplar, Bingöl, Ekinylu village, garden of Ali Atala, 38°53.056’N, 40°33.837’E, 1016 m, 19.05.2007, Uz-B. 296a.

Under poplar, Bingöl, Ekinylu village, garden of Ali Atala, 38°53.056’N, 40°33.837’E, 1016 m, 19.05.2007, Uz-B. 296b; Bingöl, Elmali village, roadside, 39°01.944’N, 40°44.579’E, 1244 m, 25.05.2008, Uz-B. 799; under willow, Bingöl, Abdulkadir Sarı recreation site, streamside, 38°54.123’N, 40°33.219’E, 1027 m, 23.04.2008, Uz-B. 537.

3.54. *Inocybe erubescent* A. Blytt
Under willow, Bingöl, Ekinylu village, roadside, 38°54.549’N, 40°34.573’E, 1054 m, 20.05.2008, Uz-B. 752.

3.55. *Inocybe perlata* (Cooke) Sacc.
Under mixed willow and poplar trees, Bingöl, Ekinylu village, 38°54.578’N, 40°34.525’E, 1051 m, 09.11.2008, Uz-B. 1059.

3.56. *Inocybe sindonia* (Fr.) P. Karst.
Under mixed willow and poplar trees, Bingöl, Ekinylu village, garden of Ali Atala, 38°53.056’N, 40°33.837’E, 1016 m, 01.05.2009, Uz-B. 1123.

3.57. *Phaeomarasmius erinaceus* (Fr.) Scherff. ex Romagn.
On branch of oak, Genç, Tarlabası village exit, 38°41.580’N, 40°29.291’E, 1276 m, 05.05.2009, Uz-B.1234.

**Incertae sedis**

On dung, Solhan entrance, roadside, 38°58.066’N, 41°05.637’E, 1482 m, 30.04.2009, Uz-B. 1075.

On cow dung, Bingöl, Çayboyu village, 38°54.121’N, 40°30.468’E, 1058 m, 12.04.2008, Uz-B. 404; Bingöl, industrial sites side, the gardens, 38°54.331’N, 40°32.010’E, 1063 m, 01.11.2008, Uz-B. 984; Solhan entrance, streamside, the gardens, 38°58.066’N, 41°05.637’E, 1482 m, 30.04.2009, Uz-B. 1065; on horse dung, Genç, conifer forest, 38°44.795’N, 40°34.305’E, 1143 m, 02.05.2009, Uz-B.1171; Genç, Doğrular village, 38°39.234’N, 40°29.794’E, 1263 m, 04.05.2009, Uz-B. 1213.

**Marasmiaceae** Roze ex Kühner

3.60. *Marasmius oreades* (Bolton) Fr.
Under willow, Solhan, Dilektepe village, Yetkinoğlu petrol station side, 38°57.235’N, 40°58.604’E, 1276 m, 27.05.2006, Uz-B. 6; under poplar, Bingöl, Beyaztoprak village, 38°54.964’N, 40°37.515’E, 1058 m, 14.04.2008, Uz-B. 426; in meadow, Bingöl, Yolçu village, 38°56.714’N, 40°17.433’E, 1644 m, 10.05.2008, Uz-B. 594; Köği, center, roadside, 39°18.498’E, 40°20.865’E, 1495 m, 26.05.2008, Uz-B. 812.

3.61. *Marasmius rotula* (Scop.) Fr.
On leaf remnants, Bingöl, Aşağı Çavuşlar village, 38°55.960’N, 40°45.368’E, 1333 m, 10.11.2006, Uz-B. 109.

**Mycenaceae** Roze

3.62. *Mycena polygramma* (Bull.) Gray
On dead wood of oak, Bingöl, Aşağı Çavuşlar neighborhood, 38°55.960’N, 40°45.368’E, 1016 m, 19.05.2007, Uz-B. 284.

**Physalaciaceae** Corner

Under oak, Bingöl Ekinylu village, 38°54.578’N, 40°34.525’E, 1051 m, 19.05.2007, Uz-B. 284.

**Pluteaceae** Kotl. & Pouzar

On dead wood, Bingöl, Güveçli village, streamside, 38°50.881’N, 40°31.602’E, 1046 m, 18.10.2008, Uz-B. 940.

**Psathyrellaceae** Vilgalys, Moncalvo & Redhead

3.67. *Coprinellus disseminatus* (Pers.) J.E. Lange
Around stump of poplar, Solhan entrance, Beyaz bridge side, 38°58.044’N, 41°03.828’E, 1387 m, 10.11.2006, Uz-B. 71; Bingöl, Horsan hamlet, side of Horsan stream, 38°56.071’N, 40°38.883’E, 1093 m, 20.05.2007, Uz-B. 346.

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Around stump of willow Bingöl, Abdulkadir Sarı recreation site, streamside, 38°54.123’N, 40°33.219’E, 1027 m, 23.04.2008, Uz-B. 541; Bingöl, Çukurca village, the gardens, 38°55.278’N, 40°31.148’E, 1250 m, 24.04.2008, Uz-B. 550; Solhan entrance, streamside, the gardens, 38°58.066’N, 41°05.637’E, 1482 m, 30.04.2009, Uz-B. 1067.

Under willow, Bingöl, Ekinolu village, 38°54.578’N, 40°34’525’E, 1051 m, 20.05.2008, Uz-B. 746.

3.70. *Coprinopsis cordispora* (T. Gibbs) Gminder
On dung, Karlıova, Serpmekaya village, 39°15.676’N, 41°02.735’E, 1794 m, 24.05.2008, Uz-B. 791.

**Macroscopic and microscopic features**

*Pileus* closed and globose, subglobose or ovoid when young, up to 10 × 6 mm, then campanulate to convex-campanulate, finally flat, up to 15 mm in diam., grooved, completely covered by whitish or pale pinkish brown powdery veil, at margins hairy-floccose. *Lamellae* free, at first whitish then grayish to black. *Stipe* 20–45 × 0.5–1 mm, cylindrical, swollen at the base, whitish, hyaline.

*Flesh* thin, whitish. *Spores* 7–11.5 × 6–10 × 4–6 μm, rectangular lemon-shaped, lentiform, dark red-brown, with central germ pore.

3.71. *Coprinopsis picacea* (Bull.) Redhead, Vilgalys & Moncalvo
Under poplar, Bingöl, Horsan hamlet, side of Horsan stream, 38°56.071’N, 40°38.883’E, 1093 m, 24.05.2008, Uz-B. 989.

3.72. *Psathyrella candolleana* (Fr.) A.H. Sm.
Under poplar, Bingöl, G üveç village, Pala petrol station side, 38°50.875’N, 40°31.602’E, 1046 m, 02.05.2009, Uz-B. 1186.

3.73. *Psathyrella olympiana* A.H. Sm.
Under poplar, Bingöl, G üveç village, streamside, 38°50.881’N, 40°31.602’E, 1046 m, 02.05.2009, Uz-B. 1149.

On dead wood, Bingöl-Genç highway, Göynük 2 hamlet, 38°51.714’N, 40°31.921’E, 1038 m, 18.05.2008, Uz-B. 730.

3.75. *Psathyrella prona* (Fr.) Gillet
Under mixed willow and poplar trees, Bingöl, Ekinolu village, roadside, 38°54.549’N, 40°34.573’E, 1054 m, 02.10.2008, Uz-B. 841.

3.76. *Psathyrella spadiceogrisea* (Schaef.) Maire
Under poplar, Solhan entrance, streamside, the gardens, 38°58.066’N, 41°05.637’E, 1482 m, 30.04.2009, Uz-B. 1074; Solhan, Yüzen island hamlet, mosque garden, 38°58.166’N, 40°56.530’E, 1354 m, 30.04.2009, Uz-B. 1089.

3.77. *Schizophyllum commune* Fr.
On stump of willow, Bingöl, After location, the gardens, 38°52.390’N, 40°31.633’E, 1049 m, 05.05.2008, Uz-B. 581; on stump of cherry (*Prunus cerasus*), Bingöl, K a leönü, Yekmal neighborhood, the gardens, 38°54.481’N, 40°31.894’E, 1078 m, 04.10.2008, Uz-B. 862; on stump of poplar, Bingöl, industrial sites side, the gardens, 38°54.331’N, 40°32.010’E, 1063 m, 01.11.2008, Uz-B. 989.

3.78. *Agrocybe molesta* (Lasch) Singer
Under poplar, Bingöl, Ekinolu village, 38°54.578’N, 40°34’525’E, 1051 m, 19.05.2007, Uz-B. 289.

3.79. *Agrocybe paludosa* (J.E. Lange) Kühner & Romagn.
On dead wood, Bingöl, Ekinolu village, 38°54.578’N, 40°34’525’E, 1051 m, 20.05.2008, Uz-B. 742.

3.80. *Deconica merdaria* (Fr.) Noordel.
On dung, Bingöl, K ültür neighborhood, İ nalı place, 38°52.639’N, 40°31.321’E, 1081 m, 14.05.2008, Uz-B. 643.

3.81. *Leratiomyces squamosus* (Pers.) Bridge & Spooner
Under fir, Genç, Tarlabası village exit, 38°41.580’N, 40°29.291’E, 1276 m, 05.05.2009, Uz-B.1233.

3.82. *Psolithia aurivella* (Ratsch) P. Kumm.
On willow, Bingöl, Ekinolu village, 38°54.578’N, 40°34’525’E, 1051 m, 09.11.2008, Uz-B. 1060.

3.83. *Psolithia conissans* (Fr.) M.M. Moser
Under poplar, Bingöl, G üveç village, streamside, 38°50.881’N, 40°31.602’E, 1046 m, 18.10.2008, Uz-B. 924.

3.84. *Psolithia gummosa* (Lasch) Singer
Under willow, Solhan-Bingöl highway, Alpet petrol station back, 38°57.318’N, 40°59.020’E, 1273 m, 10.11.2006, Uz-B. 95.
On remnants of willow, Bingöl, Aydinsu neighborhood, 38°52.426'N, 40°31.617'E, 1055 m, 11.11.2006, Uz-B. 146;
on dead wood, Bingöl, Aşağı Çarşı neighborhood, side of Çapakçur stream, 38°53.652'N, 40°28.621'E, 1138 m, 18.10.2007, Uz-B. 370.

*Figure 10. Coprinopsis cordispora:* a) mature basidiocarps, b) cystidia, c) basidiospores, d) basidia.
Tricholomataceae  R. Heim ex Pouzar

3.86. *Bonomyces sinopicus* (Fr.) Vizzini  
Under pine, Genç, conifer forest, 38°44.795′N, 40°34.305′E, 1143 m, 17.05.2008, Uz-B.683.

3.87. *Clitocybe costata* Kühner & Romagn.  
Under pine, Bingöl, Aşağı Çarşı neighborhood, side of Çapaçur stream, 38°53.652′N, 40°28.621′E, 1138 m, 20.05.2007, Uz-B.310.

Under poplar, Bingöl-Genç highway, Göynük 2 hamlet, 38°51.714′N, 40°31.921′E, 1038 m, 18.05.2008, Uz-B. 727.

3.89. *Lepista nuda* (Bull.) Cooke  
Under oak, Bingöl, Şehitlik forest, 38°54.331′N, 40°32.010′E, 1495 m, 20.09.2008, Uz-B. 827.

Under pine, Genç, conifer forest, 38°44.795′N, 40°34.305′E, 1143 m, 12.11.2006, Uz-B.179.

3.91. *Resupinatus applicatus* (Batsch) Gray  
On dead branch of pine, Genç, conifer forest, 38°44.795′N, 40°34.305′E, 1143 m, 14.10.2010, Uz-B.1238.

On dead branch of pine, Genç, conifer forest, 38°44.795′N, 40°34.305′E, 1143 m, 14.10.2010, Uz-B.1235.

Under pine, Genç, conifer forest, 38°44.795′N, 40°34.305′E, 1143 m, 17.05.2008, Uz-B. 671.

3.94. *Tricholoma populinum* J.E. Lange  
Under poplar, Bingöl, Aşağı Çavuşlar village, 38°55.960′N, 40°45.368′E, 1333 m, 10.11.2006, Uz-B. 107; Bingöl-Genç highway, behind of Kandemir petrol station, 38°45.052′N, 40°32.418′E, 982 m, 12.11.2006, Uz-B. 176; Bingöl, Aşağı Çarşı neighborhood, side of Çapaçur stream, 38°53.652′N, 40°28.621′E, 1138 m, 18.10.2007, Uz-B. 378; Bingöl, Güveçli village, streamside, 38°54.331′N, 40°32.010′E, 1063 m, 02.10.2008, Uz-B. 845; Bingöl, Güveçli village, streamside, 38°50.881′N, 40°31.602′E, 1046 m, 18.10.2008, Uz-B. 948; Bingöl, industrial sites side, the gardens, 38°54.331′N, 40°32.010′E, 1063 m, 01.11.2008, Uz-B. 987; under oak, Bingöl, Şehitlik forest, 38°52.225′N, 40°31.001′E, 1093 m, 11.11.2006, Uz-B. 141; under willow, Kığa, center, roadside, 39°18.498′N, 40°20.865′E, 1495 m, 20.09.2008, Uz-B. 929.

3.95. *Phallus vermillis* Watling  
Under poplar, Bingöl, Güveçli village, streamside, 38°50.881′N, 40°31.602′E, 1046 m, 18.10.2008, Uz-B. 929.

3.97. *Paxillus involutus* (Batsch) Fr.  
Under mixed willow and poplar trees, Solhan-Bingöl highway, Alpet petrol station back, 38°57.318′N, 40°59.020′E, 1273 m, 10.11.2006, Uz-B. 100; under poplar, Bingöl, Aşağı Çavuşlar village, 38°55.960′N, 40°45.368′E, 1333 m, 10.11.2006, Uz-B. 107; Bingöl-Genç highway, behind of Kandemir petrol station, 38°45.052′N, 40°32.418′E, 982 m, 12.11.2006, Uz-B. 176; Bingöl, Aşağı Çarşı neighborhood, side of Çapaçur stream, 38°53.652′N, 40°28.621′E, 1138 m, 18.10.2007, Uz-B. 378; Bingöl, industrial sites side, the gardens, 38°54.331′N, 40°32.010′E, 1063 m, 02.10.2008, Uz-B. 845; Bingöl, Güveçli village, streamside, 38°50.881′N, 40°31.602′E, 1046 m, 18.10.2008, Uz-B. 948; Bingöl, industrial sites side, the gardens, 38°54.331′N, 40°32.010′E, 1063 m, 01.11.2008, Uz-B. 987; under oak, Bingöl, Şehitlik forest, 38°52.225′N, 40°31.001′E, 1093 m, 11.11.2006, Uz-B. 141; under willow, Kığa, center, roadside, 39°18.498′N, 40°20.865′E, 1495 m, 20.09.2008, Uz-B. 927.

3.98. *Paxillus vernalis* Watling  
Under poplar, Bingöl, Güveçli village, streamside, 38°50.881′N, 40°31.602′E, 1046 m, 18.10.2008, Uz-B. 929.

Under pine, Genç, conifer forest, 38°44.795′N, 40°34.305′E, 1143 m, 18.05.2008, Uz-B.712.

3.100. *Suillus brevipes* (Peck) Kuntze  
Under pine, Bingöl, behind Yeni neighborhood, 38°52.734′N, 40°28.956′E, 1227 m, 15.06.2008, Uz-B. 818.

3.101. *Phallus impudicus* L.  
Under willow, Bingöl, Aşağı Çavuşlar village, 38°55.960′N, 40°45.368′E, 1333 m, 10.11.2006, Uz-B. 103.

3.102. *Laetiporus sulphureus* (Bull.) Murrill  
On willow, Bingöl, Büyüktekören village, 38°50.012′N, 40°34.466′E, 1011 m, 04.10.2008, Uz-B. 867; Karhova center, roadside, 39°17.994′N, 41°00.645′E, 1847 m, 05.10.2008, Uz-B. 889; Bingöl, Bilaloğlu village, 38°55.372′N, 40°23.814′E, 1294 m, 17.10.2008, Uz-B. 903; Bingöl, Güveçli village, streamside, 38°50.881′N, 40°31.602′E, 1046 m, 18.10.2008, Uz-B. 909.
Ganodermataceae Donk

3.103. **Ganoderma applanatum** (Pers.) Pat.
On stump of poplar, Bingöl-Genç highway, Göynük 2 hamlet, 38°51.714’N, 40°31.921’E, 1038 m, 13.04.2008, Uz-B. 419.

Meruliaceae P. Karst.

3.104. **Atheliachaete calotricha** (P. Karst.) Tura, Zmitr., Wasser & Spirin
On dead branch of oak, Genç, Tarlabaşı village exit, 38°41.580’N, 40°29.291’E, 1276 m, 05.05.2009, Uz-B.1229.

Polyporaceae Fr. ex Corda

3.105. **Cerioporus squamosus** (Huds.) Quél.
On stump of poplar, Bingöl, Kadran village, streamside, 38°54.339’N, 40°28.259’E, 1097 m, 26.05.2007, Uz-B. 366.

3.106. **Lentinus brumalis** (Pers.) Zmitr.
On dead branch of oak, Genç, Tarlabaşı village exit, 38°41.580’N, 40°29.291’E, 1276 m, 05.05.2009, Uz-B.1232.

3.107. **Picipes badius** (Pers.) Zmitr. & Kovalenko
On willow, Bingöl, Aydinsu neighborhood, 38°52.426’N, 40°31.617’E, 1055 m, 11.11.2006, Uz-B. 148.

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**Figure 11.** *Paxillus vernalis:* a) basidiocarp, b) pileipellis and clamp (Congo red + distilled water), c) basidiospores (distilled water), d) basidia (Bs) and pleurocystidia (Pc) (KOH), e) basidia (Melzer’s reagent).
3.108. **Trametes trogii** Berk.
On stump of poplar, Bingöl, DSİ garden, 38°54.069′N, 40°30.356′E, 1064 m, 06.05.2007, Uz-B. 251; Bingöl, Ekinyolu village, 38°54.578′N, 40°34′525′E, 1051 m, 19.05.2007, Uz-B. 285; on stump of willow, Bingöl, side of Çapakçur stream, 38°53.635′N, 40°28.671′E, 1134 m, 04.10.2008, Uz-B. 879.

3.109. **Stereum hirsutum** (Willd.) Pers.
On dead branch of oak, Genç, Tarlabaşı village exit, 38°41.580′N, 40°29.291′E, 1276 m, 05.05.2009, Uz-B.1228.

3.110. **Stereum rugosum** Pers.
On dead branch of oak, Genç, Tarlabaşı village exit, 38°41.580′N, 40°29.291′E, 1276 m, 05.05.2009, Uz-B.1227.

3.111. **Thelephora terrestris** Ehrh
Under pine, Bingöl-Genç highway, Şeyh Ahmet streamside, 38°46.540′N, 40°32.235′E, 1000 m, 27.05.2006, Uz-B. 11.

3.112. **Tremella mesenterica** Schaeff.
On dead branch of poplar, Bingöl, Ekinyolu village, streamside, 38°54.575′N, 40°34.568′E, 1050 m, 20.05.2008, Uz-B. 759.

4. Discussion
As a result of the studies carried out on 1241 samples collected during field surveys within the boundaries of Bingöl Province, 112 species belonging to 10 orders, 38 families, and 68 genera were identified. Seventeen of them belong to Ascomycota and 95 to Basidiomycota.

Eighty-nine species have previously been reported from the region by local studies (Uzun et al., 2009, 2010a, 2010b, 2013, 2014; Kaya et al., 2010). Together with the newly determined 112 species, the total current taxa number is increased to 201.

The most populous families in the region are Agaricaeae (19), Psathyrellaceae (10), Tricholomataceae (9), and Strophariaceae (8), respectively. This distribution conforms to the climatic characteristics and vegetation of the region.

Forty-five of the determined taxa are edible, 49 are inedible, and 18 are poisonous (Figure 12). However, only 15 species, *Agaricus arvensis*, *A. bisporus*, *A. bitorquis*, *A. campestris*, *A. litoralis*, *A. litoralis*, *A. macrocarpus*, *A. sylvicola*, *Lepiota clypeolaria*, *L. erminea*, *Leucoagaricus leucothites*, *M. procera*, *Pleurotus eryngii*, *P. ostreatus*, *Lentinus tigrinus* and *Lactarius controversus*, are collected and consumed by local residents.

Some local names for macrofungi are also used by the locals. Macrofungi growing on trees or wood residues are called “sung” and those growing on soil are called “klawek”. *Pleurotus eryngii* is called “kınkor”, especially in the Karlıova district, and *P. ostreatus* is known as “darwela” in the Genç district. Brown and blackish macrofungi such as *Melanoleuca* and *Pluteus* species are generally called “yılan mantarı”. *Coprinus comatus* and *Coprinellus micaceus* are known as “eşek mantarı” and regarded as poisonous. *Stropharia coronilla* is regarded as inedible and called “kefgarik”. *Fomes fomentarius* is known as “puya” and elderly citizens mention its use as fire fuel in historic times. Although *Morchella* species are favored for eating in many other provinces of Turkey, they are known as poisonous in this region.

Species identified in the province were compared with the studies carried out close to the region by Yıldız and Ertekin (1997), Demirel et al. (2003), Keleş and Demirel (2010), Akçağ et al. (2010), Acar et al. (2015), and Demirel et al. (2016) and almost 50% similarity was observed between the determined taxa in these regions and Bingöl.

Ten of the determined species (*Orbilia auricolor*,...
O. luteorubella, Mollisia lividofusca, Calycina languida, Vibrissea filispora, Iodophanus carneus, Amanita gilbertii, Conocybe brachypodii, Coprinopsis cordispora, and Paxillus vernalis) were identified for the first time from Turkey. Among them Iodophanus carneus is new at the genus level.  

Orbilia species grow on rotten wood of hardwoods (Cannon and Kirk, 2007). O. curvatispora also has curved ascospores like O. auricolor, but spores of O. curvatispora are narrower and the apothecium is urceolate when young (Breitenbach and Kränzlin, 1984), whereas the apothecia of O. auricolor are never urceolate. O. luteorubella and Hyalorhiza inflata are quite similar, but H. inflata has unstalked asci arising from crozier, an excipulum of textura prismatica, and filiform paraphyses a bit clavate but not knob-headed as in most species of Orbilia (Baral, 1994; Beug et al., 2014).  

Mollisia lividofusca is similar to M. cinerea morphologically, but its spores are longer and its asci are shorter than those of the other, and the spores show biseriate or irregular arrangement depending on the preparation method. Moreover, M. cinerea grows on the ruins of oak and beech trees, while M. lividofusca has been identified on a wide range of deciduous substrates (Breitenbach and Kränzlin, 1984; Thompson, 2013).  

Vibrissea filispora differs from the common V. leptospora by shorter asci and spores. It is closely related to V. guernisacii, which has asci of 160–190 µm and spores 100–145 µm in length (Breitenbach and Kränzlin, 1984).  

Iodophanus carneus is easily observed when cultivated on various kinds of dung. The salmon-pink color and the bluing of the hymenium as well as the ascus walls in iodine are reliable identifying characteristics. The fine punctuation of the spores can be observed with certainty only under oil-immersion (Breitenbach and Kränzlin, 1984).  

Calycina languida, Pezizella parilis, and P. vulgaris are quite similar in appearance, but they can be distinguished easily from each other by ascospore features. The ascospores of P. parilis are 8–14 × 1.5–2 µm, 1-septate, and constricted (Thompson, 2013), while the ascospores of P. vulgaris are 5.5–9 × 0.9–1.4 µm, curved, inequilateral, and with 1 or 2 small apical guttules. P. vulgaris also has inamyloid asci (Morozova, 2014).  

Amanita gilbertii is the most similar to A. cylindrispora Beardslee morphologically. Recent molecular studies support morphological studies concerning a close relationship between the two species (Justo et al., 2010), but A. cylindrispora has elongate bulbs, narrow spores, and fruiting bodies deeply inserted in the soil, often associated with “leaky” ecosystems (Tulloss, 2005).  

Conocybe brachypodii grows mostly in rather moist deciduous forests, along roadsides, or in herbal layers, and more rarely in grassy places under shrubs, in grasslands, or in grassy coniferous forests (Hausknecht, 2009). The closest species to C. brachypodii morphologically is C. mesospora, but it has a brighter colored (yellow-orange to brownish orange) cap, slightly larger spores, and a constantly negative ammonia reaction.  

Coprinopsis cordispora differs from similar species (C. cardiasporus, C. ephemeroides, C. patouillardii) in the presence of lageniform cheilocystidia. Moreover, C. patouillardii does not occur on dung, C. ephemeroides, may sometimes also possess sparse lageniform cheilocystidia and has a small ring, and C. cardiasporus has differently shaped spores, which are heart-shaped and much narrower (Prydiuk, 2011).  

Paxillus vernalis grows scattered or gregariously and is mycorrhizal with quaking aspen or paper birch; it is apparently also capable of existing as a saprobe on wood and woody debris. P. vernalis and P. involutus are morphologically very similar, but P. vernalis has a thicker stipe and the length of the pleuro- and cheilocystidia are longer at about 15–20 µm (Lincoff, 2008).  

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References  


