

New records of fungi, fungus-like organisms, and slime moulds from Europe and Asia: 20–27

Compiled by Cvetomir M. Denchev

Abstract. *Synnemacrodictys stilboidea* on *Ailanthus altissima* and *Juniperus chinensis* is recorded for the first time from Korea and Asia. Occurrence of *Diplodia subtracta* on *Acer palmatum*, *Melanconis aucta* on *Alnus glutinosa*, and *Microbotryum stellariae* on *Stellaria graminea* is reported from Bulgaria. Records of three larger basidiomycetes are given as new for Ukraine (*Cantharellus amethysteus*) and Bulgaria (*Sarcodon joeides* and *Pluteus salicinus*). A new Turkish record of a myxomycete, *Physarum perfectum*, is also presented.

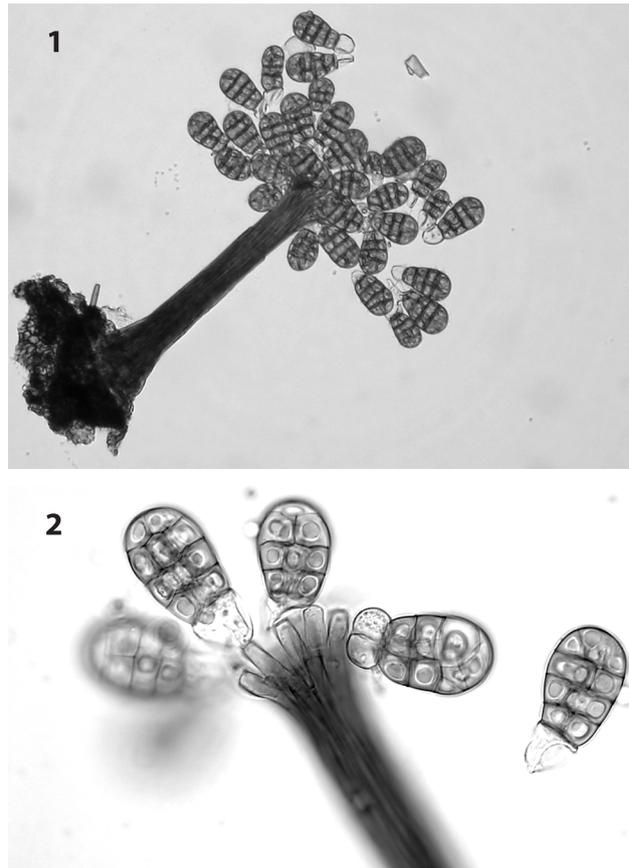
Key words: *Acer palmatum*, *Ailanthus altissima*, *Alnus glutinosa*, Bulgaria, *Cantharellus amethysteus*, *Diplodia subtracta*, *Juniperus chinensis*, Korea, *Melanconis aucta*, *Microbotryum stellariae*, myxomycetes, *Physarum perfectum*, *Pluteus salicinus*, *Sarcodon joeides*, *Stellaria graminea*, *Synnemacrodictys stilboidea*, Turkey, Ukraine

20. *Synnemacrodictys stilboidea* (anamorphic fungi) in Korea

In October 2004, a synnematosus hyphomycete (*Dematiaceae*) was found on bark of *Ailanthus altissima* and dead twigs of *Juniperus chinensis* in Seoul. In spite of different substrates, the external appearance of the two collections was similar. Under a stereomicroscope, the conidiomata look like minute palm trees with spreading crowns. Further studies showed that the morphological characters were very close in both specimens. Robust synnemata with dictyosporous conidia indicate that this fungus belongs to a group of hyphomycete genera comprising *Dictyocatenulata*, *Kostermansinda*, *Kostermansindiopsis*, *Pantospora*, *Sclerographium*, *Tretopileus* and *Waibonghopsis*, with special similarity to *Kostermansinda*. However, the morphology of synnema, conidiogenous cells and conidia showed that the fungus from Korea fits well to recently described genus *Synnemacrodictys* W.A. Baker & Morgan-Jones (Gams *et al.* 2009). The type species, *S. stilboidea*, was found in Cuba on a dead branch of *Zantoxylum* sp. (Mercado & Mena 1986), and it was also recorded from Mexico, on twigs of an unknown tree (Heredia *et al.* 2000). The description below is based on the specimens from Korea.

Synnemacrodictys stilboidea (J. Mena & Mercado) W.A. Baker & Morgan-Jones, Mycotaxon 110: 107, 2009. — *Acrodictys stilboidea* J. Mena & Mercado, in Mercado Sierra & Mena Portales, Acta Bot. Hung. 32: 190, 1986. Figs 1–2

Colonies effuse, hairy, brown or dark brown. Synnemata solitary, simple, more or less clavate, up to 180 µm long, up to



Figs 1–2. *Synnemacrodictys stilboidea*.

35 µm wide at the base, up to 20 µm in the middle and up to 25 µm wide just beneath the apical part consisting of conidia. Conidiophores macronematous, straight or slightly flexuous, septate, olive-brown or brown. Conidiogenous cells integrated, monoblastic, determinate, cylindrical. **Conidia** solitary, dictyosporous, ellipsoid or turbinate, slightly constricted at the septa, 32–37 × 14–17 µm (on *Ailanthus altissima*) and 31–39 (–40) × 14–16 µm (on *Juniperus communis*), smooth, olive-brown; basal cells of the conidia obconical, truncate at the base, paler than the conidial main body.

Specimens examined. On bark of *Ailanthus altissima* (Mill.) Swingle. **KOREA:** Seoul, near Anam Dormitory, 18 Oct 2004, V. Mel'nik (LE 226 202). On dead twigs of *Juniperus chinensis* L. **KOREA:** Seoul, near Nacheon Stadium, 18 Oct 2004, V. Mel'nik (LE 226 199).

Acknowledgements. The author thanks Dr. Keith Seifert for valuable comments.

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Mercado-Sierra, A. & Mena-Portales, J. 1986. Hifomicetes de Topes de Collantes, Cuba I. Especies holoblásticas. — *Acta Botanica Hungarica* 32: 189–205.

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21. *Diplodia subsecta* (anamorphic fungi) in Bulgaria

In 2007, a new anamorphic fungus on branches of an ornamental tree of genus *Acer* was found. The sample is documented with microphotographs and concise description. Microscopic features in LM were observed in lactophenol. Measurements of the conidia are given in the form: min–max (mean ± standard deviation). The specimen is kept at the Mycological Collection of the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (SOMF). Identification of the fungus is confirmed by the works of Grove (1937), Merezhko (1980), Farr *et al.* (1989), and Mufenko *et al.* (2008).

Diplodia subsecta Fr., *Summa Veg. Scand.*, Section Post. (Stockholm): 417, 1849. **Figs 3–4**

Pycnidia in linear rows, on branches, immersed, then erumpent, single or aggregated, globose, dark brown to black, thick-walled, 200–400 µm in diameter. Ostioles circular, papillate, 80–100 µm in diameter. **Conidia** at first hyaline, unicellular, cylindrical with rounded apex, smooth, later becoming brown to dark brown, oblong ellipsoid, sometimes ovoid, bicellular, with distinct septum, slightly constricted at the septum, thick-walled, apex obtuse, base truncate or obtuse, 17–24 × 7.5–10 (20.0 ± 1.9 × 8.7 ± 1.0) µm (*n* = 50).

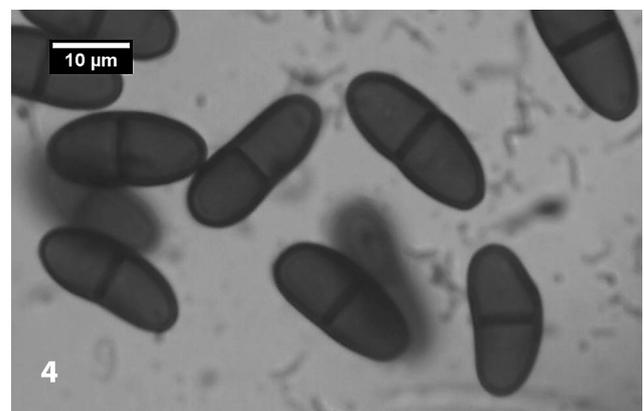
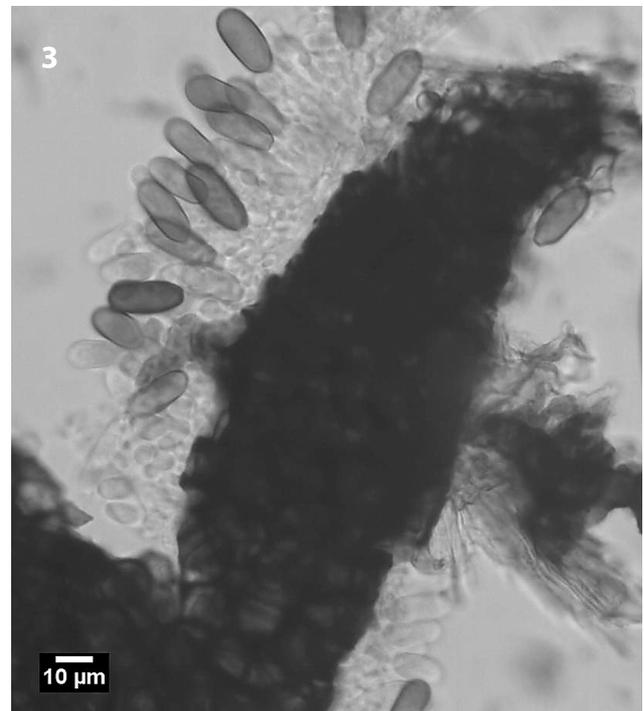
Specimen examined: **BULGARIA:** Sofia region, Sofia, 'King Boris Garden', on branches of *Acer palmatum* Thunb., 2 Oct 2007, leg. A. Pencheva (SOMF 27 939).

Acknowledgements. The study was supported by a grant no. RD 56-1313/2006 (Municipality of Sofia).

Farr, D.F., Bills, G.F., Chamuris, G.P. & Rossman, A.Y. 1989. *Fungi on plants and plant products in the United States*. APS Press, Minnesota, USA.

Grove, W.B. 1937. *British stem- and leaf-fungi (Coelomycetes)*. Vol. 2. Cambridge University Press, London.

Merezhko, T.A. 1980. [Flora Fungorum RSS Ucrainicae. Ordo *Sphaeropsidales*, familia *Sphaeropsidaceae* (Phaeodidymae)]. Naukova Dumka, Kiev. (In Russian)



Figs 3–4. *Diplodia subsecta*. 3. Part of a pycnidium with young conidia. 4. Mature conidia. Scale bars = 10 µm

Mułenko, W., Majewski, T & Ruskiewicz-Michalska, M. [eds] 2008. A preliminary checklist of micromycetes in Poland. – In: Biodiversity of Poland. Vol. 9. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków.

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22. *Melanconis aucta* (*Melanconidaceae*) in Bulgaria

Specimens are kept at the Mycological Collection of the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (SOMF). The asci and ascospores of the studied specimens are documented with color microphotographs from semipermanent slides made in water solution of Cotton Blue. The obtained data for the spores were examined using standard statistic methods and are presented in the brief description of the fungus in the form: (min–) mean \pm standard deviation (–max), length/width ratio (min–max). The identification is confirmed by the work of Wehmeyer (1941).

Melanconis aucta (Berk. & Broome) Wehm., Univ. Mich. Stud., Sci. Sér. 14: 58, 1941.

Stromata 0.5–1 mm in diam, immersed, later projecting through the periderma, arising in the form of conic disc, pustulate. **Ectostroma** small, conic, grayish. **Beaks** 1–5, erumpent through the pustule, along the ruptures. **Perithecia** 300–600 μm , globose or depressed, in groups, immersed in the tissues of the bark. **Asci** 85–95 \times 30–35 μm , broadly ellipsoid, 8-spored. **Ascospores** (25.5–) 34.9 \pm 3.7 (–41) \times (10–) 11.8 \pm 1.0 (–14) μm , $n = 100$, l/w (2.5–3.5), hyaline, one septate, elongate-ellipsoid, constricted or non-constricted at the septum, with small short, hyaline spatuliform appendage at both ends; often 3-septate and brown coloured when ripe.

Specimens examined: BULGARIA: Forebalkan: Lovech distr., Golyama Zhelyazna village, near river Toplya, on bark and twigs of *Alnus glutinosa* (L.) Gaertn., 24 May 2009, D.Y. Stoykov (SOMF 27 278 & 27 285); Western Stara Planina Mts: along the village of Stargel, 26 Jun 2009, D.Y. Stoykov (SOMF 27 318).

In Europe, *Melanconis aucta* is recorded on twigs of *Alnus glutinosa* and *A. incana* (L.) Moench (*Betulaceae*). It is similar in its morphology to *M. glutinosae* Z. Urb., but bears smaller ascospores and has longer and thinner asci. Wehmeyer (1941) gave smaller width of the asci (25–27 μm).

Acknowledgements. Part of this study was supported by the European Social Fund, within the Operational Program “Development of the Human Resources”, Project BG051PO001/07/3.3-02/70/17.06.2008, through the Bulgarian Ministry of Education, Youth, and Science.

Wehmeyer, L.E. 1941. A revision of *Melanconis*, *Pseudovalsa*, *Prosthecium* and *Titania*. — University of Michigan Studies, Scientific Series 14: 1–161.

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23. *Cantharellus amethysteus* – a new for Ukraine chanterelle species

The specimen is deposited in the Herbarium of the Botany Department of Biological faculty of Taras Shevchenko National University of Kyiv. The microscopic structures were inspected on dried material. Sections of hymenium and pileipellis were made at about 1/2 of the radius of the pileus and examined in 3 % KOH. The spores were studied in water and 3 % KOH separately.

Cantharellus amethysteus (Quél.) Sacc., Syll. Fung. 5: 482, 1887. — *C. cibarius* var. *amethysteus* Quél., Assoc. Fr. Avanc. Sci. Congr. Rochelle: 11: 397, 1883. **Figs 5–6**

Basidiomata single or in groups of 3–5. **Pileus** 30–60 mm in diam., turbinate, laterally convex, applanate, then somewhat depressed, often slightly tuberous. Margin inflexed, more or less wavy, yellow, egg-yellow, pale orange to ochre, gaining a lilac or pale violaceous with vinaceous tinge pubescence. **Hymenium** wrinkled, venous to almost gilled, veins thick, almost gill-like, branched, decurrent, egg-yellow. **Stipe** 30–50 \times 5–12 mm, tapering downwards,

smooth, egg-yellow to pale orange, solid. **Flesh** white, then with yellowish tinge, with pleasant smell and taste. **Spore print** white with yellowish or pinkish tinge. **Basidiospores** smooth, ovoid, broadly ellipsoid, ellipsoid, with prominent apiculus, hyaline, (9–) 10.3 \pm 0.82 (–11.5) \times (5.5–) 6.1 \pm 0.35 (–6.5) μm ($n = 30$), ratio (1.47–) 1.71 \pm 0.19 (–2.18), filled with oil drops. **Basidia** elongate-clavate to elongate-cylindric, 2–8-spored, mainly 4–6-spored, hyaline, up to 100 \times 10 μm ($n = 10$). **Cheilo-** and **pleurocystidia** absent. **Pileipellis** made up of compacted wavy hyphae up to 10.5 μm thick, flared up into a fairly loose layer of irregularly interwoven hyaline non-gelatinized hyphae up to 8.0 μm thick with clavate end cells. **Stipitipellis** of semi-parallel hyaline to pale stramineous hyphae, 8.0–11.0 μm thick, with some hymenial elements at stipe apex. **Flesh** of flexuous hyaline hyphae 2.5–5.0 μm thick. **Clamp connections** present in all tissues.

Habitat – on soil in coniferous (*Picea abies* L.) forest.

Specimen examined: UKRAINE: Lviv region, Stryi district, surroundings of the village Mokhnate, 48°53.608' N, 23°14.548' E, alt. ca 672 m, 8 Sep 2009, O.O. Senchylo.

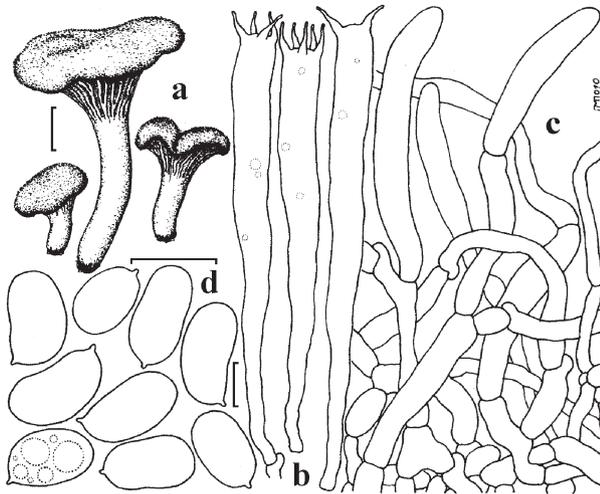


Fig. 5. *Cantharellus amethysteus*: a – fruitbodies; b – basidia; c – pileipellis; d – spores. Bars = 1 cm for fruitbodies and 10 µm for microstructures



Fig. 6. The point of the record of *Cantharellus amethysteus* (Quél.) Sacc. in Ukraine

The mushroom was found during an expedition in 2009, in the Carpathian Mountains. An inspection of this specimen allowed identification of it as *Cantharellus amethysteus* (*Cantharellales*, *Cantharellaceae*) – a rather rare

European species. Similar fruitbodies were encountered by the first author in the Crimea in 2002 (Yalta Mountain Forest Nature Reserve, near Mount Koshka) but the specimens were not kept. Therefore, the Carpathian finding we describe in this paper represents the only known location of *C. amethysteus* in Ukraine. Its Crimean spread, although possible, still has to be confirmed. This is the first record of the species in Ukraine.

The species is very close to *Cantharellus cibarius* and is treated by some authors as its variation. *C. amethysteus* is similar to *C. cibarius* in many aspects, except the lilac tinge pubescence on the cap. It is better developed in young specimens and may fade out with age. The specimens observed by one of the authors in the Crimea had the violaceous pubescence only in the middle of the pileus, while its margins remained pale-orange like hymenium and stipe. The combination of yellow and lilac colours of the fruitbody is also a characteristic of *C. melanoxeros* Desm., but this species has pale violaceous hymenium, while its cap surface and stipe are yellow (Watling & Turnbull 1998).

Interesting to note that the spores of our specimen are on average longer than those reported by other authors [$8.0\text{--}10.0 \times 5.5\text{--}6.0$ (-6.5) µm] (Watling & Turnbull 1998). However, all the other features are so characteristic that leave no doubt of its identity.

Acknowledgements. Authors are very grateful to O.O. Senchylo for kindly granted specimens.

Watling, R. & Turnbull, E. 1998. British fungus flora. Agarics and boleti. Vol. 8. *Cantharellaceae*, *Gomphaceae* and amyloid-spored and xeruloid members of *Tricholomataceae* (excl. *Mycena*). Alden Press LTD, Edinburgh.

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24. *Sarcodon joeides* (*Bankeraceae*) in Bulgaria

Air dried specimens of the fungus are preserved in the Mycological Collection at the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (SOMF). The samples are documented with colour photographs and concise description. Colour notations are in accordance with the British Fungus Flora Colour Chart (Anonymous 1969). Microscopic features are observed in water and 3 % KOH and measured in water. The measurement values for basidiospores and basidia are presented below in the following manner: (min–) mean $\pm\sigma$ (–max); for the rest of the microscopic structures minimum and maximum values are noted. The identification is justified by Breitenbach & Kränzlin (1986).

Line drawings were prepared by tracing digital photograph images on transparent paper. The SEM microphotograph is taken on JEOL JSM-6390.

Sarcodon joeides (Pass.) Bataille, Bull. Soc. Mycol. Fr. 39(4): 205, 1924.

Figs 7–8

Basidiomata usually simple or sometimes consecret. **Pileus** up to 10 cm in diam, convex to flattened, sometimes slightly depressed, fawn, clay pink, vinaceous buff, pale chestnut, pale brown vinaceous, finely fibrillose or glabrous, sometimes finely cracked, without scales or exceptionally with scarce adpressed small scales. **Stipe** up to 5 × 1.5 cm, central or excentric, cylindric or tapering downwards, tomentose to

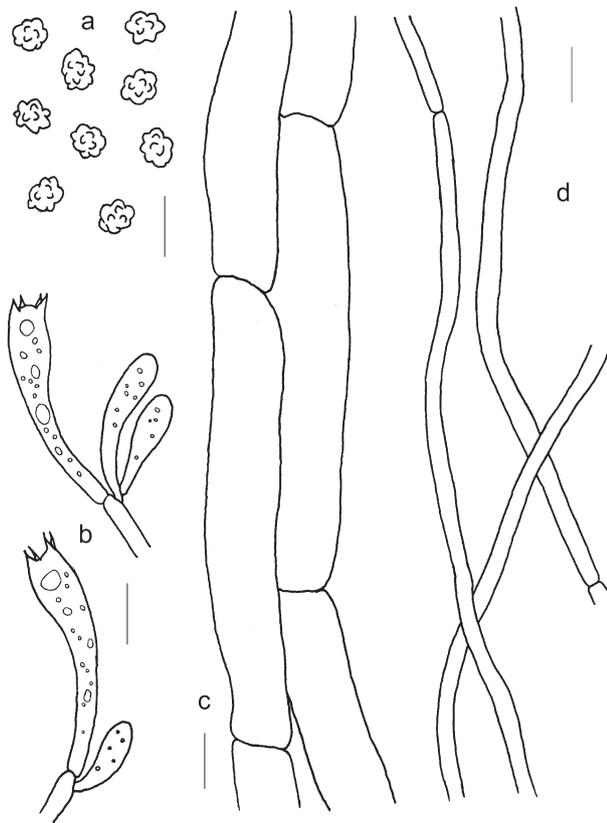


Fig. 7. Microscopic features of *Sarcodon joeides*: a – basidiospores, b – basidia, c – context hyphae, d – hyphae of spines. Scale bars = 10 μ m

fibrillose, more or less concolorous with the cap. **Context** vinaceous, livid vinaceous or lilac. **Spines** up to 4 mm long, decurrent, subulate, dirty whitish at first, then vinaceous buff to clay buff. **Odour** pleasant, somewhat fruity. **Taste** slightly bitter. **Basidiospores** tuberculate, (4–) 5.1 ± 0.3 (–6) \times (3.5–) 3.7 ± 0.3 (–4.5) μ m (including tubercules), ratio (1.1–) 1.4 ± 0.1 (–1.5) ($n = 30$). **Basidia** clavate, 4-sterigmate, (32.5–) 41.7 ± 6.6 (–57.5) \times (5–) 5.9 ± 1.2 (–7.5) μ m ($n = 30$). **Context hyphae** 10–17.5 μ m wide, hyaline, thin-walled, septate, without clamp-connexions. **Hyphae in spines** 2.5–5 μ m wide, hyaline, thin-walled, sometimes branched, septate, with long segments.

Specimen examined: **BULGARIA**: Belasitsa Mt., Petrich distr., Kongura Nature Reserve, between Belasitsa and

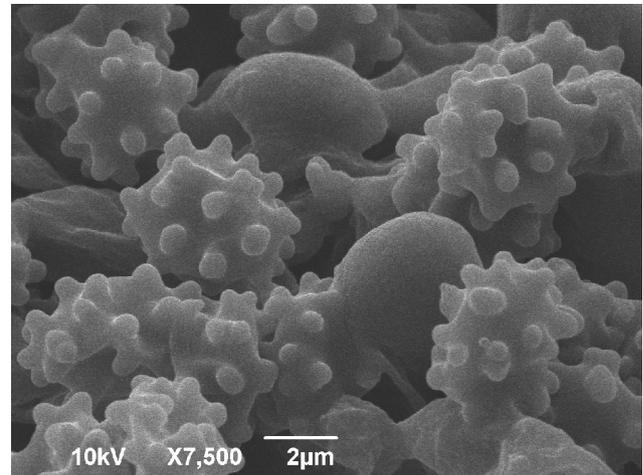


Fig. 8. SEM-micrograph of basidiospores of *Sarcodon joeides*

Kongur chalets, under *Castanea sativa* Mill., 22 Sep 2009, leg. D. Stoykov, B. Assyov & I. Assyova (SOMF 27 940).

Sarcodon joeides is a rarely encountered species (Hrouda 2005a, b). It is easily distinguished in the field by the colour of the flesh and the habitat under broadleaf trees.

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Breitenbach, J. & Kränzlin, F. 1986. Pilze der Schweiz. Bd. 2, Nichtblätterpilze. Verlag Mykologia, Luzern.

Hrouda, P. 2005a. *Bankeraceae* in Central Europe. 1. — *Czech Mycology* 57: 57–78.

Hrouda, P. 2005b. *Bankeraceae* in Central Europe. 2. — *Czech Mycology* 57: 279–297.

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25. *Pluteus salicinus* (*Pluteaceae*) in Bulgaria

Air dried specimens are preserved in the Mycological Collection at the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (SOMF). The samples are documented with color photographs and concise description. Colour notations in the description below refer to the British Fungus Flora Colour Chart (Anonymous 1969). Microscopic features are observed and measured in water. Measurement values are presented below in the following manner: (min–) mean \pm σ (–max). Spore volume (V_m) is

calculated according to the formula $V_m = 4/3\pi \cdot (1/2Sl)^2 \cdot 1/2Sl$; Sl – spore length, Sw – spore width, and the result is estimated to an integer number (Breitenbach & Kränzlin 1991)

Pluteus salicinus (Pers. : Fr.) P. Kumm., Führer Pilzk., p. 99, 1871.

Pileus up to 5 cm in diam, at first campanulate, then convex to flat, usually with a low umbo, finely radiately fibrillose, olivaceous buff, pale grey olivaceous to smoke grey, usually darker and with fine scales in the centre. **Stipe** up to 5

× 0.5 cm, fibrilous, whitish, somewhat bluish green or greyish at the base. **Flesh** white to dirty white, more greyish below the pileipellis. **Gills** free, crowded, initially cream, then pale pink to clay pink at maturity. **Spore print** pink. Smell and taste indistinct. **Basidiospores** subglobose or ovoid, (6.5–) 7.3±0.4 (–8) × (4.5–) 5.2±0.4 (–6) μm (*n* = 30), ratio (1.3–) 1.4±0.1 (–1.7), spore volume (80–) 103±19 (–151) μm³. **Basidia** clavate, 4-spored, (22–) 25.7±2.5 (–31) × (6.5–) 7.4±0.5 (–7.5) μm (*n* = 15). **Cystidia** abundant, with hooked apex, (55–) 67.2±7.1 (–82.5) × (13–) 18.0±2.9 (–24) μm (*n* = 20), with 2–4 hooks, 3–6 μm long. **Pileipellis** a cutis of septate hyphae.

Specimens examined: **BULGARIA**: Western Stara Planina Mts, Vratsa distr., Vrachanski Balkan Nature Park, Mizhishnitsa locality, on a dead stump of a deciduous tree, 18 Aug 2006, B. Assyov & D. Stoykov (SOMF 27 941); Sofia distr., Kostinbrod municipality, between Tsaritchina and Tchibaovtsi villages, on dead wood, 15 Jun 2008, B. Assyov (SOMF 27 942); Sofia city, Zapaden park, on a dead branch of a deciduous tree, 14 Oct 2008, B. Assyov (SOMF 27 943).

The Bulgarian specimens correspond very well to the descriptions given by Orton (1986), Printz (1992), Citérin & Eyssartier (1998), and Heilmann-Clausen (2008). The peculiar colours of basidiomata together with the combination of hooked cystidia and cutis are diagnostic features of this species.

The occurrence of this species in Bulgaria is of special interest as it has been reported by Stijve & Bonnard (1986) to contain psilocybine.

Acknowledgements. The research of the authors on the fungal diversity of Bulgaria was sponsored by the European Social Fund, within the Operational Program “Development of the Human Resources” (project BG051PO001/07/3.3-02/70/17.06.2008), through the Bulgarian Ministry of Education, Youth and Science.

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26. *Microbotryum stellariae* (*Microbotryaceae*) in Bulgaria

Microbotryum stellariae is reported as a new record for Bulgaria.

For LM observations, the spores were mounted in lactophenol solution on glass slides, gently heated to boiling point and then cooled. The measurements of spores are given in the form: min–max (mean ± 1 standard deviation). For SEM, the spores were attached to specimen holders by double-sided adhesive tape and coated with gold. The surface structure of spores was observed at 15 kV and photographed with a JEOL SM-6390 scanning electron microscope.

Microbotryum stellariae (Sowerby) G. Deml & Oberw., Phytopath. Z. 104: 354, 1982. **Fig. 9**

Sori in anthers. Spore mass powdery, dark purple. **Spores** globose, subglobose or broadly ellipsoidal, 5–7.5 × 4.5–7 (6.5±0.6 × 6.0±0.5) μm (*n* = 50); wall reticulate, meshes irregularly polygonal, 0.7–1.3 μm in diameter.

Specimen examined: **BULGARIA**: Rila Mts, near the Rila Monastery, on *Stellaria graminea* L., July 2008, leg. C.M. Denchev (SOMF).

Acknowledgements. The study was supported by grant no. DO 02-181/2008 (Bulgarian National Science Fund).

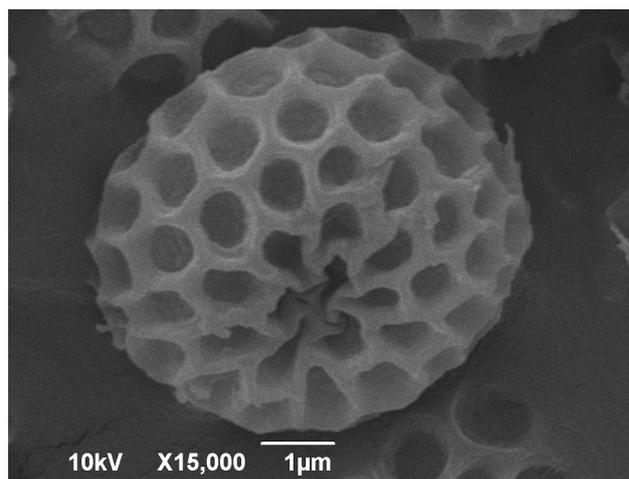


Fig. 9. *Microbotryum stellariae* on *Stellaria graminea* – a spore in SEM. Bar = 1 μm

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27. *Physarum perfectum* (*Physaraceae*) – a new myxomycete record for the myxobiota of Turkey

In August 2008, during routine field trips to different localities of Turkey, many samples of myxomycetes were collected. According to the checklists by Sesli & Denchev (2005), Dulger (2007) and Yagiz and Afyon (2007), *Physarum perfectum* was found to be a new record for Turkey. This taxon was identified with the aid of the work of Nannenga-Bremekamp (1991). The specimen cited is deposited in the Herbarium of Canakkale Onsekiz Mart University in Canakkale and in the first author's personal collection.

Physarum perfectum M. Peck, in Peck & Gilbert, Am. J. Bot. 19: 134, 1932. **Figs 10–11**

Sporocarps loosely gregarious, stipitate. Sporothecae grayish white, globose 0.6–0.8 mm in diam. Hypothallus very thin, colorless, widely effused. Stalk yellowish white, stout, calcareous, nearly smooth, slightly tapered upwards, 50–55 % of total height. Columella calcareous, well developed, white, conical, ca 30 % of the sporothecae. Peridium thin membrane, evenly granular with included lime and thickly sprinkled with rounded, mainly superficial, white lime scales. Capillitium moderately dense with numerous rounded or somewhat elongated, pale yellow, calcareous nodes. **Spores** in mass black, brown in transmitted light, minutely roughened, 9–11 µm in diam.

Specimen examined: **TURKEY**, Mersin, Camliyayla, 37°14'49.21" N, 34°37'44.08" E, alt. 928 m, on dead twig of *Pinus* sp., 25 Aug 2008, B. Dulger (BD 659).

According to Nannenga-Bremekamp (1991), this species is distinguished from *Physarum murinum* by the color of the stalk in transmitted light. This is ochraceous in *P. perfectum* and orange-brown in *P. murinum*. Also, in the color of the lime nodes, although the brown lime nodes of *P. murinum* are sometimes a very pale brown. *P. globuliferum* usually has a longer stalk which is often pinched and orange-brown at the base.

Dulger, B. 2007. Checklist of the myxomycetes in Turkey. — *Mycologia Balcanica* 4: 151–155.

Nannenga-Bremekamp, N.E. 1991. A guide to temperate myxomycetes. Biopress Ltd., Bristol.



Fig. 10. Stereomicroscopic image of the sporangia of *Physarum perfectum*. Scale bar = 0.5 mm

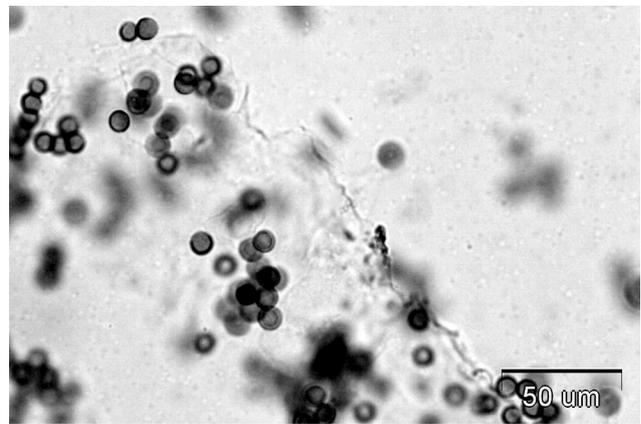


Fig. 11. A view of capillitium and spores of *Physarum perfectum*. Scale bar = 50 µm

Sesli, E. & Denchev, C.M. 2005. Checklists of the myxomycetes and macromycetes in Turkey. — *Mycologia Balcanica* 2: 119–160.

Yagiz, D. & Afyon, A. 2007. The ecology and chorology of myxomycetes in Turkey. — *Mycotaxon* 101: 279–282.

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