

# New data on Ascomycota in Bulgaria

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**Abstract.** Genus *Dialonectria* and four new species (*Coccomyces delta*, *Diatrype bullata*, *Diatrypella pulvinata*, and *Melanconis marginalis* subsp. *europaea*) are reported from Bulgaria. *Coryneum lanciforme*, *Cryptosporella suffusa*, *Dialonectria episphaeria*, *Gnomoniella tubaeformis*, *Hypospilina pustula*, *Nectria cinnabarina*, *Patellaria atrata*, and *Venturia inaequalis* f. sp. *aucupariae* are recorded on new hosts. Thirteen species (*Apiognomonium erythrostoma*, *A. petiolicola*, *Cryptosporella suffusa*, *D. episphaeria*, *Diatrypella verruciformis*, *Hysterium pulicare*, *G. tubaeformis*, *P. atrata*, *Peziza nivalis*, *Nectria cinnabarina*, *Neonectria coccinea*, *Sillia ferruginea*, and *Sydowiella fenestrans*) are presented with new country records.

**Key words:** ascomycetes, Balkan mycota, *Diaporthales*, *Hypocreales*, new substrata, *Xylariales*

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## Introduction

Summarized information on studies into the ascomycetous fungi in Bulgaria until 1930 could be found in Atanasoff & Pertoff (1930), and data about the existing more recent finds, especially about the pyrenomycetes, were given in Stoykov & Assyov (2009). Recently, a monograph was published on diaporthalean fungi (Stoykov 2012) and there were other contributions from Bulgaria and the adjacent Balkan countries (Stoykov 2016, 2017, 2018, 2019; Stoykov & Alvarado 2019). In this work, the author presents new and additional country records, nine of them on *Diaporthales*, three on *Hypocreales* and three on *Xylariales*, and information on single species from *Hysteriales*, *Patellariales*, *Pezizales*, *Pleosporales*, and *Rhytismatales*.

## Material and methods

All specimens are kept in the Mycological Collection of the Institute of Biodiversity and Ecosystem Research,

Bulgarian Academy of Sciences (SOMF). The colour photographs were taken with the aid of Canon PS A460 and Canon PS A1400 HD digital cameras under Boeco BM-180/T/SP LM and Boeco BOE 3500 dissecting microscope. Microphotographs were taken by Canon PS digital cameras. Colour photos of the ascomata in natural environment were taken *ex situ* under Boeco BOE3500 dissecting microscope. Observations of the microstructures were done in water, and colour reactions were studied additionally in lactophenol and in 5% KOH, or occasionally in 10% KOH. Asci and ascospores were measured in water under LM. The size of the spores is presented in descriptions in the following form: min-max, and (min-) mean $\pm$ 1 standard deviation (-max), length/width (l/w) ratio, n; 'n' – denotes the number of measured spores. Identification of fungal taxa generally follows Wehmeyer (1941), Menon (1956), Munk (1957), Dennis (1968), Monod (1983), Ellis & Ellis (1997), Hanlin (1998), Rossmann & al. (1999), Mejía & al. (2008), Hirooka & al. (2011), Gräfenhan & al. (2011), Medardi (2012), and Wergen (2017a, b). All fungal taxa are arranged alphabetically,

the new species and plant substrata are designated in the text with an asterisk (\*). Abbreviations used: DS (Dimitar Stoykov).

## Results and discussion

*Apiognomonium erythrostroma* (Pers.:Fr.) Höhn. (Plate I, Fig. 1)

**Material examined:** Eastern Forebalkan, Troyan Municipality, Golyama Zhelyazna village, Vlaskovska Mahala locality, 03.06.2017, DS, on overwintered leaves of *Prunus cerasifera* Ehrh.

**Note.** So far the species has been reported from Northeast Bulgaria and Mt Sredna Gora (Mt Lozenska), with descriptions and illustrations in Stoykov & Assyov (2006) and Stoykov (2012).

*Apiognomonium petiolicola* (Fuckel) M. Monod

**Specimens examined:** Vitosha region, Nature Park Vitosha, above Boyana Residential District, along the trail to Boyanski Waterfall, close to river Boyanska, 09.04.2018, DS, on overwintered petioles of leaves of *Tilia platyphyllos* Scop., SOMF 30018; Mt Belasitsa, Petrich distr., above Belasitsa village, after N41°21'03", E23°09'12", alt. 705 m, along the road, on petioles of *Tilia* sp., DS, 26.05.2013, SOMF 28646; idem., DS, SOMF 28650.

**Note.** These are the first reports from Vitosha and Belasitsa Mts. So far *A. petiolicola* has been known from the Eastern Forebalkan, Stara Planina Range, Sofia region, and Mt Western Sredna Gora (Stoykov 2012).

\**Coccomyces delta* (Kunze:Fr.) Sacc.

**Specimen examined:** Bulgaria, Valley of River Struma (Southern), Kulata town, above the cemetery, on dry leaves of *Quercus coccifera* L., 27.09.2015, DS, SOMF 30159.

**Additional specimens examined:** Greece, Sidirokastro, a park near the town, on dry leaves of *Q. coccifera*, 25.09.2015, DS, SOMF 30160; idem., 14.10.2017, DS, SOMF 30206.

**Note.** *Coccomyces delta* has been reported recently from Albania (Stoykov 2019).

*Coryneum lanciforme* (Fr.:Fr.) Volgmayr & Jacklitsch (Plate III, Figs 5-6)

Syn. *Pseudovalsa lanciformis* (Fr.:Fr.) Ces. & De Not.

**Specimen examined:** Mt Sredna Gora (Western), Mt Lozenska, above lake Pancharevo, 23.06.2017, DS, on twigs of \**Quercus pubescens* Willd., SOMF 30221.

**Note.** So far this species has been reported only from Mt Sredna Gora (Western), Mt Lozenska, on twigs of *Fraxinus* sp. by Fakirova (1985) and Stoykov (2012), but the corresponding specimen was not conserved in SOMF. Munk (1957), Ellis & Ellis (1997) and Wergen (2017b) reported *P. lanciformis* on twigs of *Betula* and on small branches. Asci from the studied Bulgarian material are about 130–160 × 25–30 (–35) μm, ascospores 35–46 (–51) × 12–15 (–18) μm [(35–) 41.2±2.4 (–46) × (12–) 15±1.3 (–17), l/w (2.2–) 2.8±0.3 (–3.3), n=40], which corresponds well to the known literature data (Barr 1978), with small differences in the ascospore width.

*Cryptospora suffusa* (Fr.:Fr.) L.C. Mejía & Castleb. (Plate II, Figs 1-3)

Syn. *Cryptospora suffusa* (Fr.:Fr.) Tul. & C. Tul.

**Ascomata** in the form of elevations in bark with ellipsoid form, with darker circular area mostly present at both ends, black, in groups; necks convergent in the centre, forming a single cavity. **Asci** 70–90 × 14–17 μm, n=10, oval to obovoid, 8-spored. **Ascospores** (45–) 69.75±10 (–75) × (3–) 3.9±0.4 (–4.5) μm, l/w (14.5–) 17.9±1.8 (–20), n=10, hyaline, flexuous, cylindrical, usually twisted, interwoven, or parallelly arranged (in fascicle), rounded at both ends.

**Material examined:** Vitosha region, Mt Vitosha, Bistrishko Branishte Biosphere Reserve, after Reznovyete locality, along the trail to Fiskulturnik chalet, 1985 m alt., 19.08.2018, DS, on overwintered twigs of \**Alnus viridis* (Chaix.) DC.

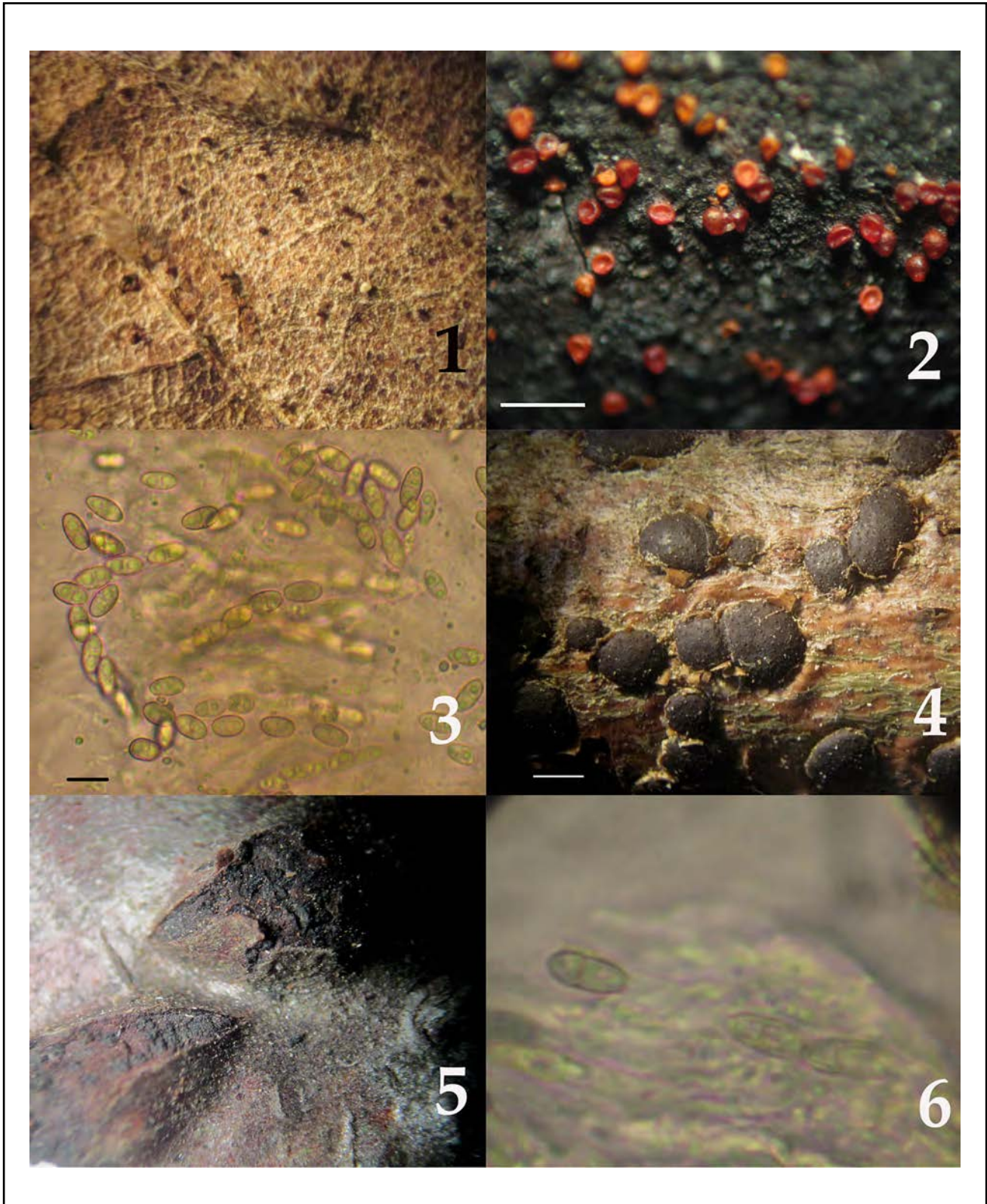
**Note.** *Cryptospora suffusa* was reported from Rila Mts, in the vicinity of Rila Monastery by Fakirova (1985, 1998), on branches of *Alnus glutinosa* (L.) Gaertn. In Europe, it is known also on twigs of *A. glutinosa* and *A. incana* (L.) Moench. (Mejía & al. 2008; Wergen 2017a).

*Dialonectria* (Sacc.) Cooke

Syn. *Nectria* subgenus *Dialonectria* Sacc., *Cosmospora* Rabenh. sensu Rossman, p. p.

**Stroma** inconspicuous or absent. **Perithecia** single or in small groups, pyriform with acute or short apical papilla, collapsing cupulate or pinched when dry, orange-red to carmine-red, turning dark-red in KOH (+), smooth-walled. **Asci** cylindrical

## Plate I.



**Fig. 1.** *Apiognomonium erythrostroma*, perithecial beaks emerging from a leaf surface; **Fig. 2.** *Dialonectria episphaeria*, ascospores on stroma of *Diatrype stigma*, SOMF 29634. Scale bar = 1 mm; **Fig. 3.** *D. episphaeria*, ascospores in water, SOMF 29634. Scale bar = 11  $\mu$ m; **Fig. 4.** *Diatrype bullata*, stromatic discs on twig of *Salix caprea*. Scale bar = 2 mm; **Fig. 5.** *Diatrypella pulvinata*, irregular stomata on twig of oak (Eastern Forebalkan); **Fig. 6.** *Venturia inaequalis* f. sp. *aucupariae* s. lat., ascospores in water.



to narrowly clavate, with an apical ring and eight uniseriate ascospores. **Ascospores** hyaline to pale-brown, 1-septate, smooth or becoming tuberculate, when mature. **Microconidia** ellipsoid to clavate, hyaline, aseptate, abundant. **Macroconidia**, when present, subcylindrical, slightly narrowing towards the ends, hyaline, mostly 3–5 septate. Usually growing on ascomata of other ascomycetes on deciduous trees.

***Dialonectria episphaeria*** (Tode:Fr.) Cooke, s. lat. (Plate I, Figs 2–3; Plate IV)

Syn. *Nectria episphaeria* (Tode:Fr.) Fr.

**Perithecia** 215–310 µm in diam., scattered, solitary or in small groups, pyriform with a short, acute or round apical papilla, smooth-walled, collapsing cupulate or pinched when dry, yellowish, orange-red or carmine-red, turning dark-red in 5% KOH to purple in 10% KOH, yellow in lactophenol. **Asci** 60–70 × (7–) 7.5–10 µm, cylindrical to narrowly clavate, with an apical ring, 8-spored, uniseriate. **Ascospores** (9–) 10–13.5 × (4–) 5.5–6 (–7) µm, [(10–) 11.71±0.7 (–13.5) × (4.9–) 5.96±0.5 (–6.8) µm; l/w (1.5–) 2±0.3 (–2.7)], n=150, hyaline, 1-septate, usually with one oil drop or several minute oil drops per cell, smooth. **Microconidia**, when present, ellipsoid, 1-celled, hyaline, abundant (see SOMF 29634).

**Specimens and materials examined:** Eastern Forebalkan, Lovech district, Golyama Zhelyazna village, along the road to Toplya Cave locality, on stromata of *Diatrype stigma* (Hoffm.:Fr.) Fr. on twigs of oak, 21.08.2015, DS, SOMF 30167; idem., 28.08.2016, on stromata of *D. stigma*, twig of broadleaf tree, SOMF 30208; idem., above Toplya Cave, N42°56'48", E24°28'56", alt. 445 m, 03.09.2016, DS, on stromata of *Eutypella quaternata* (Pers.:Fr.) Rappaz on twigs of *Fagus sylvatica* L.; idem., along the road after Luchov Chiflik, in direction to Staro Selo village, on stromata of *E. quaternata* on old fallen twigs of old beech, 19.08.2016, DS, SOMF 28631; idem., along the road to Toplya neighbourhood, alt. 400 m, 05.07.2017, DS, on *D. stigma* on old twigs, SOMF 30168; Stara Planina Mts (Central), Gabrovo district, Tryavna Municipality, near Stanchovo Han village, below peak Belnovruh, on stroma of *D. stigma* on dry bark of *Quercus dalechampii* Ten., 13.10.2014, DS, SOMF 29634; idem., Nature Park Balgarka, along the road between Bazovets and Krastets, on stromata of *E. quaternata* on dead branches of beech, 42°46'36", E25°32'45", alt. 965 m, 20.06.2012, DS, SOMF 28773, idem., 22.06.2016, DS, SOMF

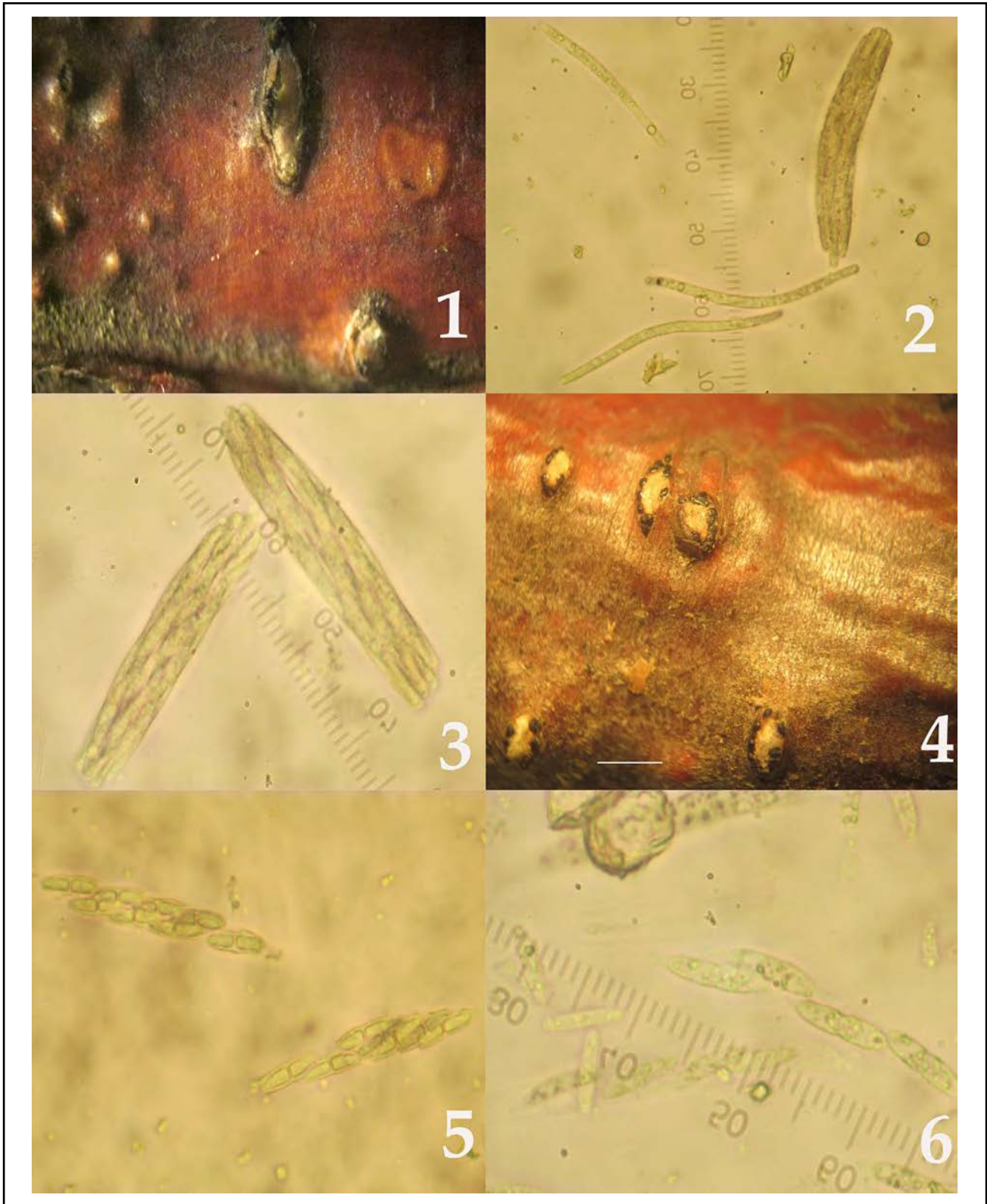
28608; Stara Planina Mts (Western), Montana district, Berkovitsa Municipality, Petrohan Pass, on black stromata of *D. stigma* on large twig of *Fagus sylvatica* (perithecia turning purple in 10% KOH), 20.04.2017, leg. B. Assyov, SOMF 30204; Vitosha region, Mt Vitosha, Nature Park Vitosha, near 'Spirka po Zhelanie' bus-stop near Dragalevski Monastery, 20.11.2016, DS, peridium K (+) dark-red, yellow in lactophenol, on stromata of *Eutypella quaternata* on dead twigs of beech, SOMF 30217; idem., Mt Vitosha, Nature Park Vitosha, after lake Boyansko Ezero, on shared trail for hikers and bykers, N42°37'54", E23°16'34.8", about 1120 m alt., 22.07.2017, DS, with peridium K(+) dark-red; yellow in lactophenol, on *E. quaternata* on beech bark, SOMF 30218; Rila Mts, Rilomanastirska Gora Reserve, on stroma of *D. stigma* on dead twig, 30.04.2015, DS, SOMF 26623.

**Additional specimen examined:** Romania, Harghita county, along the tourist trail from Băile Tuşnad Resort to Mohos Peat Bog and St. Ann Lake localities, about 950 m alt., 18.07.2006, DS, on stromata of *Eutypella quaternata* on dead twigs of *Fagus sylvatica*, SOMF 25719.

**Notes.** *Nectria episphaeria* was recorded in Bulgaria by Klika (1926) on stroma of *Eutypella quaternata* (as *Quaternaria persoonii* Tul. & C. Tul.) on *Fagus sylvatica* in the vicinities of Rila Monastery, Rila Mts. *Dialonectria episphaeria* was lectotypified subsequently on stroma of *Diatrype stigma* on partly decorticated twig (Booth 1959). It has been confirmed there on old stroma of *D. stigma* with 1-septate, guttulate spores (9–) 11±1 (–12.5) × (4.5–) 5.9±0.5 (–6.5), l/w (1.7–) 1.9±0.2 (–2.5), n=25, SOMF 26623. Recently *D. episphaeria* has been recorded on stromata of the same host-fungus on oak twigs in Albania (Stoykov 2019). *Dialonectria episphaeria* was considered a cosmopolitan species, inhabitant of stromata of some pyrenomycetous fungi on bark and twigs from different deciduous trees (Chlebicki & Chmiel 2006). *Dialonectria ullevallea* Seifert & Grafenhän, described on beech (Gräfenhan & al. 2011) has 1-septate, pale-brown ascospores about (8.7–) 9.7–11 (–12.5) × (3.7–) 4–4.5 (–4.8) µm, based on *Fusarium aquaeductuum* var. *medium* non-sexual counterpart. *Dialonectria diatrypicola* Lechat, J. Fourn. & Gardiennet (Lechat & al. 2019) differs from *D. episphaeria* and exists almost exclusively on stromata of *Diatrype bullata*.

**Comments.** There are records of *D. episphaeria* on black stromata of *Eutypella quaternata*, on twigs of

## Plate II.



**Fig. 1.** *Cryptosporella suffusa*, elevation on bark of *Alnus viridis* holding black ascomata; **Fig. 2.** *C. suffusa*, ascospores and ascus in water; **Fig. 3.** *C. suffusa*, asci in water; **Fig. 4.** *Melanconis marginalis* subsp. *europaea*, white stromatic discs, holding black perithecia on dead branch of *Alnus viridis*, SOMF 30212. Scale bar = 1 mm; **Fig. 5.** *M. marginalis* subsp. *europaea*, asci with ascospores in water, in dead state, SOMF 30164; **Fig. 6.** *M. marginalis* subsp. *europaea*, ascospores in water, in living state, SOMF 30165.

*Fagus sylvatica*, similar in their ecological preference to the first report of Klika (1926), collected from Romania in July 2006, and more recently from Bulgaria, from the Eastern Forebalkan and Vitosha region (Nature Park Vitosha) in the late summer of 2016, while in the Stara Planina Mts (Balgarka Nature Park) they were found in June 2012 and 2016. The latter were with slightly smaller reddish ascomata, usually up to (180-)195–205 × 220–230 µm, and collapsing cupulate when dry, turning dark-reddish or purple in 5% KOH, and yellow in lactophenol and Cotton Blue in lactic acid; with peridium up to 35 µm in cross section, and asci 65–70 × 6.5–7 µm, with apical ring and 1-septate, and hyaline uniseriate ascospores, (7.5-) 9.25±0.7 (-11) × (3.7-) 4.5±0.3 (-5) µm, l/w (1.85-) 2.13±0.22 (-2.7), n=50, slightly constricted at septum, smooth, ±guttulate (Plate IV). The size of their ascospores was closest to the data on *D. episphaeria* given in Booth (1959: 75). *Dialonectria quaternatae* Lechat & J. Fourn. (Lechat & al. 2019), known in France on stromata of *Eutypella quaternata* (= *Quaternaria quaternata* (Pers.:Fr.) J. Schröt.) on *Fagus sylvatica*, has larger ascomata (up to 280–300 µm in diam.), bigger asci (80–95 × 6–8 µm) and subhyaline to very pale-brown longer and slightly larger ascospores (10–13 × 4.5–5.5 µm, average 12 × 5 µm), when compared to our finds of *D. episphaeria* s. lat. on stromata of *E. quaternata* on *F. sylvatica*. So far we have not been able to confirm their position within the known members of the *Fusarium-like* clade of genus *Dialonectria* by means of DNA studies.

\**Diatrype bullata* (Hoffm.:Fr.) Fr. (Plate I, Fig. 4)

**Stromata** irregularly-pulvinate, **stromatic discs** (2.5-) 3–4 (-5) mm, n=20, black-brownish, circular to oblong. **Perithecia** 210–300 × 250–310 µm, n=5, uniseriate, in the upper part of the stroma. **Asci** 25–35 × 3.5–4.5 (-5) µm, n=15, very narrowly clavate, with minute apical ring. **Ascospores** (4.8-) 5.5–6.5 (-8.9) × (1.0-) 1.3–1.8 (-2.1) µm, n=35, arranged uniseriately to biseriately in the ascus, hyaline, almost cylindrical, slightly curved.

**Specimens and materials examined:** Bulgaria, Vitosha region, Mt Vitosha, Nature Park Vitosha, after Aleko chalet, in direction to Zlatnite Mostove locality, 21.04.2018, on dead twigs of *Salix caprea* L., SOMF 30161; idem., near Hotel Prostor locality, at the bus stop, 21.04.2018, DS; Mt Vitosha, Bistrishko Branishte Biosphere Reserve, along the trail to Reznovete

locality, N42°35'05", E23°17'22.7", 09.10.2016, DS; idem., N42°34'40", E23°18'00", 1810 m, 29.07.2017; idem., N42°34'22", E23°18'02", 1851 m, 16.08.2017, DS; Rila Mts, National Park Rila, nearby Ibur Reseve, N42°13'29", E23°44'59.1", alt. 1756 m, on rotten twigs of old *Salix* tree, 08.06.2015, DS, SOMF 30163.

**Additional material examined:** Romania, Harghita County, above Băile Tuşnad Resort, 46°07'46.13"N, 25°53'25.90"E, alt. 1050 m, on dead twig of *Salix* sp., 18.07.2006, DS.

**Notes.** Asci and ascospores were also observed under oil immersion. *Diatrype bullata* was noted in several places on Mt Vitosha, Bistrishko Branishte Biosphere Reserve, near the lower end of the tourist trail towards Reznovete locality, on dead twigs of *Salix* L. and also above Aleko chalet, in August and September 2016. Wergen (2017a) reported *D. bullata* on *Salix* with ascospore size about 5.5–6.4 × 1–1.2 µm.

\**Diatrypella pulvinata* Nitschke (Plate I, Fig. 5)

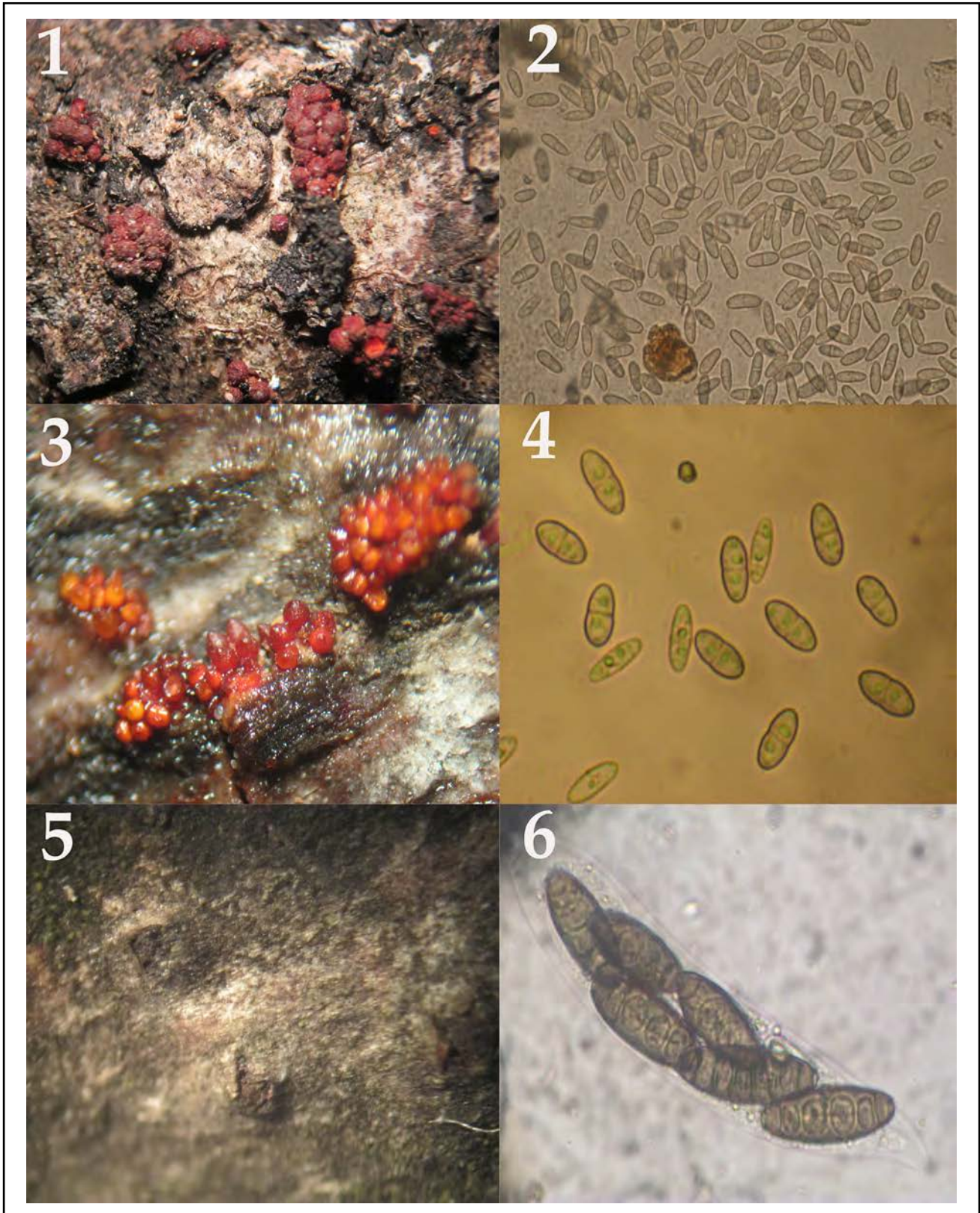
Syn. *Diatrype pulvinata* (Nitschke) Cooke

**Stromata** up to 3–3.5 mm in diam., truncate, elongate-conic, mostly irregular prismatic, numerous on twigs, dark-brown to blackened, with ellipsoid ectostromatic disc and sulcate ostioles. **Perithecia** usually large, up to 850–1300 µm, oblong to globose, immersed in 1 or 2 rows, up to 10–15, with punctate minute ostioles. **Asci** (55-) 65–85 (-120) × (5-) 6.5–9 (-12.5) µm, clavate to fusiform, long stipitate. **Ascospores** (4.5-) 5.45±0.45 (-7) × (1-) 1.26±0.18 (-1.65) µm, l/w (3.5-) 4.45±0.6 (-6), n=150, oblong ellipsoid, hyaline, straight and less curved.

**Specimens and material examined:** Forebalkan (Eastern): Lovech distr, Golyama Zhelyazna village, Mikrenska Usoyna forest, alt. 590 m, 17.08.2017, DS, SOMF 30173, on dead twig of *Quercus frainetto* Ten.; Stara Planina Mts (Western), Sofia region, above Voynegovtsi village, 12.08.2006, DS, on dead twigs of *Quercus robur* L., SOMF 30213; idem., 12.08.2006, DS, SOMF 30214; Vitosha region, above Dragichevo village, 17.05.2017, DS, SOMF 30170; on dead twigs of *Quercus frainetto* Ten.; Mt Vitosha, Nature Park Vitosha, above Knyazhevo Residential District, Byalata Voda locality, 22.09.2017, DS, on dead twig of *Quercus cerris*, SOMF 28577; idem., above Boyana Residential District, near the trail to Boyanski Waterfall, 16.06.2016, DS, on twig of *Q. dalechampii* Ten., SOMF 30171; Mt Sredna Gora (Western), Sofia distr., above lake Pancharevo, 23.05.2018, DS, on dead twigs of *Quercus pubescens*



## Plate III.



**Fig. 1.** *Nectria cinnabarina*, clusters of perithecia on twig of *Fagus sylvatica*; **Fig. 2.** *N. cinnabarina*, ascospores in water, SOMF 28717; **Fig. 3.** *Neonectria coccinea*, aggregates of perithecia in wet condition; **Fig. 4.** *N. coccinea*, ascospores in water; **Fig. 5.** *Coryneum lanciforme*, stromata on twig of *Quercus pubescens*; **Fig. 6.** *C. lanciforme*, ascus in water.

Willd., SOMF 30215; idem., 27.06.2017, on dead twig of *Q. pubescens*, DS, SOMF 30216.

**Note.** Munk (1957) distinguished *D. pulvinata* from *D. quercina* (Pers.) Nitschke on oak twigs by its smoother stromata and smaller and less curved ascospores, 6–7 × 1.5 µm.

***Diatrypella verruciformis* (Ehrh.) Nitschke**

**Specimens examined:** Forebalkan (Eastern), Lovech distr., Golyama Zhelyazna village, above Toplya Cave natural landmark, along the main road, 25.09.2016, DS, on bark of old *Corylus avellana* L., SOMF 30210; Vitosha region, Mt Vitosha, Nature Park Vitosha, above Boyana Residential District, along the trail to lake Boyansko Ezero, 17.07.2017, DS, on bark of twigs from *C. avellana*, SOMF 30209; Rila Mts, Rilomanastirska Gora Reserve, along the trail from Kalugerski Dol to Ivan Vazov chalet, 30.04.2015, DS, SOMF 30174, on twigs of hazel.

**Note.** *D. verruciformis* was reported earlier only from Rila and Pirin Mts (Klika 1926; Fakirova 1978).

***Gnomoniella tubaeformis* (Tode: Fr.) Sacc.**

**Materials examined:** Vitosha region, Mt Vitosha, Bistrishko Branishte Biosphere Reserve, after Reznyovete locality, along the trail to Fizkulturnik chalet, N42°33'26.5", E23°17'49", 02.07.2016, alt. 1980 m; idem., 29.07.2017; DS, 09.07.2016 and 06.08.2016, DS, on dead leaves of \**Alnus viridis*, often accompanied by the black perithecia of *Gnomonia alnea* (Fr.: Fr.) Sogonov.

**Note.** In Bulgaria, it has been so far known from Mt Sredna Gora, on overwintered leaves of *Alnus glutinosa* (Sameva 1981; Fakirova 1998; Stoykov 2012).

***Hypospilina pustula* (Pers.: Fr.) M. Monod**

**Specimen examined:** Sofia region, Sofia, Vrana Park, behind the main buildings of Vrana Residence, 04.04.2018, DS, on overwintered leaves of \**Quercus palustris* Münchh, SOMF 30019.

**Notes.** The host plant of *H. pustula* is native species to North America, and obviously had been intentionally introduced and artificially planted in Vrana Park. To our knowledge, this is the first report of *H. pustula* on leaves of *Q. palustris* (Barr 1978; Monod 1983).

***Hysterium pulicare* Pers.: Fr.**

**Specimen examined:** Rila Mts, Blagoevgrad distr., Rilomanastirska Gora Reserve, near the trail from

Kalugerski Dol to Ivan Vazov chalet, 30.04.2015, DS, on bark of *Fagus sylvatica*, SOMF 30205.

**Additional specimens examined:** Stara Planina Mts, Gabrovo distr., Nature Park Balgarka, N42°45'49", E25°29'54", alt. 1125 m, 24.03.2013, DS, on bark of *Acer pseudoplatanus* L., SOMF 28360; idem., below peak Belnovruh, in the vicinity of Vlasatili village, 13.10.2014, DS, on bark of *Quercus dalechampii*, SOMF 29653.

**Note.** *Hysterium pulicare* has been known only from Stara Planina Mts (Nature Park Balgarka and Vitinya), Gyosheva & al. (2016), Bencheva (2019) and from Sofia and Vitosha regions (Fakirova 1991, 1997).

\****Melanconis marginalis* subsp. *europaea*** Jaklitsch & Volgmayr (Plate II, Figs 4-6)

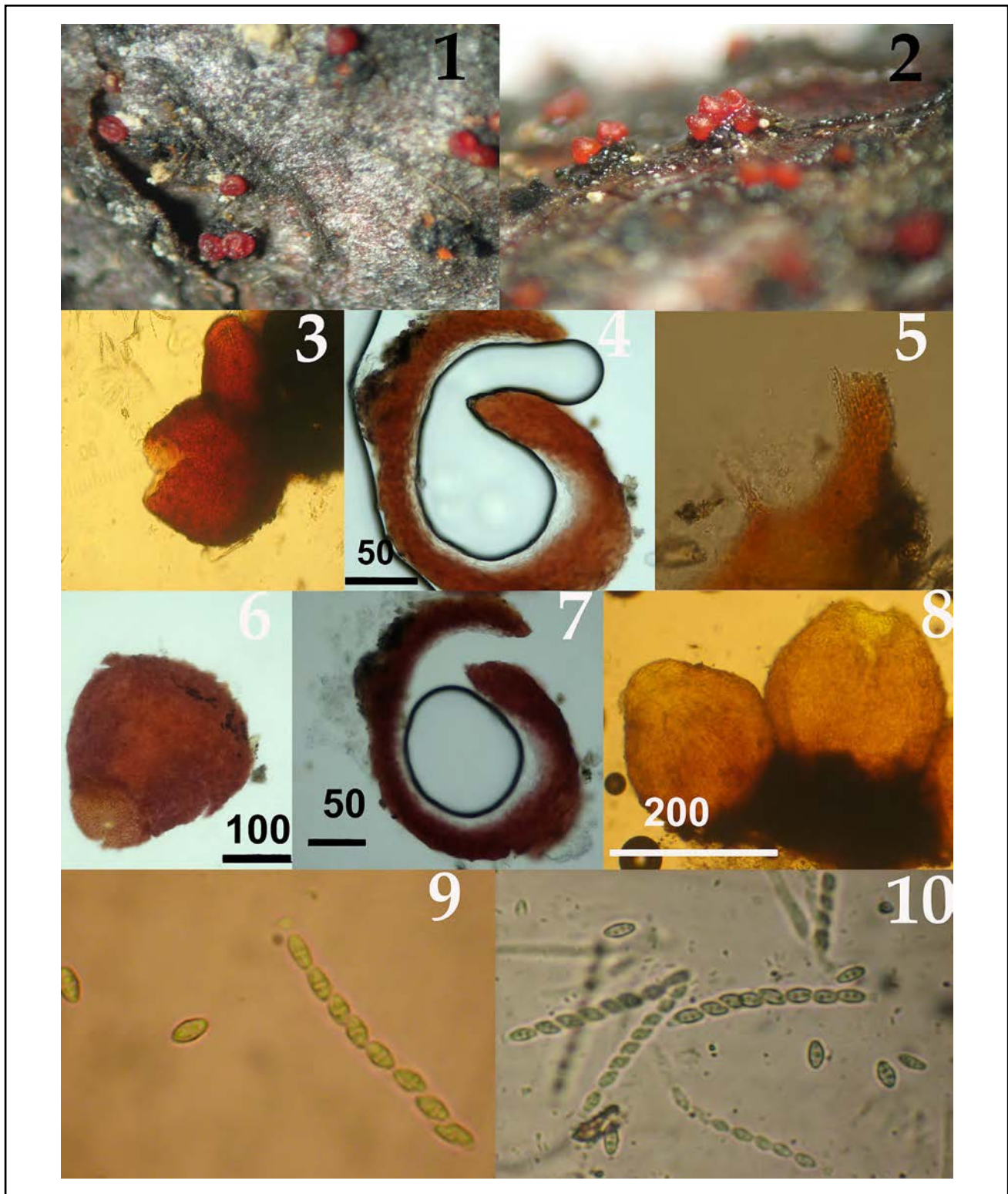
**Stomata** on the host surface look as numerous, raised circular flat-conical pustules, about 2 mm in diam., with central circular or fusoid white to yellowish disc up to 1 mm in diam., and many short cylindrical-pustulate ostioles; usually arranged along the disc margins, situated between and in the periderm. **Perithecia** up to 350–400 µm in diam., globose to flattened, black. **Asci** fusoid-cylindric, 60–75 (-90) × (6-) 8–12 (-14) µm, n=10, with minute apical annulus, 8-spored. **Ascospores** overlapping uniseriate to irregularly biseriate above to uniseriate below, hyaline, fusoid-ellipsoidal, 1-septate, constricted at the septa, ends obtusely rounded, (12-) 16±1.1 (-20) × (2.5-) 4.25±0.8 (-5) µm, l/w (3.2-) 3.85±0.51 (-4.8), n=20, SOMF 30164, without visible oil contents in dead state under LM, with guttules in living state (15-) 18.4±2 (-20) × (3.5-) 4.3±0.6 (-5), n=10, SOMF 30165, with short to elongate, cylindrical appendages at both ends, occasionally ±tapering towards the tips, evanescent in old collections.

**Specimens examined:** Vitosha region, Mt Vitosha, Bistrishko Branishte Biosphere Reserve, along the trail after Reznyovete locality, towards Fizkulturnik chalet, N42°33'26.5", E23°17'49", alt. ca 1985 m, 04.06.2017, DS, on dead branches of *Alnus viridis*, SOMF 30212; idem., 19.08.2017, on dead branches of *A. viridis*, SOMF 30165; Rila Mts, National Park Rila, above Kostenets town, along the upper stream of river Chavsha, near the old chalet, 09.06.2015, DS, SOMF 30164, on dead branches of *A. viridis*.

**Notes.** This is a new record for Bulgaria. The species has been so far known in Europe from Austria, Czech Republic, Romania and Switzerland on *Alnus alnobetula*



## Plate IV.



*Dialonectria episphaeria* s. lat., SOMF 28773. **Fig. 1.** Collapsed cupulate ascomata in dry condition, on *Eutypella quaternata* on dead twig of *Fagus sylvatica*; **Fig. 2.** Ascomata in wet condition, on *E. quaternata* on twigs of *F. sylvatica*; **Fig. 3.** Ascomata, asci and spores in water, under LM; **Fig. 4.** Vertical section of peridium, in water. Scale bar = 50  $\mu$ m; **Fig. 5.** Vertical section of lateral ascomatal wall showing cell layers, in water; **Fig. 6.** Ascoma in 5% KOH. Scale bar = 100  $\mu$ m; **Fig. 7.** Vertical section of peridium in 5% KOH. Scale bar = 50  $\mu$ m; **Fig. 8.** Ascomata in lactophenol. Scale bar = 200  $\mu$ m; **Fig. 9.** Ascus with an apical ring and septate ascospores, in water; **Fig. 10.** Asci with uniseriate hyaline ascospores, in water.

(Ehrh.) K. Koch, *A. incana*, *A. viridis*, (Wehmeyer 1941; Senn-Irlet & al. 2012; Jaklitsch & Voglmayr 2020).

***Nectria cinnabarina*** (Tode.: Fr.) Fr. (Plate III, Figs 1-2).

**Stromata** pseudoparenchymatous. **Ascomata** perithecia, superficial on stromata, solitary or in clusters up to 25 on stroma, occasionally grouped around the base, subglobose to globose, 280–410 × (360) 390–440 µm diam., n=8, red to reddish-brown, even cupulate when dry, non-papillate, apical region darker (resembling a dark dot), KOH (+) dark-red, Cotton Blue in lactophenol (+) yellow, surface usually warted, occasionally smooth in appearance. **Peridium** (50-) 55–65 (-70) µm thick. **Asci** (50-) 55–75 (-90) × (9-) 10–11 (-12.5) µm, n=10, cylindrical to narrowly clavate, unitunicate, with inconspicuous apical ring, 8-spored, ascospores biseri-ate above, to uniseriate below. **Ascospores** (11.5-) 13–17.5 (-21) × 4.0–5.5 (-6.0) µm, [(11.5-) 15.26±1.22 (-21) × (4.0-) 4.81±0.48 (-6.0) µm, l/w (2.4-) 3.18±0.34 (-4.3), n=130], ellipsoid to fusiform, straight, but often slightly curved, hyaline, (0-)1-septate, septum median or near so. **Sporodochia** of *Tubercularia vulgaris* Tode.: Fr. type, whitish, conidia 1-celled, hyaline (3.4-) 5.2–7.5 (-7.8) × (1.2-) 1.8–2.3 (-2.5) µm, l/w (2.5-) 4.2±0.4 (-4.2), n=25; on *Castanea sativa* Mill., Forebalkan, 25.04.2014 (5.03-) 6.44±1.02 (9.0) × (1.4-) 2.29±0.43(-3.3), n=15.

**Specimens and materials examined:** Northeast Bulgaria, Shoumen Plateau, Bukaka Reserve, 24.10.2007, on dead twigs of *Fagus sylvatica*, N43°15'21.6", E26°52'25.6", alt. 433 m, DS, SOMF 26320, SOMF 26711 (as *T. vulgaris*); Forebalkan, Troyan Municipality, Golyama Zhelyazna village, 25.04.2014, on apical branches of *Castanea sativa*, alt. 415 m, DS (as *T. vulgaris*); idem., Vlaskovska neighbourhood, towards Mikrenska Usoyna forest, on twig of dead *\*Robinia pseudoacacia* L., 28.08.2017, DS, SOMF 30169; Sofia region, Vrana Park, 04.04.2018, on branch of *Acer* sp., (as *T. vulgaris*), SOMF 30158; Rila Mts, Rilomanastirska Gora Reserve, on dead twigs of *F. sylvatica*, 30.04.2015, N42°07'56.0", E23°19'30", alt. 1354 m, DS, SOMF 30162.

**Additional specimen examined:** Romania: Transylvania (Eastern), Harghita county, above Băile Tuşnad Resort, Tinovul Mohoş vicinity, N46°07'46.13", E25°53'25.90", alt. 1050 m, on dead twig of *Acer* sp., 18.07.2006, DS, as sexual morph, SOMF 28717.

**Notes.** A common species, known in Bulgaria on various deciduous trees and shrubs. It was described and reported on bark of beech by Fakirova & Sameva

(1983), but the corresponding specimen was not conserved in SOMF. Both authors described asci about 45–80 × 9–10 µm and ascospores 10–20 × 3–6 µm, which are similar to those presented herein. Recently, it has been reported from Mt Strandzha by Hüseyin & Selçuk (2007). The collection from Ibur Reserve on *Acer hyrcanum* Fisch & C.A. Meyer, SOMF 30172 is ±similar in appearance to *Nectria dematiosa* (Scwein.) Berk., with perithecia 250–350 (-400) µm, occasionally cupulate when dry and ascomatal wall about 40–50 µm in vertical section, ascospores slightly longer, ellipsoid to fusiform (13.5-) 16.1±1.6 (-19.5) × (3.9-) 4.9±0.6 (-6.2) µm (n=21), straight or slightly curved, (0-)1-septate, occasionally with obtuse ends. The species is known from North Europe, in Poland, and further molecular examination may be helpful in revealing the exact position of this find within *Nectria cinnabarina* or *N. dematiosa* species complexes, see Hirooka & al. (2011: 41).

***Neonectria coccinea*** (Pers.: Fr.) Rossmann & Samuels (Plate III, Figs 3-4).

**Stromata** up to 2–3 mm in diam. **Perithecia** 250–350 × 300–430 µm in diam., superficial or in tiny stroma, usually aggregated in groups up to 30, seldom single, globose to oval, scarlet, with papillate ostioles, densely gregarious, ovate, subglobose, bright-red or dark-red. **Peridium** red to reddish-brown in water; purple in 5% KOH, yellow in lactophenol. **Asci** (70-) 80–90 × 8–11 (-12) µm, narrowly-clavate, stipitate, 8-spored, obliquely uniseriate, biseri-ate at the apex. **Ascospores** (10.5-) 12.1±0.8 (-13.6) × (4.4-) 5.4±0.5 (-6.6) µm, l/w (1.8-) 2.23±0.25 (-2.9), n=80, ellipsoid to fusiform with narrowly rounded ends, straight or slightly curved, hyaline, finely spinulose, 1-septate, slightly or not constricted at septa.

**Specimens and materials examined:** Eastern Forebalkan, Lovech district, Troyan Municipality, Golyama Zhelyazna village, above Toplya Cave, on bark of old *Fagus sylvatica* L., 30.08.2015, DS; idem., 15.09.2015, SOMF 25719, and 22.09.2015, DS.

**Additional specimen examined:** Hungary, Valley Ablakoskő völgy, mountain Bükk hegység, near Nagvisnió village, on bark of *Fagus sylvatica*, 08.05.1955, leg. S. Tóth, as *Nectria coccinea* (Pers.: Fr.) Fr., SOMF 6326, scarlet in tap-water, purple in 5% KOH, yellowish in lactophenol.

**Notes.** The species has been so far known from Stara Planina, Vitosha, Rila and Pirin Mts, on bark of beech (Bencheva 2006; Mihál & al. 2009, 2014, 2015). It

is reported from Bulgaria by Rosnev & Petkov (1996), along with *Neonectria ditissima* Tul. & C. Tul. *Neonectria faginata* (Lohman, Watson & Ayers) Castl. & Rossman, known from North America (Castlebury & al. 2006), is easily distinguished from *N. coccinea* by macroconidia more than 80 µm long, when 5-septate and 1-septate, finely spinulose, with ascospores  $8.5\text{--}14.3 \times 4\text{--}8$  µm.

***Patellaria atrata*** (Hedw.: Fr.) Fr.

**Apothecia** ca 350–900 µm in diam., blackened, fragile, fresh up to 1500 µm, soft, usually clustered. **Asci** 115–130 × 14–18 µm, 8-spored, bitunicate, clavate, apical porus not clearly visible, with spores overlapping biserially. **Paraphyses** numerous, slender from the middle, mostly multiple branched, slightly widened at the apex. **Ascospores** 30–45 × (5.5–) 7–8 (–9) µm, clavate, slightly to distinct flexuose, with eight to eleven cross-septa, hyaline.

**Specimens examined:** Stara Planina Mts (*Central*), Troyan Municipality, Oreshak village, near Troyan Monastery, 07.07.2006, DS, SOMF 28774, on dead bark of \**Tilia cordata* Mill.; Sofia region: Sofia, Lyulin 3 Residential District, 06.11.2013, DS, SOMF 28766, on old bark of \**T. platyphyllos* Scop.; idem., Sofia, Vrana Park, 04.04.2018, DS, on decorticated branch of \**Tilia* sp., SOMF 30219.

**Notes.** *Patellaria atrata* has been known in Bulgaria only from the Black Sea region, on part of hemp sack (Fakirova 1978). Dennis (1981) considered it a rare fungus in Great Britain. Our recent finds on *Tilia cordata*, *T. platyphyllos* and *Tilia* sp. show new substrata of *P. atrata* in Bulgaria.

***Peziza nivalis*** (R. Heim & L. Remy) M.M. Moser

**Specimen examined:** Vitosha region, Mt Vitosha, Bistrishko Branishte Biosphere Reserve, on soil over plant debris, close to the melting snow, 21.04.2018, DS, SOMF 30031.

**Note.** *Peziza nivalis* is known and described in Bulgaria from the Pirin Mts (Dimitrova & Dankova 2009). Ascospores in our specimen were (16–)  $18.1 \pm 1.03$  (–20) × (8.1–)  $10.3 \pm 0.94$  (–11.5) µm, l/w (1.5–)  $1.75 \pm 0.13$  (–2.1), n=30, measured in tap-water, in living condition; asci: 14–15 µm wide.

***Sillia ferruginea*** (Pers.: Fr.) P. Karst.

**Specimen examined:** Rila Mts, above Kostenets, Ibur Reserve, Shavaritoto Dere locality, on bark of broadleaf tree, 08.06.2015, DS, SOMF 30211.

**Note.** The species is known only from Mt Sredna Gora (Fakirova 1978; Fakirova & Sameva 1983; Stoykov 2012) on twigs of *Betula pendula* Roth and *Fagus sylvatica*.

***Sydowiella fenestrans*** (Duby) Petr.

**Specimen examined:** Vitosha region, Mt Vitosha, above Aleko chalet, Mecha Polyana locality, on dead stems of *Epilobium angustifolium* L., 29.07.2017, DS, SOMF 30166.

**Note.** The species has been so far recorded only from Belasitsa and Rhodopi Mts (Fakirova 1978; Stoykov & Denchev 2006; Stoykov 2012).

***Venturia inaequalis*** (Cooke) G. Winter f. sp. ***aucupariae*** (Lasch) R. Menon, Phytopath. Z., 27: 130, 1956, s. lat. (Plate I, Fig. 6)

Syn. *Sphaerella aucupariae* Lasch, Sphaer. Brit. 3, no 65, 1878.

**Ascomata** single, brownish, formed in dead leaves of the host, without visible hypostroma, with setae observed. **Asci** 40–60 (–65) × 8–10 µm, cylindrical, often broadened towards the base. **Ascospores** (8–)  $10.22 \pm 1.2$  (–13.5) × (2.7–)  $3.9 \pm 0.5$  (–4.5) µm, l/w (2.2–)  $2.76 \pm 0.25$  (–3.2), n=15, mostly hyaline to slightly olivaceous, ellipsoid, 1-septate, constricted at the septum, upper cell often widened, uniseriate towards the apex, irregular at the base of asci.

**Material examined:** Mt Strandzha, Nature Park Strandzha, Marina Ryaka protected area, along the road between Kosti village and Ahtopol town, 09.06.2004, leg. B. Assyov, on overwintered leaf of \**Torminalis glaberrima* (Gand.) Sennikov & Kurtto (= *Sorbus torminalis* (L.) Crantz), *Rosaceae*.

**Notes.** Measurements of the ascospores were taken mostly inside the asci. Menon (1956) described asci of *V. inaequalis* f. sp. *aucupariae* as sized about 68–80 × 8 µm and ascospores 12–14 × 4–5 µm. Braun (2019: 65) studied the duplicate specimen of *Sphaerella aucupariae* on *Sorbus aucuparia* L. (Sphaer. Brit. no. 92), which showed slightly smaller size for both asci and ascospores. *Venturia inaequalis* was reported from Bulgaria on *S. aucuparia* and *S. aria* (L.) Crantz (Atanasoff & Petroff 1930; Stancheva & Bencheva 2004). *Sorbus aria* is considered type host of *V. inaequalis*, but the fungus was separated by Menon (1956) into different biologically distinct special forms ('formae speciales'), with high degree of host specialization, based on their variability on different rosaceous plants.



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