

## New records of Bulgarian *Mycosphaerella* (Ascomycetes). II\*

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**Abstract.** *Mycosphaerella ambigua*, *M. bracteophila*, *M. effigurata*, *M. eriophila*, *M. eryngina*, *M. euphorbiae*, *M. hieracii*, *M. hyperici*, *M. implexicola*, *M. molluginis*, *M. polycarpa*, *M. populi*, *M. pterophila*, *M. sarracenica*, *M. urticae-dioicae*, and *M. viburni* are reported for Bulgaria. Most species are new for Southeast Europe. The morphological features of these species are described and illustrated.

**Key words:** ascomycetes, fungal diversity, fungi of Bulgaria, *Mycosphaerella*, taxonomy

### Introduction

The present study is the second contribution to the diversity of *Mycosphaerella* Johanson in Bulgaria (see Fakirova 1995), resulting in 16 new records for the country. Excluding *M. ambigua* and *M. eriophila*, already known from Romania (Bontea 1986), the other 14 species are reported for the first time for the region of Southeast Europe.

### Materials and Methods

All examined specimens of *Mycosphaerella* are preserved in the Mycological Collection of the Institute of Botany, Bulgarian Academy of Sciences (SOMF). For the identification of the fungi, dried herbarium material was observed and measured by light microscopy in lactophenol after heating.

### New records

*Mycosphaerella ambigua* (Fautrey & Lambotte) Tomilin, *Opređelitel' gribov roda Mycosphaerella*, p. 61, 1979. (Fig. 1)

**Pseudothecia** up to 93 µm diam, globose, black, scattered singly, subepidermal, immersed in tissue of stems and leaves. **Asci** ventricose, subsessile, fasciculate, 33–47 (–57) × 11–13 (–14) µm, 8-spored. **Ascospores** fusiform-clavate, hyaline,

smooth, 11–13 × 3.5–4.5 µm, septate in the middle, slightly constricted at the septum.

Know distribution: Central and SE Europe.

On overwintered leaves and stems of *Cichorium intybus* L. Vitosha region: Mt Vitosha, Zheleznița, 17 Jul 1994, V. Fakirova (VF) (SOMF 21 419).

*Mycosphaerella bracteophila* (Pass.) Tomilin, *Novit. Syst. Pl. non Vascularium* 6: 119, 1970. (Fig. 2)

**Pseudothecia** up to 100 µm diam, globose to conical, black, grouped in circular areas on the upper side (surface) of leaves. **Asci** ventricose, subsessile, fasciculate, bitunicate, 55–77 × 13–18 µm, 8-spored. **Ascospores** fusiform-clavate, hyaline, smooth, 16–21 × 4.5–6 µm, septate in the middle, slightly constricted at the septum.

Know distribution: Central Europe.

On overwintered leaves of *Tilia* sp. Mt Sredna Gora: Mt Losenska Planina, 26 Mar 1994, VF (SOMF 21 399); Stara Planina Mts: Bouhovo, 5 Apr 1995, VF (SOMF 21 526); Forebalkan: Distr. Gabrovo, Petko Slaveikov, 10 Apr 1994, VF (SOMF 21 400).

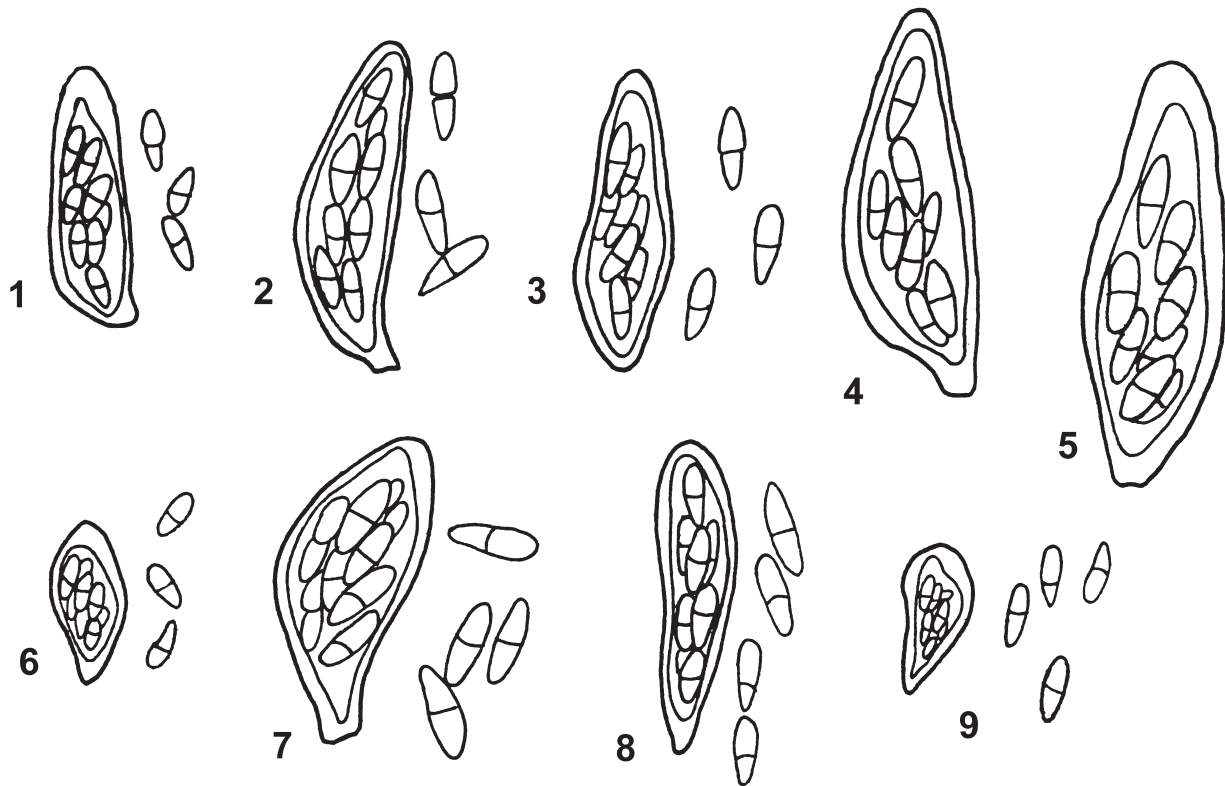
Comment: The dimensions of the asci and ascospores in our collections are larger than in Tomilin's description (Tomilin 1979) (asci (48–) 53–57 × 18–21 µm, ascospores 12–14 × 3–4 (–4.2) µm).

*Mycosphaerella effigurata* (Schwein.) House, *New York State Mus. Bull.* 232–233: 27, 1921. (Fig. 3)

**Pseudothecia** 100–120 µm diam, globose to conical, black, scattered or grouped and forming small dark spots on

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Figs 1-9. Asci and ascospores of: 1 – *Mycosphaerella ambigua*; 2 – *M. bracteophila*; 3 – *M. effigurata*; 4 – *M. eriophila*; 5 – *M. eryngina*; 6 – *M. euphorbiae*; 7 – *M. hieracii*; 8 – *M. hyperici*; 9 – *M. implexicola*

the upper surface of leaves. **Asci** ventricose, fasciculate, bitunicate,  $37-55 \times 11-15.5 \mu\text{m}$ , 8-spored. **Ascospores** fusiform-ellipsoid, hyaline, smooth,  $13-17.5 \times 3-5 \mu\text{m}$ , septate in the middle, constricted at the septum, overlapping biseriolate.

Know distribution: N. America.

On overwintered leaves of *Fraxinus ornus* L. Mt Sredna Gora: Mt Lozenska Planina, Distr. Sofia, Kokaljane, 25 Mar 1995, VF (SOMF 21 529); Sofia region: Sofia, Borisova Gradina, 20 Apr 1998, VF (SOMF 22 158).

*Mycosphaerella eriophila* (Niessl) Lindau, Hilfsbuch Sammeln Ascomyceten, p. 12, 1903. (Fig. 4)

**Pseudothecia** up to  $150 \mu\text{m}$  diam, globose, black, scattered singly, subepidermal, ostioles erumpent on the upper surface. **Asci** ventricose, subsessile, fasciculate, bitunicate,  $57-77 \times 13-22 \mu\text{m}$ , 8-spored. **Ascospores** fusiform-clavate, hyaline, smooth,  $17-22 \times 5-6 \mu\text{m}$ , septate in the middle, slightly constricted at the septum.

Know distribution: Central and SE Europe, Asia, N. America.

On overwintered stalks and leaves of *Artemisia vulgaris* L. Mt Belasitsa: Distr. Blagoevgrad, Samouilovo, 10 May 1994, VF (SOMF 21 421).

*Mycosphaerella eryngina* (Gonz. Frag.) Tomilin, Novit. Syst. non Vascularium 7: 202, 1970. (Fig. 5)

**Pseudothecia** up to  $100 \mu\text{m}$  diam, globose, black, scattered singly, immersed in host tissue. **Asci** ventricose, fasciculate, bitunicate,  $75-85 \times 20-23 \mu\text{m}$ , 8-spored. **Ascospores** ellipsoid-fusiform, hyaline, smooth,  $21-24 \times 5.5-7 \mu\text{m}$ , septate in the middle, not constricted at the septum, guttulate.

Know distribution: SW Europe.

On overwintered stalks and leaves of *Eryngium campestris* L. Vitosha region: Mt Vitosha, Bistritsa, 16 Apr 1994, VF (SOMF 21 405).

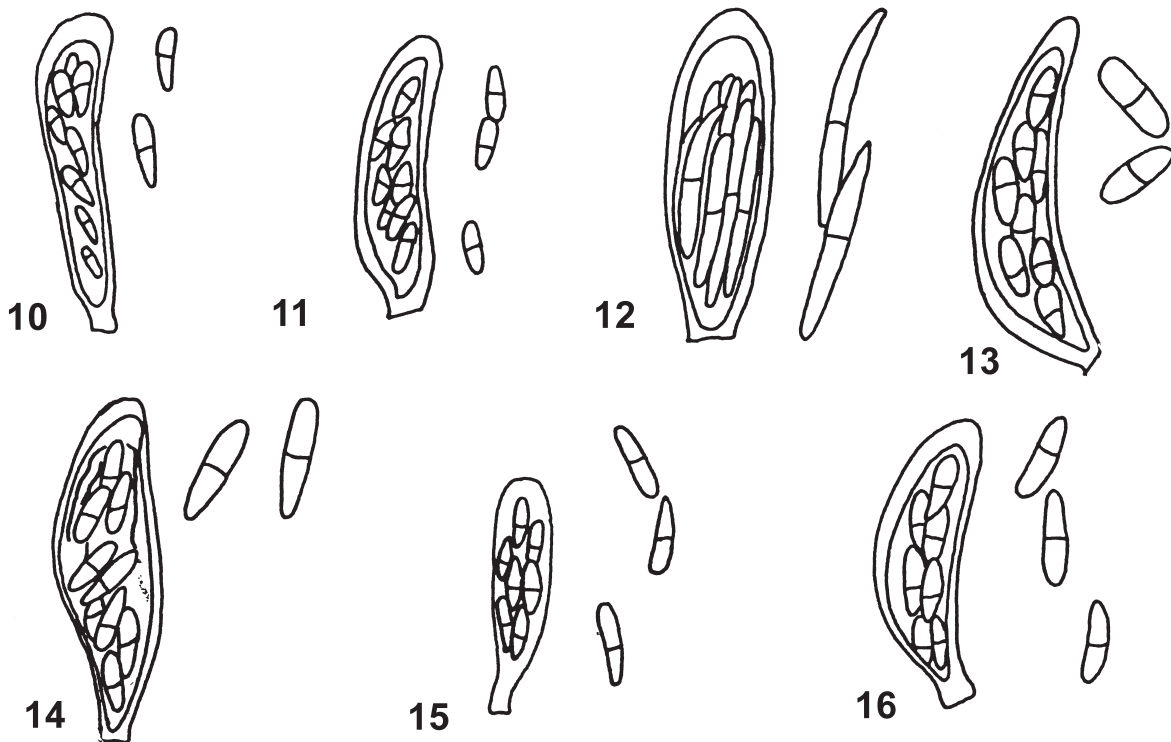
*Mycosphaerella euphorbiae* J. Schröt. in Cohn, Kryptogamenfl. Schlesien 3(2): 338, 1893/Nov 1894. (Fig. 6)

**Pseudothecia** up to  $100 \mu\text{m}$  diam, globose, black, scattered singly, immersed in host tissue, ostioles erumpent, mostly on the upper surface. **Asci** cylindrical-clavate, fasciculate, bitunicate,  $25-30 \times 7-8.5 \mu\text{m}$ , 8-spored. **Ascospores** fusiform, hyaline, smooth,  $8-10 \times 2-2.5 \mu\text{m}$ , septate in the middle, not constricted at the septum.

Know distribution: Central Europe.

On overwintered leaves and stems of *Euphorbia cyparissias* L. Mt Belasitsa: Distr. Blagoevgrad, Samouilovo, 10 May 1994, VF (SOMF 21 422).

*Mycosphaerella hieracii* (Sacc. & Briard) Jaap, Verh. Bot. Vereins Prov. Brandenburg 50: 36, Jan 1908; Jaap, Fungi Selecti Exsicc., no. 263. (Fig. 7)



Figs 10-16. Asci and ascospores of: 10 – *Mycosphaerella molluginis*; 11 – *M. polycarpa*; 12 – *M. populi*; 13 – *M. pterophila*; 14 – *M. sarracenica*; 15 – *M. urticae-dioicae*; 16 – *M. viburni*

**Pseudothecia** up to 110  $\mu\text{m}$  diam, globose, black, aggregated in circular spots, immersed in host tissue. **Asci** ovoid, fasciculate, bitunicate, 44-62  $\times$  20-24  $\mu\text{m}$ , 8-spored. **Ascospores** ellipsoid, rounded above, hyaline, smooth, 19-22  $\times$  4-5  $\mu\text{m}$ , septate in the middle, slightly constricted at the septum.

Know distribution: Central Europe, Asia.

On overwintered leaves of *Hieracium* sp. Vitoshka region: Mt Vitoshka, Bistritsa, 3 Mar 1995, VF (SOMF 21 534).

*Mycosphaerella hyperici* (Auersw.) Starbäck, Bih. Kongl. Svenska Vetensk.-Akad. Handl. 15: 9, 1889. (Fig. 8)

**Pseudothecia** up to 80  $\mu\text{m}$  diam, globose, black, scattered, immersed in stalk tissue. **Asci** cylindrical-clavate, fasciculate, bitunicate, 44-55  $\times$  6-7  $\mu\text{m}$ , 8-spored. **Ascospores** fusiform-ellipsoid, hyaline, smooth, 10-12  $\times$  2.5-3.5  $\mu\text{m}$ , septate in the middle, not constricted at the septum, overlapping biseriately.

Know distribution: Central Europe, Asia.

On overwintered stalks of *Hypericum perforatum* L. Vitoshka region: Mt Vitoshka, Simeonovo, 29 Jun 1997, VF (SOMF 22 161).

*Mycosphaerella implexicola* (Maire) Jaap, Ann. Mycol. 14(1-2): 14, 1916. (Fig. 9)

**Pseudothecia** up to 150  $\mu\text{m}$  diam, globose, black, scattered, aggregated or separate, on the lower leaf surface. **Asci** cylindrical-clavate, fasciculate, bitunicate, 33-37  $\times$  6-10  $\mu\text{m}$ , 8-

spored. **Ascospores** fusiform, hyaline, smooth, 10-11  $\times$  3-3.5  $\mu\text{m}$ , septate in the middle, not constricted at the septum, overlapping biseriately.

Know distribution: Central Europe.

On overwintered leaves of *Loniceta* sp. Rila Mts: Borovets, 29 May 1994, VF (SOMF 21 423).

*Mycosphaerella molluginis* (Rehm) Tomilin, Novit. Syst. Pl. non Vascularium 8: 151, 1971. (Fig. 10)

**Pseudothecia** up to 130  $\mu\text{m}$  diam, globose, black, scattered, singly, immersed in host tissue. **Asci** ventricose, fasciculate, bitunicate, 44-60  $\times$  9-10  $\mu\text{m}$ , 8-spored. **Ascospores** ellipsoid, fusiform, hyaline, smooth, 10-14  $\times$  2.5-4  $\mu\text{m}$ , septate in the middle, not constricted at the septum.

Know distribution: Central Europe.

On overwintered leaves and stalks of *Galium* sp. Mt Sredna Gora: Mt Lozenska Planina, Distr. Sofia, Kokalyane, 25 Mar 1995, VF (SOMF 21 543).

Comment: The spores in our collection are smaller than in the original description (12-18  $\times$  4-5  $\mu\text{m}$ ) (Rehm, Annales Mycologici 7(6): 527, 1909).

*Mycosphaerella polycarpa* (Kirschst.) Tomilin, Novit. Syst. Pl. non Vascularium 10: 111, 1973. (Fig. 11)

**Pseudothecia** up to 80  $\mu\text{m}$  diam, globose, black, scattered or aggregated in spots, immersed in host tissue. **Asci**

cylindric-clavate, fasciculate, bitunicate, 32-55 × 8-11 μm, 8-spored. **Ascospores** ellipsoid-fusiform, hyaline, smooth, 10-13 × 3-4 μm, septate in the middle, not constricted at the septum, overlapping biseriately.

Know distribution: Central Europe.

On overwintered leaves of *Syringa vulgaris* L. Mt Sredna Gora: Mt Lozenska Planina, Distr. Sofia, Kokalyane, 25 Mar 1995, VF (SOMF 21 539).

*Mycosphaerella populi* (Auersw.) J. Schröt. in Cohn, Kryptogamenfl. Schlesien 3(2): 336, 1894. (Fig. 12)

**Pseudothecia** up to 100-120 μm diam, globose, black, scattered, immersed in host tissue, ostioles erumpent, mostly on the lower surface. **Asci** cylindric clavate, fasciculate, bitunicate, 66-80 × 15-17 μm, 8-spored. **Ascospores** fusiform-ellipsoid, rounded above, hyaline, smooth, 40-46 × 3.5-4.5 μm, septate in the middle, not constricted at the septum.

Know distribution: Europe, Asia.

On overwintered leaves of *Populus* sp. Sofia region: Sofia, 24 Apr 1998, VF (SOMF 19 240).

*Mycosphaerella pterophila* (Pass.) Tomilin, Novit. Syst. Pl. non Vascularium 7: 205, 1970. (Fig. 13)

**Pseudothecia** up to 100 μm diam, globose, black, scattered singly, immersed in host tissue. **Asci** ventricose, fasciculate, bitunicate, 60-100 × 15-20 μm, 8-spored. **Ascospores** ellipsoid, hyaline, smooth, 16-22 × 5-6.5 μm, septate in the middle, not constricted at the septum, overlapping biseriately.

Know distribution: Central Europe.

On overwintered leaves of *Fraxinus* sp. Sofia region: Sofia, Borisova Gradina, 14 Apr 1998, VF (SOMF 22 160).

*Mycosphaerella sarracenica* (Sacc. & Roum.) Lindau, Hilfsbuch Sammeln Ascomyceten, p. 112, 1903. (Fig. 14)

**Pseudothecia** up to 100 μm diam, globose, black, scattered singly, immersed in the stem tissue. **Asci** ventricose, fasciculate, bitunicate, 46-56 × 16-22 μm, 8-spored. **Ascospores** fusiform, hyaline, smooth, 16-18 × 4-5.5 μm, septate in the middle, slightly constricted at the septum.

Know distribution: Central Europe, N. America.

On overwintered stems (mainly) and leaves of *Senecio* sp. Vitosha region: Mt Vitosha, Zheleznitsa, 15 Apr 1995, VF (SOMF 22 159).

*Mycosphaerella urticae-dioicae* Tomilin, Novit. Syst. Pl. non Vascularium 10: 97, 1973. (Fig. 15)

**Pseudothecia** up to 100 μm diam, globose, black, scattered singly, immersed in the stem tissue. **Asci** ventricose, fasciculate, bitunicate, 40-50 × 8-10 μm, 8-spored. **Ascospores** fusiform-clavate, hyaline, smooth, 15-19 × 3.5-4.5 μm, septate in the middle, slightly constricted at the septum.

Know distribution: N. Europe.

On overwintered stems of *Urtica dioica* L. Sofia region: Sofia, 'Kambanite', 13 May 1991, VF (SOMF 22 162).

*Mycosphaerella viburni* (Nitschke) J. Schröt. in Cohn, Kryptogamenfl. Schlesien 3(2): 335, 1893/Nov 1894. (Fig. 16)

**Pseudothecia** up to 100 μm diam, globose, black, aggregated in circular spots on the under surface of leaves, immersed in host tissue. **Asci** ventricose, fasciculate, bitunicate, 50-60 × 14-60 μm, 8-spored. **Ascospores** ellipsoid-fusiform, rounded above, hyaline, smooth, 16-18 × 4.5-5.5 μm, septate in the middle, not constricted at the septum.

Know distribution: Central Europe.

On overwintered leaves of *Viburnum lantana* L. Vitosha region: Mt Vitosha, Bistritsa, 6 May 1996, VF (SOMF 22 166).

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