Once again on Discosphaerina

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Discosphaerina Höhn. is reinstated as a valid generic name, typified by D. discophora Höhn., for some small, amerosporous, unitunicate Ascomycetes that fit best within the family Hypocondriaceae. The new combinations D. niesslii (Kunze ex Rehm) L. Holm, K. Holm & M.E. Barr, and D. lonicerae (Dearn. & Barthol.) L. Holm, K. Holm & M.E. Barr are made, and the new species D. sorbi L. Holm, K. Holm & M.E. Barr is described. Guignardia Viala & Ravaz, nom. cons., is accepted for similar small, amerosporous but bitunicate Ascomycetes in the Dothideaceae.

Key words: Ascomycetes, Hypocondriaceae, Dothideaceae, taxonomy, morphology

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Introduction

Within the past few years, we have been puzzled by several amerosporous ascomycetes that lack a defined ostiole and periphyses, and open irregularly between cells in the upper region of ascomata. The small ascomata are sphaeroid, often collabent on drying, and are visible as dark sunken dots in the affected tissues. The thin-walled apical cells are usually encircled by one or two rows of dark-walled pseudoparenchymatous cells that continue as the lateral and basal peridium. A shallow clypeus of *textura epidermoidea* may extend from the upper surface. The hymenium lacks paraphyses, or occasionally a few are seen compressed between asci; the ascii arise from a wide basal subhymenial layer, and have a somewhat thickened wall that lacks an ocular chamber or obvious apical ring. The ascii have not been observed to open in a fissitunicate fashion. A critical observation made recently is that following alkaline pretreatment (Kohn & Korf 1975) a low or well developed, amyloid apical ring is seen to be present.

*Arwidssonia* B. Erikss. is similar by habit in leaves and by the collabent lenticular ascomata that open by three to five lobes. *Arwidssonia empetri* (Rehm) B. Erikss. is a phragmosporous taxon. The hymenium does exhibit paraphyses, and the ascus apices are amyloid after pretreatment. Eriksson (1974) did not indicate familial position of the genus. Barr (1976) assigned it to the Physosporellaceae, i.e. Hypocondriaceae, and it has remained there ever since (e.g., Hawksworth et al. 1995, Eriksson & Hawksworth 1998). The taxa in question also share many features with *Hypocleista* Sacc., where periphysate osti-oles are formed. In that genus, *H. buxi* (Alb. & Schwein. : Fr.) Sacc. has nonamyloid ascus apices, although most other species presently included (Barr 1977) have amyloid apices. The amyloid reaction appears to be variable within genera or among species of a genus and does not constitute a good family characteristic.
The taxonomic problem
To determine a possible genus, we investigated the past disposition of some of the species involved. Discosphaerina Höhn. was assigned to synonymy under Guignardia Viala & Ravaz by Arx and Müller (1954). Several of the species that they illustrated have strongly sphaeroid, nonostiolate ascomata; Arx and Müller indicated that the asci were bitunicate. Discosphaerina is typified by D. discophora Höhn., on leaves of Solidago. Höhnel (1917) observed that it differed from Guignardia by the plane, nonostiolate apical region of shallow ascomata and absence of paraphyses. He described thin-walled asci. He also noted that asci develop from a wide basal layer, rather than in a fascicle from a restricted subhyphalium that gives a turbinate shape to the structure in section, and lack paraphyses. His cultures yielded conidia in age from short contorted hyphae, interpreted by Sivanesan (1984) as belonging to Aureobasidium. Klebahn’s attempted infection of living plants failed.

Unitunicate Discosphaerina
We believe the evidence is convincing that Discosphaerina is indeed an unitunicate taxon, and that the genus should be utilized for this particular group of species. Their disposition in the Hypocreaceae points to a close relationship with Arwidssonia on the one hand, and Hyponecatoria on the other. We propose the following synonymy and include the names of a few other species, as well as an undescribed species, that belong in the genus.


Additional species:
Discosphaerina epilobii (Wallr.) Petr. On stems of Epilobium spp.
Discosphaerina punctoidea (Cooke) Petr. On leaves of Quercus spp.
Discosphaerina sorbi, L. Holm, K. Holm & M.E. Barr, sp. nov. – Figs. 1–5.

Ascomata epiphyllous, subcuticular, gregarious, often two or three confluent, generally 0.1–0.2 mm diam., including a distinct margin, up to 40 μm broad, first very broadly conical, later collapsing. Peridium mostly 10–15 μm broad (laterally more), of 2–3 layers of cells (laterally more); the upper part composed of somewhat radially arranged cells up to 15 μm long, basally the cells smaller and more angular; laterally the peridium is made up of larger cells, up to 20 μm and passing into a clypeal margin of textura epidermoidea
Figs. 1–5: Discosphaerina sorbi. 1. Ascomata on leaf of Sorbus aucuparia (Holm & Holm 6170). Bar = 1 mm. 2. Ditto, clypeus visible at arrows. Bar = 0.2 mm. 3. Part of crushed ascoma, clypeus seen from above (6170). Bar = 20 μm. 4. Ascoma in section, with lateral clypeus (4096). Bar = 20 μm. 5. Asci with apical annulus J+ after KOH-pretreatment (4087a). Bar = 20 μm. Fig. 6: D. discophora. Asci with apical annulus J+ after KOH-pretreatment (Petr., Fl. Bohem. Mor. exs. II: 1 no 1232 sub nom. Guignardia steppani). Bar = 20 μm.
composed of one layer of elongated, often lobed cells, up to 40 μm. Paraphyses none. Ascii generally 55–60 x 5–6 μm, cylindric-clavate, 8-spored, with a small apical annulus, J+ after KOH-pretreatment. Ascospores nonseptate, hyaline, about ellipsoid, somewhat unequally flattened, 9–13 x 3.5–5 μm. In last year’s fallen leaves of Sorbus aucuparia L.


It is noteworthy that this conspicuous fungus so far has been found only in the subalpine and adjacent regions of north Sweden. The host, Sorbus aucuparia, is widely distributed and mostly common.

Similar bitunicate taxa

The small, bitunicate, amerosporous taxa now require some consideration. When Arx and Müller (1954) included several of the taxa noted above under Guignardia Viala & Ravaz, they assigned to the genus small taxa (most less than 200 μm diam), without distinct apical papilla and with sparse locule tissues (or paraphyses) to separate them from the species of Botryosphaeria Ces. & DeNot. Petrak (1957) argued that Botryosphaeria comprised four sections, including the group of Guignardia bidwillii (Ellis) Viala & Ravaz which contained such small taxa, mostly on leaves. He recognized Discosphaerina as distinctive on the bases of small sizes, lack of an ostiole and usually of paraphyses. Barr (1972) accepted Botryosphaeria in Petrak’s wide sense, as a member of the Dothioraceae, and considered Discosphaerina to belong in the Dothideaceae. Later (Barr 1987) she assigned both Botryosphaeria and Guignardia (as Discosphaerina) to the Botryosphaeriaceae of the Pleosporales, but retained Discosphaerina in the Dothideaceae of the Dothideales. The argument over locule tissues in Guignardia has been a problem for determining the familial status of the genus. Studies of numerous collections within the genus showed no pseudoparaphyses present at maturity, but only interthecial cells that become compressed between and above the developing ascii. Aa (1973) had a similar view of the locule in Guignardia. Janex-Favre et al. (1996) argued that such structures did develop, coexisting with carpocentral cells, and that Guignardia should be assigned to the Botryosphaeriaceae. Recent classifications, such as Eriksson (1992), Hawksworth et al. (1995), Eriksson and Hawksworth (1998), have Guignardia in the Mycosphaerellaceae, Botryosphaeria in the Botryosphaeriaceae, i.e., with interthecial cells in Guignardia, pseudoparaphyses in Botryosphaeria. The Dothideaceae, including Mycosphaerellaceae, for taxa having uni- or multiloculate ascocoma, would seem to be suitable to house Guignardia.


Anamorphs in a number of species belong in Phyllosticta, with holoblastic conidiogenous cells, and phialidic spermatia in Leptodothiorella (Aa 1973); several species form Kabatia anamorphs (Reusser 1964, Sivanesan 1984). These anamorphs fit well among the varied ones already known in the Dothideaceae.

References


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