MICROFUNGI ON *DRYAS* EXTRACTED FROM POLISH PHANEROGAM HERBARIA

ANDRZEJ CHLEBICKI

Polish Academy of Sciences, Wł. Szafer Institute of Botany in Kraków
Laboratory of Mycology
ul. Podwale 75, PL-50-449 Wrocław-2, Poland

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ABSTRACT

Twenty seven taxa of the microfungi on *Dryas* have been recorded from Austria, Bosnia and Herzegovina, Canada, Finland, France, Horvatia, Italy, Korea, Norway, Poland, Rumania, Russia, Slovakia, Sweden, Switzerland, Ukraina, U.S.A. and Yugoslavia, including: *Brunnipila dryadis, Cainiella johansonii, Crocicreas dryadis var. dryadis, C. dryadis var. uniseptata, Discosia strobilina, Epipolaeum absconditum, Gnomonia dryadis, Hypoderma dryadis, Isothea rhytismoides, Leptosphaerulina dryadis, Lophiostoma macrostomum, L. winteri, Massarina balnei-ursi, Melanomma dryadis, Mycosphaerella octopetalae, Otthia dryadis, Patinella dryadea, Phaeosphaeria dryadea, Pleospora ascodedicata, Pseudomassaria islandica, P. minor, Scleropleella hyperborea, Sphaerotheca volkartii, Septoria sp., Stomiopeltis dryadis, Tubeufia alpina* and *Wettsteinina dryadis. Patinella dryadea* has been removed to lichenized microfungi from the genus *Lecidiella*.

KEY WORDS: microfungi on *Dryas*, taxonomy, distribution.

INTRODUCTION

Dryas octopetala is an Alpine-Arctic species with a circumpolar distribution present in the mountains of central and southern Europe. In Poland *D. octopetala* occurs in the Tatra Mts. Its small population has been discovered in the Lower Pieniny (Kornaś 1958). A map of distribution of this species has been described by e. g. Hultén (1959), Meusel et al. (1965), Browicz & Gostyńska-Jakuszewska (1970) and Kozhevnikov (1984a, b).

D. octopetala belongs to a specific group of host-plants which are characterized by the persistence of the dead, but still attached leaves. These, gathered by phanerogamists plants, are frequently in a good state of preservation and enable the working at home and scrutinize a material from vast areas of the world (Holm 1975). It is noteworthy that *D. octopetala* is a long-lived shrub. Kihlman (1890) and Debaud (1987) found specimens about 100 years old. Schroeter (1908) illustrated 50 years old specimen with a stems ca 140 cm long and its asymmetric cross-sections. Such old specimens are often colonized by very interesting epixylic microfungi (Holm & Holm 1985) and lichens (e. g. *Caloplaca stillicidiorum* (Vahl.) Lynge, many times observed by me in materials from the Tatra Mts., Kola Peninsula and Siberia).

The occurence of quite a number of microfungi on *D. octopetala* is conditioned by the peculiar structure of coriaceous leaves characterized by presence of the tomentum of white hairs which may reduce evaporation (Holm 1979). Also the mentioned long period of plant existence enables colonisation by microfungi belong to various ecological groups such as leaf-inhabiting parasites and saprophytes, fungi inhabiting hypanthium and especially epixylic saprophytes. First *Isothea rhytismoides* (Bab. ex Berk.) Fr. has been described as *Sphaeria rhytismoides*, the next species have been described by Auerswald (1869), Rostrup (1888), Johanson (18845, 1890), Starbäck (1890), Oudemans (1886), Rehm (1904), Barr (1959) and Vasilyeva (1979, 1987). Miscellanous data have been reported in many papers from the Arctic (Gronlund 1876, Halgrimsson 1987, Kari 1936, Larsen 1932, Lind 1910, 1928, 1934, Moller 1958, Oudemans 1886, Petrak 1928) and the Alps (Magnus 1893, Rehm 1903, 1904). Few mycologists have paid more attention to microfungi on *D. octopetala*, especially Holm (1979), Holm & Holm (1985, 1993), Debaud (1987), Nograsek (1990) and Nograsek & Metzer (1991). Thus, since 1979 there has been a considerable accumulation of information about the occurence of microfungi on this host-plant. Some 74 ascomycete taxa have so far been reported from Europe, North America and Asia. Hayes and Rheinberg (1975) described microfungal populations occuring on leaves and leaf-litter of *D. octopetala*. They listed 8 species of *Hyphomycetes* and *Coelomycetes*. Müller and Magnuson (1987) reported *Synchytrium cupulatum* (*Chytridiales*) as Eurasiatic, Arctic and North American species. Shkarupa (1981) described a new species *Entyloma tichomirovii* (*Ustilaginales*) found on *D. octopetala* ssp. *punctata*. According to I. Karatygin (person. com.) it is evidently a member of *Hyphomycetes*.

Among these species only *Isothea rhytismoides* (Wróblewski 1925), *Patinella dryadea* (Velenovsky 1934), *Mycosphaerella octopetalae, Wettsteinina dryadis* (Sandu-Ville 1971) and *Sphaerotheca volkartii* (Sałata et al. 1984) have been reported from the Carpathians Mts. All the mentioned below fungi have been extracted from Polish phanerogam herbaria

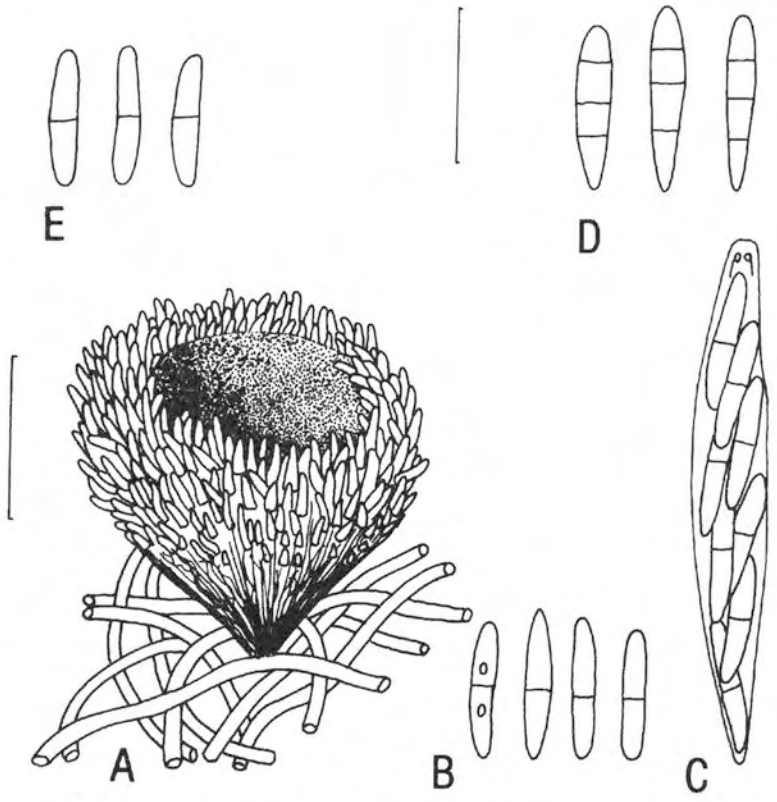


Fig. 1. A-C, *Crocicreas dryadis v. uniseptata*, A – apothecium, B – ascospores, C – ascus; D, *Crocicreas dryadis v. dryadis*, ascospores; E, *Brunnipila dryadis*, ascospores. Scale bars: A: 50 µm; B-E: 10 µm

(KRA, KRAM, WA, herb. Mądalski) and deposited in KRAM-Chlebicki in Wrocław. The fungi have been found previously on *Dryas octopetala*. In such case it is not given. In other cases the name of the host-plant is given.

LIST OF SPECIES

Discomycetes

Brunnipila dryadis Nograsek & Matzer, Nova Hedwigia 53: 447, 1991.

TYPE: Austria, Niederösterreich, Northern Alps, Hochschneeberg, between 1800-1885 m elevation, on *Dryas octopetala*, 19 August 1990, leg. A. Nograsek, W. Pongratz & K. Waltl (GZU-holotype).

DESCRIPTION: Apothecia olive braun, concave, contracted at the base, covered with rough hairs, asci octospored 44-48 x 5,7-7,7 µm, ascospores one-celled, hyaline, fusiform 7,7-10 x 2,5-3,0 µm (Fig. 1E); on lower sides of leaves. For a full description see Nograsek & Matzer (1991).

MATERIAL EXAMINED: FRANCE: Pyrenees, Central Pyrenees, Pic d'Astaron near Gavarnie, at 1900 m elevation, 28 July 1958, leg. A. Jasiewicz, KRAM-Chleb. 41 635; Gédre, between Chapelle d'Héas and Vallé de Troumoure, at 1700 m elevation, 10 July 1964, leg. S. Batko, KRAM-Chleb. 41 636.

COMMENTS: So far it has been reported from Alps only (Nograsek & Matzer 1991). Raitvir (1987) included the genus *Brunnipila* in *Lachnum* subgen. *Belonidium* sect. *Brunnipila*.

Crocicreas dryadis (Nannfeldt ex L. Holm) Carpenter, Brittonia 32: 270, 1980. var. **dryadis**

BAS.: *Allophylaria dryadis* Nannf. ex L. Holm, Bot. Notiser 132: 80, 1979.

TYPE: Sweden, Jämtland: Undersaker, Snasahörgarna, N. Tvärädalen, on leaves of *Dryas octopetala*, 22 July 1946, leg. J. A. Nannfeldt, (UPS-holotype).

DESCRIPTION: Apothecia funnel-shaped to urceolate, asci 38-48 x 5,7-6,5 µm, ascospores hyaline 3-septate 10-13,5 x 2-2,8 µm. On lower sides of leaves in the tomentum, attached to the hairs (Fig. 1D).

MATERIAL EXAMINED: BOSNIA and HERZEGOVINA: Vranica Planina, North Cirque of Krstac, limestone, at 1950 m elevation, 21 July 1957, leg. A. Jasiewicz, KRAM-Chleb. 41 630; HORVATIA: Gorski Kotar, Ponikwa Ceclje, at 1250 m elevation, 5 August 1957, leg. K. Zarzycki, KRAM-Chleb. 41 622, 41 623; POLAND: West Carpathians, Tatra Mts., Smytniańskie Crags, 8 July 1955, leg. J. Mądalski, KRAM-Chleb. 41 629; Łysa Glade, May 1939, leg. Z. Radwańska-Paryska, KRAM-Chleb. 41 618; Giewont Mt., 21 July 1875, leg. W. Kulczyński, KRAM-Chleb. 41 619; Tatra Mts., leg. J. Krupa, KRAM-Chleb. 41 621; Giewont Mt., 1877, leg. E. Janota, KRAM-Chleb. 41 625; Giewont Mt., 5 August 1879, leg. W. Kulczyński, KRAM-Chleb. 41 626; Kościeliska Valley, upper part of Kraków Gully, 17 July, leg. H. Czeczottowa, KRAM-Chleb. 41 624; Upłaz Pasture, at 1700 m elevation, 17 July 1972, leg. R. Ochyra, KRAM-Chleb. 41 702; Mały Giewont Mt., 26 July 1956, leg. J. Kucowa, KRAM-Chleb. 41 710; Wielka Równień near Giewont Mt., at 1300 m elevation, 29 June 1938, leg. M. Łańcucka, S. Pawłowska & B. Pawłowski, KRAM-Chleb. 41 723; SLOVAKIA: West Carpathians: Tatra Mts., Bujači Mt., at 1950 m elevation, 26 July 1955, leg. A. Jasiewicz, KRAM-Chleb. 41 628; Tatra Mts., Hawrań Mt., 1 Sept. 1878, leg. A. Rogalski, KRAM-Chleb. 41 627; Vratna, leg. Schütz, KRAM-Chleb. 41 620.

COMMENTS: Holm (1979) noted that this xerophytic fungus has a very specialized ecology. According to him the apothecia are attached to the hairs of leaf tomentum only, moreover the marginal hairs surrounding an apothecium are thick-walled. I have observed that the apothecium can change its diameter in dependence on moisture. A dry apothecium has a considerably smaller diameter of opening than the soaked one.

Crocicreas dryadis (Nannfeldt ex L. Holm) S. E. Carpenter var. **uniseptata** A. Nograsek & M. Matzer, Nova Hedwigia 53: 451, 1991.

SYN.: *Grahamiella dryadis* (Nannf. ex L. Holm) Spooner, Trans. Br. Myc. Soc 76: 281, 1981.

TYPE: Austria, Steiermark, Northern Alps, Hochschwabgruppe, on leaves of *Dryas octopetala*, 14 July 1990, leg. M. Matzer & B. Pelzmann (GZU-holotype).

DESCRIPTION: Apothecia funnel-shaped to urceolate (Fig. 1A), olive to dark brown, asci 30 - 35 x 5,7-7,6 µm, ascospores hyaline, uniseptate 7,7-9,6 (10) x 1,8-2 µm (Fig. 1B, C). On lower sides of leaves in the tomentum, attached to the hairs.

MATERIAL EXAMINED: SWITZERLAND: Jura, Noiraigue near Neuchâtel, Ie Soliat, at 1386 m elevation, 22 June 1967, leg. J. Mądalski, KRAM-Chleb. 41 631.

COMMENTS: It is reported from Scotland (Spooner 1981), Iceland (Holm & Holm 1984), Sweden and Austria (Nograsek & Matzer 1991). The first two collections from Scotland have been revised by Carpenter (1980, 1981). He wrote: "These collections (from Great Britain) are so scant, containing only two or three apothecia per collection, that I cannot tell whether they represent a varietal form with 1-septate ascospores or wether the ascocarps are immature." Nograsek & Matzer (1991) revised a larger material from the Alps and Scandinavia. They recognized the uniseptate and the differently coloured form as a distinct variety *C. dryadis* v. *uniseptata*.

Hypoderma dryadis Nannf. ex L. Holm, Bot. Notiser 132: 80, 1979.

TYPE: Sweden, Jämtland, Are, Skurdalshöjden Mt., at 750 m elevation, on leaves of *Dryas octopetala*, 31 July 1950, leg. J. A. Nannfeldt (UPS-holotype).

Hypoderma rostrupii L. Vasilyeva, Mikologiya i Fitopatologiya 13(4): 280, 1979.

TYPE: Russia, Magadan district, vicinity of Kedon, on leaves of *Dryas octopetala* ssp. *punctata*, 6 Aug. 1975, leg. L. N. Vasilyeva.

DESCRIPTION: Apothecia epiphyllous, oval, with a longitudinal slit at the top. More detailed description is given by Holm (1979) and Vasilyeva (1979).

MATERIAL EXAMINED: SWEDEN: Lycksele Lappmark, Tärnaan Giervario, at 1100 m elevation, leg. N. Johnsson, June 1924, KRAM-Chleb.43 212; Jämtland, Are, Skurdalshöjden Mt., near Storlien, 10 August 1903, leg. A. Björkman, KRAM-Chleb. 43 213 (locus classicus).

COMMENTS: It is rare species in Europe. Holm (1979) reported five collections from Sweden and Greenland, Nograsek and Matzer (1991) noted only one find from Sweden. Vasilyeva (1979) described the same species (as *H. rostrupii*) from Kedon (Magadan district in Russia) which has been found on leaves of *D. octopetala* ssp. *punctata*. The simultaneity of description in literature (Holm 1979, Vasilyeva 1979) make a choice difficult. However Holm's description is inserted on page with less foliation than that of *H. rostrupii*.

"Patinella dryadea" Velenovsky, Monographia Discomycetum Bohemiae p.75, 1934.

TYPE: SLOVAKIA: Tatra Mts., on Dryas octopetala, August 1926, leg. A. Pilát

DESCRIPTION: Apothecia black, circular, flat (Fig. 2A), asci 8-spored 38-46 x 12-15 µm, paraphyses branched, filiforme (Fig. 2B), ascospores hyaline, 1-celled 9,6-11,5 x 6,5-7,7 µm (Fig. 2C); on decorticated wood of old stems (Fig. 2A).

MATERIAL EXAMINED: FRANCE: Pyréneés Mts., Cirque de Gavarnie, at 1600 m elevation, 11 July 1962, leg. S. Batko, KRAM-Chleb. 41 673; SLOVAKIA: Tatra Mts., August 1926, leg. A. Pilat, PRM 149128 (holotype)!

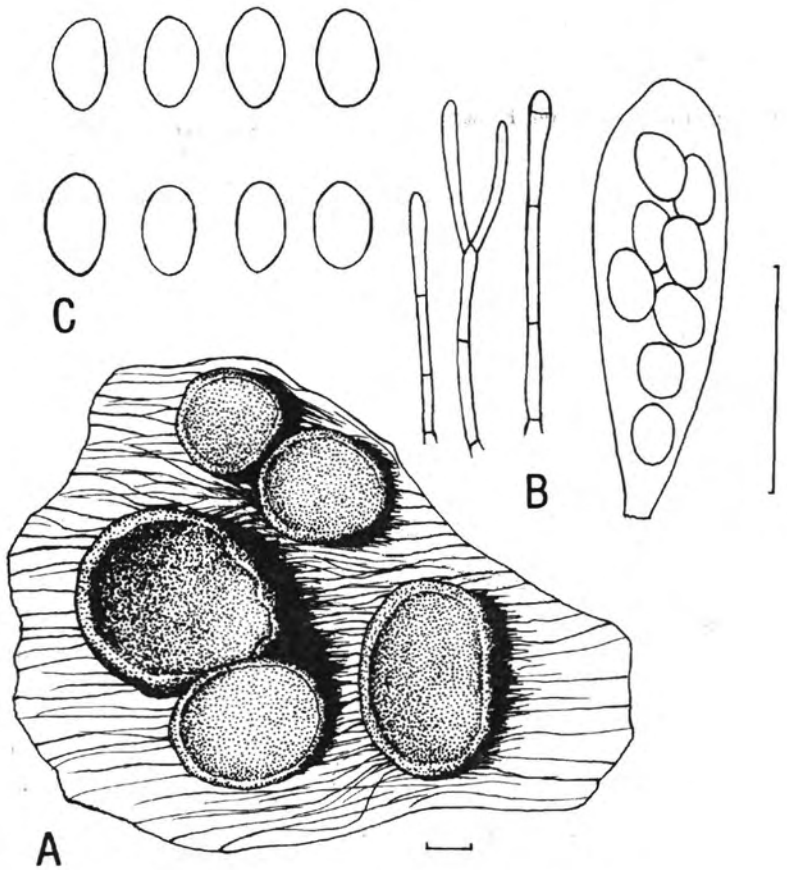


Fig. 2. "*Patinella dryadea*": A – apothecia, B – ascus and paraphyses, C – ascospores. Scale bars:A: 100 µm, B, C: 25 µm

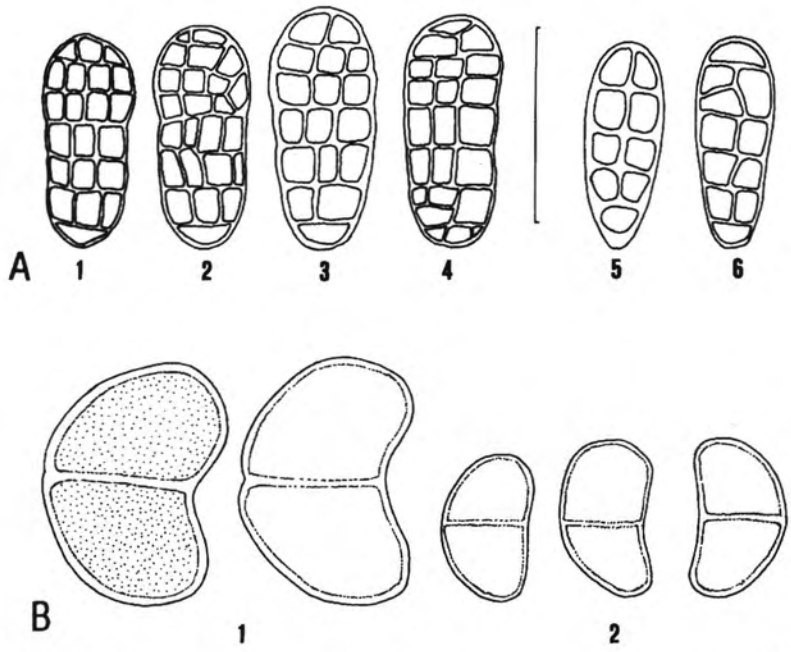


Fig. 3. Ascospores: A1-6, *Leptosphaerulina dryadis*, A1 – Rumania, KRAM-Chleb. 41 599, A2 – Ukraina, KRAM-Chleb. 41 719, A3 – Tatra Mts. (Poland), KRAM-Chleb. 41 632, A4 – Scandinavia (Sweden) KRAM-Chleb. 41 656, A-5 – Tatra Mts. (Poland), KRAM-Chleb. 41 632, A6 – Korea, KRAm-Chleb. 41 664; B1-2, *Cainiella johansonii*, B1 – Scandinavia (Sweden), KRAM-Chleb. 41 656, B2 – Switzerland, KRAM-Chleb. 41 607. Scale bar: 25 µm

COMMENTS: So far it has been known only from the type locality. Velenovsky (1934) described it as follows: *Ap. 1 mm, gregaria, dura, nigra, sessilie, lentiformi-convexa. As. 50-60 x 15-20, late clavati, basi parum attenuati, par. filiformes, divisae, apice incrassatae et cum epithecia coerules-virenti cohaerentes. Sp. 10-12, inaequaliovato- ellipticae, hyaline, unicellulares. Ad caules vetustos Dryadis octopetalae in Tatra aug. 1926, leg. A. Pilat. Persuosum habeo, eam hucce nec ad lichenes referendum esse.* The fungus from France is well developed and agrees well with Velenovsky's description. I have found similar fungi in a material from the Tatra Mts., Kola Peninsula and Polar Ural. The type material consists of one, dissected apothecium without any ascospores. M. Svrček who revised this material wrote: "1. *Solum apothecium unicum nigrum inveni est probabiliter Lichen!* 2. *Perithecia nigra, immersa, ostiole ± compresso, sporis 3-4 septis, brunneoluteis 27-34 x 6-8 µm est Lophiostoma sp.*". Decorticated wood of *Dryas octopetala* is partially covered by white lichen thallus, especially around the apothecium. The latin diagnosis and branched paraphyses with thickened ends of the French specimen suggests that it belongs to the genus *Lecidiella*. Apart of them there are perithecia of *Lophiostoma winteri*.

Pyrenomycetes

Cainiella johansonii (Rehm) E. Müller, Sydowia 10: 121. 1957.

BAS.: *Lizonia Johansonii* Rehm, Österr. Bot. Zeitschr. 54: 86, 1904; *Lizoniella Johansonii* Sacc. et D. Sacc. Syll. Fung. 17: 661, 1906.

TYPE: Germany, Bavaria, Herzogenstand, on dead leaves of *D. octopetala*, 4 XI 1900, leg. H. Rehm (S).

DESCRIPTION: Perithecia immersed, with a long neck, ascospores hyaline, finally brown, 1-septate (Fig. 3B); on midribs and veins of booth sides of leaves and petioles.

MATERIAL EXAMINED: NORWAY: Trondfjället, July 1891, leg. T. E. Göransson, KRAM-Chleb. 41 648; Troms Fylke, Flöta, at 500 m elevation, 4 July 1957, leg. A. Środoń, KRAM-Chleb. 41 661; SWEDEN: Härjedalen: Tännäs, Hamrafjället, 7 August 1932, leg. A. Binning, KRAM-Chleb. 41 656; SWITZERLAND: Jura, Noiraigue near Neuchâtel, Ie Soliat, at 1386 m elevation, 22 June 1967, leg. J. Mądalski, KRAM-Chleb. 41 607.

COMMENTS: Ascospores from Scandinavian population are bigger and more curved (Fig. 3B1) than those of Alps population (Fig. 3B2, see also Nograsek 1990). Müller (1957) described this species as the type of the genus *Cainiella*. Barr (1990) transferred this genus to the *Sordariaceae* from the *Amphisphaeriaceae* because its wall ornamentation is similar to the pitted walls in species of *Gelasinospora*. Rehm (1904) and Müller (1957) reported it from the Alps, and Barr (1959) listed four finds from the Canadian Arctic, on *D. drummondii* and *D. integrifolia*. Holm (1979) on the basis of the *Dryas* collections in UPS has extended the known distribution to the Faroe Islands, Spitzbergen and Novaya Zemlya. Spooner (1981) reported three finds from Scotland.

Epipolaeum absconditum (Johanson) L. Holm, Bot. Notiser 132: 85, 1979.

BAS.: *Lizonia abscondita* Johanson, Öfv. K. Sv. Vet.-Acad. Förhandl. 1884(9): 167, 1884.

TYPE: Iceland, Eskifjrðöur, on *D. octopetala*, 21 June 1883, leg. H. Strömfeldt.

DESCRIPTION: Ascocarps black, pyriform; asci 44-52 x 16-21 µm, ascospores hyaline, 2-celled 15-17 x 7-8 µm (Fig. 5F). It occurs in the median furrow of upper side of leaf.

MATERIAL EXAMINED: FRANCE: Pyrenees: Cirque de Gavarnie, at 1600 m elevation, 11 July 1962, leg. S. Batko, KRAM-Chleb. 41 675.

COMMENTS: It is a rare species known from Scandinavia (Holm 1979) and the Alps (Nograsek 1990).

Gnomonia dryadis Auersw., Mycol. Europ. 5/6: 26, 1869.

TYPE: No type collection in B (Monod 1983).

DESCRIPTION: Perithecia globose ca. 500 µm diam. with 300-340 µm long, stright or slightly curved beak (Fig. 6 A, B), asci polysporous 57-71 x 10-15 µm, ascospores hyaline two-celled, lacking ap-

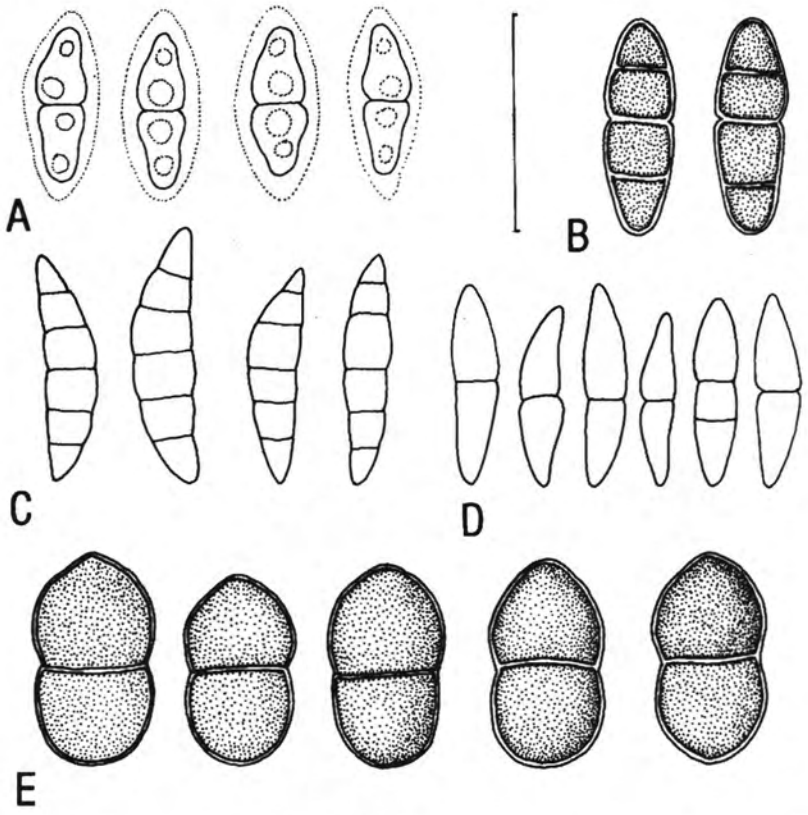


Fig. 4. Ascospores. A – *Massarina balnei-ursi*, B – *Melanomma dryadis*, C – *Lophiostoma winteri*, D – *L. macrostomum*, E - *Otthia dryadis*. Scale bar: 25 μm

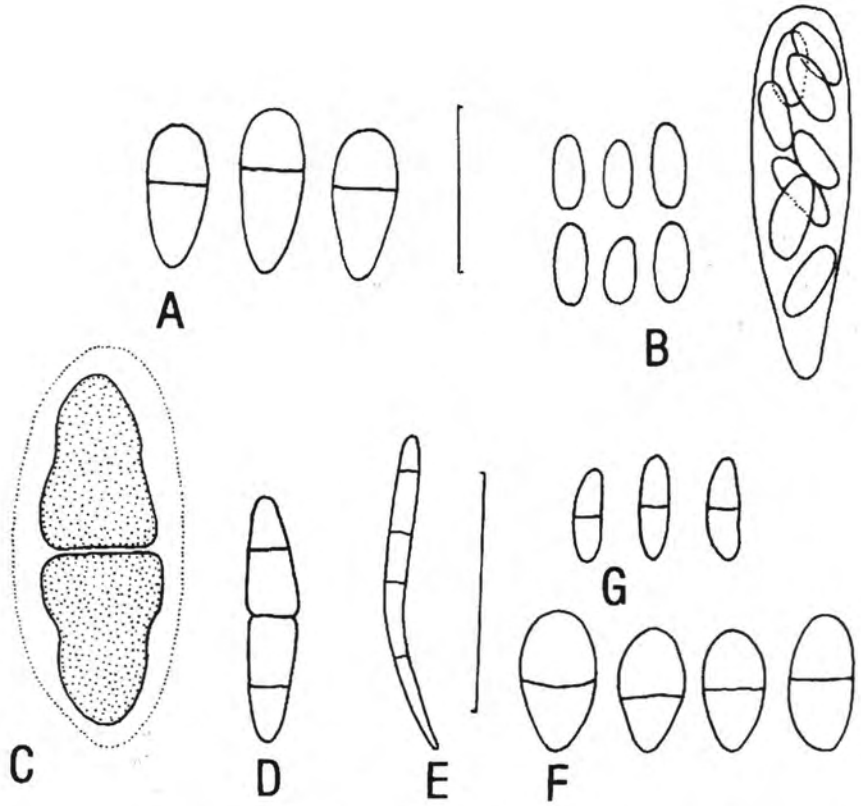


Fig. 5. Ascospores. A – *Mycosphaerella octopetalae,* B – *Isothea rhytismoides* (ascospores and ascus), C – *Wettsteinina dryadis,* D – *Phaeosphaeria dryadis,* E – *Tubeufia alpina,* F – *Epipolaeum absconditum,* G – *Stomiopeltis dryadis.* Scale bars: A, B: 25 μm, C-G: 25 μm

pendages 15-19 x 4-5,7 µm (Fig. 6 C, D); on dead petioles and decorticated wood of stems.

MATERIAL EXAMINED: AUSTRIA: Kärnten, Mittagskogel, at 1700 m elevation, 23 August 1896, leg. B. Kotula, KRAM-Chleb. 41 668; FRANCE: Pyrenees, Pic d'Astaron near Gavarnie, at 1900 m elevation, 28 July 1958, leg. A. Jasiewicz, KRAM-Chleb. 41 637; POLAND: West Carpathians: Tatra Mts., Strążyska Valley, July 1911, leg. M. Wirstleinowa & K. Stecki; West Tatra Mts., 1952, leg. R. Kobendza; Mały (Little) Giewont Mt., at 1728 m elevation, 2 July 1912, leg. T. Wilczyński, KRAM-Chleb. 41 643; Face of Mały (Little) Giewont Mt., 4 June 1952, leg. K. Kostrakiewicz, KRAM-Chleb. 41 669; Królowa Niżna Pasture, 14 June 1952, leg. K. Kostrakiewicz, KRAM-Chleb. 41 694; YUGOSLAVIA: Črna Gora, Visétor Mt. near Plav, at 2000-2200 m elevation, 2 August 1974, leg. A. Jasiewicz, KRAM-Chleb. 41 687.

COMMENTS: It is a rare Alpine-Arctic species known so far from Germany, Scandinavia (Holm 1979, Holm & Holm 1986, Nograsek 1990) and Canadian Arctic (Barr 1959, 1978). According Nograsek (1990) the Scandinavian population of *G. dryadis* is slightly different from that of Alpine. Its ascospores are terminated with gelatinous appendages at booth ends. Polish specimens resemble those of the Alpine population booth in lacking appendages and occurence of polysporous asci.

Isothea rhytismoides (Bab. ex Berk.) Fr., Summa Veg. Scand. 421, 1849.

BAS.: *Sphaeria rhytismoides* Bab. ex Berk., Ann. Mag. Nat. Hist. ser. 1. 6: 361, 1841;

SYN.: *Sphaerella rhytismoides* De Not., Recl. Pir., 12, 1867; *Laestadia rhytismoides* Saccardo, Syll. Fung. 1: 424, 1882; *Hypospila rhytismoides* (Bab. ex Berk.) Niessl. in Rabenhorst-Winter, F. eur. 3261, 1885; *Sphaeria dryadis* Fuckel, Symb. Myc. 108, 1870; *Didymella dryadis* (Fuckel) Spegazzini, Decades Mycol. Ital. No. 89, 1879; *Didymosphaeria dryadis* Winter, Rabenh. Kryptfl., Pilze 2, 428, 1887; *Carlia rhytismoides* (Bab. ex Berk.) O. Kze, Revisio Gen. Plant. 2: 846, 1891; *Carlia rhytismoides* (Bab. ex Berk.) Jacz. Bull. Soc. Mycol. 12: 100, 1896; *Guignardia rhytismoides* (Bab. ex Berk.) Trav. Fl. It. Crypt. 1, Fungi 1: 386, 1906; *Phyllachora rhytismoides* (Bab. et Berk.) L. Vasilyeva, Pirenomicety i lokuloaskomicety severa Dalnego Vostoka p. 225, 1987.

TYPE: Scotland, Sutherland, Inchnadamff, on *Dryas octopetala*, September 1838, leg. C. Babington.

DESCRIPTION: A very characteristic parasitic species, common on *Dryas*. Asci clavate (Fig. 5B) 40-46 x 13-15 µm, ascospores hyaline, one-celled (Fig. 5B) 11-15 x 4-6 µm, on upper part of leaves; more detailed description vide Arx & Müller (1954) and Barr (1959).

MATERIAL EXAMINED: CANADA: Alberta: Banff N. P., Sunwapta Pass, on *D. octopetala var. hookeriana* 12 August 1980, leg. J. Mądalski, KRAM-Chleb. 41 611; FRANCE: Pyrenees: Pic d'Astaron near Gavarnie, at 1900 m elevation, 28 July 1958, leg. A. Jasiewicz, KRAM-Chleb. 41 639; HORVATIA: Gorski Kotar, Ponikwa Ceclje, at 1250 m elevation, 5 August 1957, leg. K. Zarzycki, KRAM-Chleb. 41 622; POLAND: West Carpathians, Tatra Mts., Giewont Mt., 5 August 1879, leg. W. Kulczyński, KRAM-Chleb. 41 626; Kościeliska Valley, uppert part of Kraków Gully, 17 July, leg. H. Czeczottowa, KRAM-Chleb. 41 624; Kominy Tylkowe Mt., 26 June 1953, leg. M. Zajączówna, KRAM-Chleb. 41 657; Rzędy (Tomanowe) near Ciemniak Mt., at 1800 m elevation, 2 September 1977, leg. M. Pawlus, KRAM-Chleb. 41 679; Upłaz Meadow (an alpine meadow) near Kościeliska Valley, at 1700 m elevation, 17 July 1972, leg. R. Ochyra, KRAM-Chleb. 41 703; between Mały (Little) Giewont Mt. and Mała Łąka Meadow, 26 July 1956, leg. J. Kucowa, KRAM-Chleb. 41 709; RUSSIA: East Siberia: Chentej-Tschikoi Mts., Bystrinsky goletz Mt. near the Bystraja River, on *D. oxydonta*, 1 July 1967, leg. A. & M. Maximov, KRAM-Chleb. 41 659; SWITZERLAND: Graubünden kt., Julierpass near Pic Valetta, at 2200-2400 m elevation, 18 July 1972, leg. J. Mądalski, KRAM-Chleb. 41 610; Jura, Noiraigue near Neuchâtel, Ie Soliat, at 1386 m elevation, 22 June 1967, leg. J. Mądalski, KRAM-Chleb. 41 609; UKRAINA: East Carpathians: Čarnohora Mts., Pop Ivan Mt., at 2000 m elevation, 1 Sept. 1934, leg. J. Mądalski, KRAM-Chleb. 41 612.

COMMENTS: Raciborski found this fungus in the Tatra Mts. (Wróblewski 1925). The same locality reported Starmachowa (1963) but placed it in *Melanconiales* (sic!) which belong to *Deuteromycotina*! Wróblewski (1925) reported it as *Carlia rhytismoides* (Bab.) Kze and Starmachowa (1963) erroneously cited it as *Guignardia rhytismoides* (Bab.) Kze (it should be *Guignardia rhytismoides* (Bab. ex Berk.) Trav.). Recently Sałata et al. (1984) reported it from Kopa Królowa Wielka Mt., at 1520 m elevation in the Tatra Mts.

Vasilyeva (1987) considered the genus as synonymous with *Phyllachora*. I believe that *Isothea* is closely related to *Phyllachora*, however I can't accept the Vasilyeva's disposition. The similarities between *Isothea* and *Phyllachora* are noteworthy. It seems that the derivation of *Isothea* from *Phyllachora* is possible. It is widely distributed in Arctic and Alpine region of northern hemisphere.

Leptosphaerulina dryadis (Starbäck) L. Holm, Bot. Notiser 132: 86, 1979.

SYN.: *Sphaerulina Dryadis* Starbäck, Bihang K. Sv. Vet.-Akad. Handl. 16(3):3:10, 1890. Type: Sweden, Jämtland, Are, Skurdalsporten, on dead leaves of *Dryas octopetala*, leg. A. Y. Grevillius.

DESCRIPTION: Ascocarps immersed – 76-124 µm diam., high 76-115 µm, ascospores hyaline 23-33 x 9,6-12,5 µm (Fig. A1-6); on veins of lower sides of leaves and petioles.

MATERIAL EXAMINED: KOREA: Nakai, on *Dryas octopetala* var. *asiatica*, 15 July 1972, leg. ?, KRAM-Chleb. 41 664; POLAND: West Carpathians: Tatra Mts., Giewont Mt., 1877, leg. E. Janota, KRAM-Chleb. 41 632; between Mały (Little) Giewont Mt. and Mała Łąka Meadow (an Alpine meadow), 26 July 1956, leg. J.Kucowa, KRAM-Chleb. 41 709; ROMANIA: East Carpathians, Sučeava, Rarâu Mt., Pietrele Doamnei Rocks, at 1653 m elevation, 29 June 1974, leg. J. Mądalski, KRAM-Chleb. 41 599; SWEDEN: Härjedalen: Tännäs, Hamrafjället, 7 August 1932, leg. A. Binning, KRAM-Chleb. 41 656; UKRAINA: East Carpathians: Čarnohora, Pop Ivan Mt., 22 July 1880, leg. H. Zapałowicz, KRAM-Chleb. 41 719.

COMMENTS: Holm (1979) reported very small ascocarps ca. 50 µm diam., whereas Nograsek (1990) noted 50-170 µm in material from the Alps. Such differences may be connected with the influence of Arctic and Subarctic conditions (Saville 1972). Ascospores from the Carpathian Mts. and Scandinavia (Fig. 3 A1-4) resemble those of *L. polyphragmia* Nograsek and Holm's *L. dryadis* (Holm 1979, Fig. 8, p. 90). However in the same material there occur booth types of ascospores (Fig. 3 A5). What is apparent, the same types of ascospores are present in populations from the Carpathian Mts. and Scandinavia.

Lophiostoma macrostomum (Tode: Fries) Cesati et De Notaris, Comm. Soc. Critt. Ital. 1: 219, 1863.

SYN.: *Sphaeria macrostoma* Tode, F. Mekl. 2: 12, 1791; Fries, Syst. Mycol. 2: 469, 1823.

TYPE: *Sphaeria macrostomum* Tode: lectotype "*Sphaeria macrostoma* Femsjö, Fries (UPS).

DESCRIPTION: Perithecia superficial, asci 76-86 x 11-13,5 µm, ascospores hyaline 2-4 celled 19-27 x 5-6,5 µm (Fig. 4D). Epixylic saprophyte occuring on decorticated wood of old stems.

MATERIAL EXAMINED: RUSSIA: West Siberia: Jamal Peninsula, east coast near Mys Kamennyj, Laptajakha, on *D. octopetala*, 12 July 1979, leg. O. W. Rebristaja, KRAM-Chleb. 41 714.

COMMENTS: So far it has been noted on *Rumex, Epilobium, Urtica* (Chesters & Bell 1970) and *Salix reticulata* (Nograsek 1990).

Lophiostoma winteri (Sacc.) Winter in Rabenh., Krypt.-Fl., 2. Aufl., 1(2): 297, 1885.

BAS.: *Lophiotrema winteri* Sacc., Michelia 1: 358, 1878;

TYPE: Switzerland: Zürich, culm of *Helianthemum Chamaecytisus* (= *H. nummularium*), August 1878, leg. Winter

SYN.: *Lophiostoma insidiosum* var. *sessile* Rehm, Hedwigia 40: 104, 1901.

TYPE: Germany: Bayerische Alpen near Herzogenstand, on culms of *Erica carnea*, September 1900, Rehm (S, holotype)

DESCRIPTION: Ascocarps partially immersed, ascospores 6-celled (Fig. 4C). Epixylic saprophyte occuring on decorticated wood of *Dryas* stems.

MATERIAL EXAMINED: AUSTRIA: Tirol: Somertal, 26 June 1897, leg. B. Kotula, KRAM-Chleb. 41 652; POLAND: West Carpathians: Tatra Mts., near Mały (Little) Giewont Mt. towards Mała Łąka Meadow, 26 July 1956, leg. J. Kucowa, KRAM-Chleb. 41 708; ROMANIA: East Carpathians: Sučeava, Rarâu Mt., Pietrele Doamnei Rocks, leg. A. Rehman, KRAM-Chleb. 41 716; RUSSIA: East Siberia: Yakutia, Yakutia's Peninsula, 615 km from estuary of the Sinevec River, on *D. integrifolia*, 24 July 1983, leg. A. E. Katenik & N. L. Sepretareva, KRAM-Chleb. 41 681.

Massarina balnei-ursi (Rehm) K. Holm & L. Holm, Sydowia 38: 142, 1985.

SYN.: *Melanopsamma balnei-ursi* Rehm, Öst. Bot. Zeitschr. 53: 10, 1903.

TYPE: Austria: Tirol, Kaiserstuhl, on dead wood of *Dryas octopetala*, August 1902, Rehm (S).

DESCRIPTION: Ascocarps superficial 230-320 µm diam, asci 115-134 x 9,8-13,4 µm, ascospores hyaline 19-21 x 7,7-9,6 µm with a gelatinous coating (Fig. 4A). It occurs on decorticated wood of dead stems.

MATERIAL EXAMINED: RUSSIA: East Siberia: Yakutia, southern part of Yakutia's Peninsula, 615 km from estuary of the Sinevets River, on dead stems of *D. integrifolia*, 24 July 1983, leg. A. E. Katenik & N. L. Sepretareva, KRAM-Chleb. 1683 (3 ascocarps only).

COMMENTS: An epixylic saprophyte reported from the Alps (Holm & Holm 1985, Nograsek 1990) and Sweden (Nograsek 1990).

Melanomma dryadis Johanson ap. Rabenhorst, F. europaei no. 3659, 1890.

SYN.: *Leptosphaeria Dryadis* Rostrup, Bot. Tidsskr. 25: 305, 1903, pro parte (nomen confusum, vide infra) (non *Leptosphaeria Dryadis* Rostr. 1904, p. 24 = *L. Rostrupii* Sacc. et D. Sacc.)

TYPE: Sweden, Jämtland, Renfjället, at 900 m elevation, on *D. octopetala*, 13 July 1884, leg. Johanson.

DESCRIPTION: Ascocarps superficial, ascospores brown, 4-celled (Fig. 4B). A very peculiar fungus. It occurs on dead sepals of previous year's flowers.

MATERIAL EXAMINED: RUMANIA: East Carpathians: Sučeava, Rarâu Mt., Pietrele Doamnei Rocks, at 1653 m elevation, 29 June 1974, leg. J. Mądalski, KRAM-Chleb. 41 598.

COMMENTS: It has been reported from Alaska (Sprague 1955), Alps, Greenland, Iceland, Novaya Zemlya, Scandinavia, Spitsbergen (Holm 1957, 1979, Nograsek 1990, Holm & Holm 1993) and Kamchatka (Vasilyeva 1987).

Mycosphaerella octopetalae (Oudemans) Lind, Rep. Sci. Res. Norw. Exp. Nov. Zemlya 19: 12, 1921.

BAS.: *Sphaerella octopetalae* Oudemans, Verls. Meded. K. Akad. Wet. Naturk. ser. 3(2): 159, 1885.

TYPE: Novaya Zemlya, on leaves of *D. octopetala*, July 1881, leg. M. Weber.

DESCRIPTION: Ascocarps partially immersed, scattered, ascospores hyaline, 2-celled 17-24 x 7-9 µm (Fig. 5A). It occurs on upper side of *Dryas* leaves.

MATERIAL EXAMINED: BOSNIA and HERZEGOVINA: Vranica Planina, North Cirque of Krstac, limestone, at 1950 m elevation, 21 July 1957, leg. A. Jasiewicz, KRAM-Chleb. 41 634; CANADA: Alberta: Banff N. P., Sunwapta Pass, at 2035 m elevation, on *D. octopetala* var. *hookeriana*, 12 August 1980, leg. J. Mądalski, KRAM-Chleb. 41 613; HORVATIA: Gorski Kotar, Ponikwa Ceclje, at 1250 m elevation, 5 August 1957, leg. K. Zarzycki, KRAM-Chleb. 41 622; KOREA: Nakai, on *D. octopetala* var. *asiatica*, 15 July 1972, leg.?, KRAM-Chleb. 41 665; NORWAY: Tron(d)fjället (at present probably belong to Sweden-Jamtland), July 1891, leg. T. E. Göransson, KRAM-Chleb. 41 649; POLAND: West Carpathians, Tatra Mts., Smytniańskie Crags, 8 July 1955, leg. J. Mądalski, KRAM-Chleb. 41 617; Łysa Glade, May 1939, leg. Z. Radwańska-Paryska, KRAM-Chleb. 41 618; Giewont Mt., 21 July 1875, leg. W. Kulczyński, KRAM-Chleb.41 619; Kościeliska Valley, upper part of Kraków Gully, 17 July, leg. H. Czeczottowa, KRAM-Chleb. 41 624; Tatra Mts., July-August 1949, leg. T. Tacik, KRAM-Chleb. 41 646; Wielki Kopieniec Mt.., 8 August 1966, leg. H. & T. Tacik; Tatra Mts., Kominy Tylkowe Mt., 23 June 1935, leg. J. Środoń; Mała Łąka Valley, 19 July 1902, leg. J. Król; Mały (Little) Giewont, July 1855, leg. F. Berdau; Pieniny Mts., Biała Woda Valley, 13 September 1979, leg. H. Trzcińska-Tacik, KRAM-Chleb. 41 692; ROMANIA: East Carpathians: Sučeava, Rarâu Mt., Pietrele Doamnei Rocks, 29 June 1974, leg. J. Mądalski, KRAM-Chleb. 41 614; Pietrosul Mt., 3 August 1910, leg. H. Zapałowicz, KRAM-Chleb. 41 650; RUSSIA: West Siberia: Jamal Peninsula, east coast near Mys Kamennyj, Laptajakha, 12 July 1979, leg. O. V. Rebristaja, KRAM-Chleb. 41 715; East Siberia: Yakutia, Medvezhji Islands, Tschetyrekhstolbovyj Island, 10 July 1971, leg. M. Maximov, KRAM-Chleb. 41 690; Chentej-Tschikoi, Bystrinskij Mt. near the Bystraja River, on *D. oxydonta*, 1 July 1967, leg. A . Maximov & M. Maximov, KRAM-Chleb. 41 660; Tschukotzkij district, Schakhtiorskij 3, southern slope of Zolotovyj khrebt, on *D. punctata*, 6 September 1662, leg. V. A. Jurcev, KRAM-Chleb. 41 662; SLOVAKIA: West Carpathians, Vratna, leg. Schütz, KRAM-Chleb. 41 620; SWEDEN: Härjedalen: Tännäs, Hamrafjället, 7 August, 1932, leg. A. Binning, KRAM-Chleb. 41 655; UKRAINA: East Carpathians, Čarnohora Mts., Gadzhyna Mt., August 1927 and 24 July 1933, leg. J. Mądalski, KRAM-Chleb. 41 615, 41 616; Čarnohora Mts., Pop Ivan Mt., 22 July 1880, leg. H. Zapałowicz, KRAM-Chleb . 41 719; U.S.A.: Colorado: Rocky Mts., Boulder Co.: Niwot Ridge, southwest of Ward, at 3500-3650 m elevation, on *D. octopetala* var. *hookeriana* 28 July 1965, leg. P. J. Salamun, KRAM-Chleb. 41 667; Alpine zone above Long Lake, at 3500 m elevation, on *D. octopetala* var. *hookeriana* 19 August 1962, leg. G. N. Jones, KRAM-Chleb. 41 688.

COMMENTS: The most common fungus on *Dryas*.

Otthia dryadis L. Holm & A. Nograsek, Bibliotheca Mycologica 133: 172, 1990.

TYPE: Norway, Oppland, Dovre, Grimsdalen, 22 Aug. 1985, leg. K. Holm & L. Holm (UPS, holotype).

DESCRIPTION: Ascocarps globose, scattered, immersed in the wood with black, minute clypeus, asci 8-spored 144-160 x 23-25 µm, pseudoparaphyses branched, filiform, longer than the asci, ascospores glabrous, brown, 1-septate (Fig. 4 E) 23-27 x 12-15,4 µm; on dead wood of stems.

MATERIAL EXAMINED: POLAND: West Carpathians: Tatra Mts., on *Dryas octopetala*, July-August 1949, leg. T. Tacik, KRAM-Chleb. 41 645; Tatra Mts., Mały (Little) Giewont Mt., 2 July 1912, leg. T. Wilczyński, KRAM-Chleb. 41 644.

COMMENTS: It is reported from the Alps and Scandinavia (Nograsek 1990). The *Dryas* specimen has been collected by T. Tacik in the Tatra Mts. There is no detailed information concerning locality. Both examined samples are very poor.

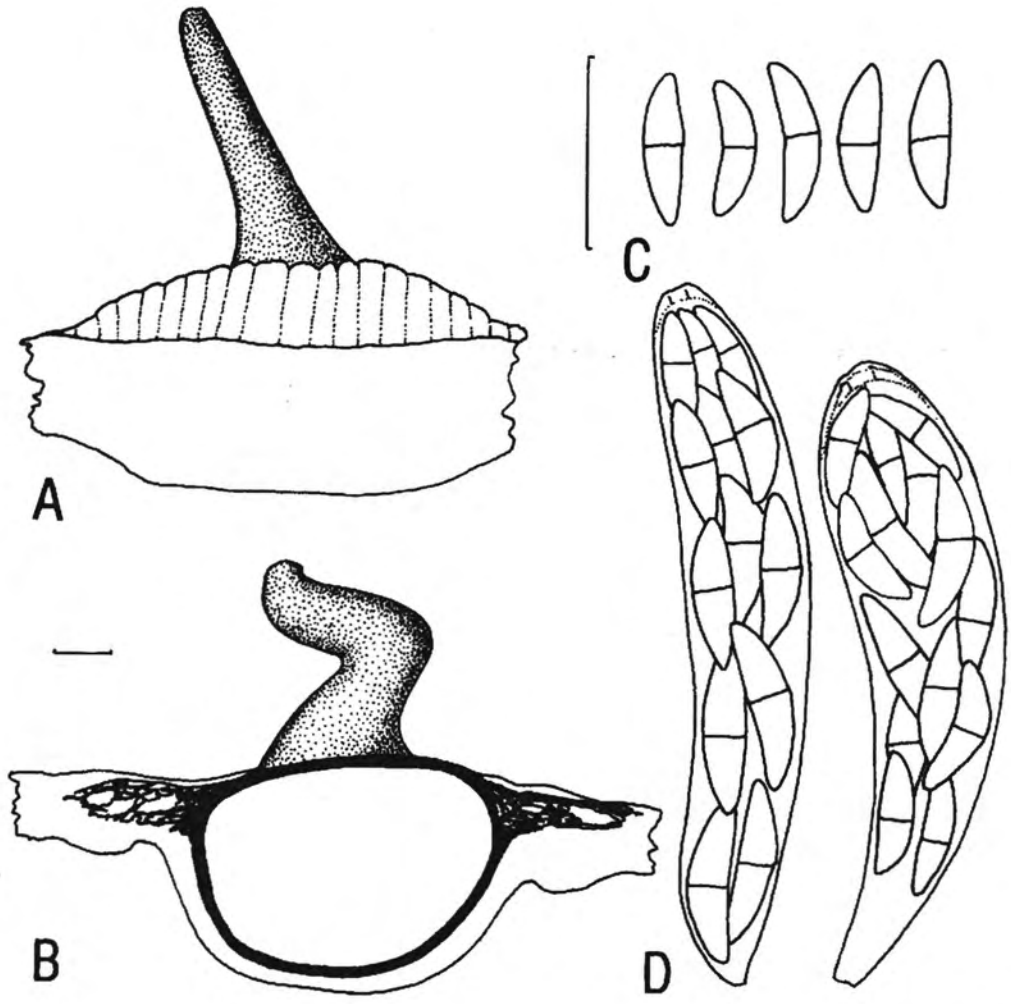


Fig. 6. *Gnomonia dryadis*. A – beck of perithecium, B – longitudinal section of perithecium, C – ascospores, D – polysporous asci. Scale bars: A, B: 100 µm, C, D: 25 µm

Phaeosphaeria dryadea Nograsek, Bibliotheca Mycologica 133: 179, 1990.

TYPE: Austria, Steiermark, Hochschwabgebiet: Seeleiten, NE of Seewiesen, at 1730 m elevation, on *Dryas octopetala*, 21 June 1984, leg. J. Hafellner & A. Nograsek (GZU-holotype).

DESCRIPTION: Asci 8-spored 76-90 x 12-16 µm, ascospores light brown 23-27 x 5,7-7 µm (Fig. 5D), on upper side of leaf (one ascocarp only).

MATERIAL EXAMINED: ROMANIA: East Carpathians: Sučeava, Rarâu Mt., Pietrele Doamnei Rocks, leg. A. Rehman, KRAM-Chleb. 41 717 (on slide only).

COMMENTS: So far it has been reported from the Alps only (Nograsek 1990).

Pleospora ascodedicata K. Holm, L. Holm & Nograsek in Nograsek, Bibl. Mycol. 133: 194, 1990.

TYPE: SWEDEN: Torne Lappmark, Jukkasjärvi: Laktajakka, on *Dryas octopetala*, 14.7.1986, A. Nograsek, (GZU-holotype).

DESCRIPTION: Ascocarp superficial (Fig. 7A). The material studied is scanty with very variable spores (33) 44-100 (130) x (19) 25-38 µm (Fig. 7B, C). Immature spores are small, pale yellow with only 5-8 transversal septa and oval shape (Fig. 7B). The mature spores are ellipsoid in shape and have up to 30 transversal and up to 7 longitudinal septa (Fig. 7C). The differences between size of ascospores are also connected with number of spores per ascus. In the Polish material I have found asci containing the bigest and single ascospores. A few ascocarps on old leaves.

MATERIAL EXAMINED: POLAND: West Carpathians, Tatra Mts., Rzędy Rockies near Ciemniak Mt., at 1800 m elevation, on old peduncles, 1977, leg. M. Pawlus, KRAM-Chleb. 41 678; RUSSIA: East Siberia: Yakutia, Yakutia's Peninsula, 615 km from estuary of the Sinevec River, on woody stems and occasionally on peduncles of *D. integrifolia*, 24 July 1983, leg. A. E Katenik & N L. Sepretareva, KRAM-Chleb. 41 682. (on slides only!)

COMMENTS: Recently described species which provisionally has been referred to the genus *Pleospora* (Holm & Holm 1993). Nograsek (1990) reported it from Alps and Scandinavia on *D. octopetala*. Holm & Holm (1993) found some immature ascocarps in Spitsbergen (Ny-Alesund area) with ascospores which are very similar to those of Yakutia.

Pseudomassaria islandica (Johanson) Barr, Mycologia 56: 854, 1964.

BAS.: *Venturia islandica* Johanson, Ofv. K. Sv. Vet. Akad. Förhandl. 9: 168, 1884; *Chaetapiospora islandica* (Johanson) Petrak, Sydowia 1: 87, 1947.

TYPE: Iceland, Eskifjörður, on *D. octopetala*, 21 june 1883, H. Strömfelt

SYN.: *Trichosphaeria dryadea* Rehm, Hedwigia 42, Beiblatt: 292, 1903.

TYPE: Austria, Tirol, Kaisertal, on *D. octopetala* (= Rehm, Asc. 1484)

Venturia tiroliensis von Höhnel, Ann. Mycol. 1: 395, 1903.

TYPE: Austria, Tirol, on *Dryas octopetala,* Sulden, 1899.

DESCRIPTION: Ascocarps partially immersed, apex setose, asci 8-sporous (Fig. 8E) 70-100 x 23-27 µm, ascospores hyaline 20-25 x 9-11 µm (Fig. 8F), on upper and lower sides of leaves and petioles. For a full description see Petrak (1947).

MATERIAL EXAMINED: AUSTRIA: Weissenbach near the Lech River, 2 July 1969 leg. J. Mądalski, KRAM-Chleb. 41 602; BOSNIA and HERZEGOVINA: Prenj Planina: Bjela Voda Valley, at 1500 m elevation, 1962, leg. A. Jasiewicz, KRAM-Chleb. 41 713; Vranica Planina, North Cirque of Krstac, limestone, at 1950 m elevation, 21 July 1957, leg. A. Jasiewicz, KRAM-Chleb. 41 633; FINLAND: Lapponia petsamoensis: Kalastasaarento, Pummanki Kiviaidantunturi, 4 August 1926, leg. A. Cajander, KRAM- Chleb. 41 711; FRANCE: Pyrenees: Pic d'Astaron near Gavarnie, at 1900 m elevation, 1958, leg. A. Jasiewicz, KRAM- Chleb. 41 640; HORVATIA: Gorski Kotar, Ponikwa Ceclje, at 1250 m elevation, 5 August 1957, leg. K. Zarzycki, KRAM-Chleb. 41 622; ITALY: Lago di Garda, Monte Baldo, Cima delle Pazette, between 1800-2240 m elevation, July 1980, leg. A. Jasiewicz, KRAM-Chleb. 41 685; POLAND: West Carpathians, Tatra Mts., Kalacka Crag, 3 Sept. 1954, leg. J. Mądalski, KRAM-Chleb. 41 601; Giewont Mt., 29 June 1938, Rośliny Polskie (Plantae Polonicae) No 338, leg. M. Łańcucka, S. Pawłowska & B. Pawłowski, KRAM-Chleb. 41 600; Bobrowiec Mt., 25 August 1938, leg. J. Mądalski, KRAM-Chleb. 41 605; Łysa Glade, May 1939, leg. Z. Radwańska-Paryska, KRAM-Chleb. 41 618; Kościeliska Valley, upper part of Kraków Gully, 17 July, leg. H. Czeczottowa, KRAM-Chleb. 1624; Valley of Biały Stream, 3 June 1915, leg. K. Miczyński, KRAM-Chleb. 1647; Chochołowska Valley, Małe Koryciska, June 1939, leg. Z. Radwańska-Paryska, KRAM-Chleb. 41 651; Kominy Tylkowe Mt. , 26 June 1953, leg. M. Zajączówna, KRAM-Chleb. 41 658; Sucha Valley near Giewont Mt., 13 July 1911, leg. J. Krol, KRAM-Chleb. 1691; Giewont Mt., 23 July (1911?), leg. J. Król, KRAM-Chleb. 41 707; Wielka Valley, 10 June 1907, leg. J. Król; Kominy Tylkowe Mt., 23 June 1935, leg. J. Środoń; ROMANIA: East Carpathians: Maramureš district, Arosa, 29 June 1912, leg. St. Fedorowicz, KRAM-Chleb. 41 670; SWITZERLAND: Jura, Noiraigue near Neuchâtel, Ie Soliat, at 1386 m elevation, 22 June 1967, leg. J. Mądalski, KRAM-Chleb. 41 603; Graubünden kt., Bivio, Julierpass near Pic Valetta, between 2200-2400 m elevation, 18 July 1972, leg. J. Mądalski, KRAM-Chleb. 41 604; YUGOSLAVIA: Črna Gora: Visetor near Plav, between 2000-2200 m elevation, 2 August 1974, leg. A. Jasiewicz, KRAM-Chleb. 41 687.

COMMENTS: *P. islandica* is a common and widespread species on all members of the genus *Dryas* such as *D. octopetala*, *D. integrifolia* and *D. drummondii*.

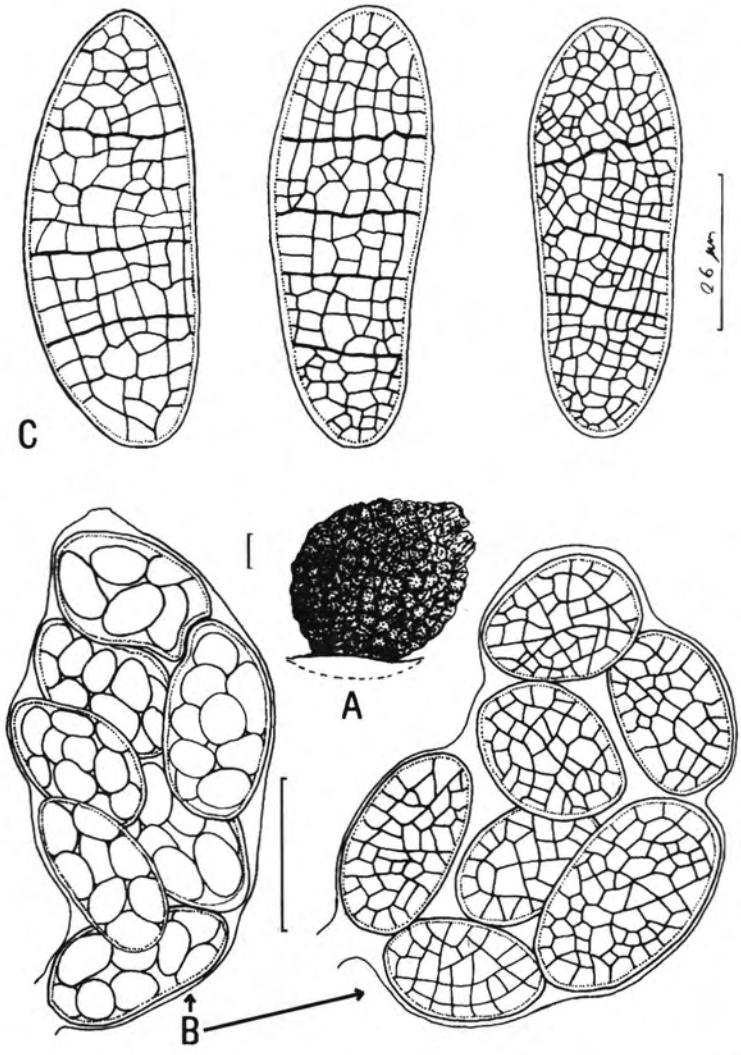


Fig. 7. *Pleospora ascodedicata*. A – ascocarp, B – asci with young ascospores, C – mature ascospores. Scale bars: A: 100 µm, B, C: 26 µm

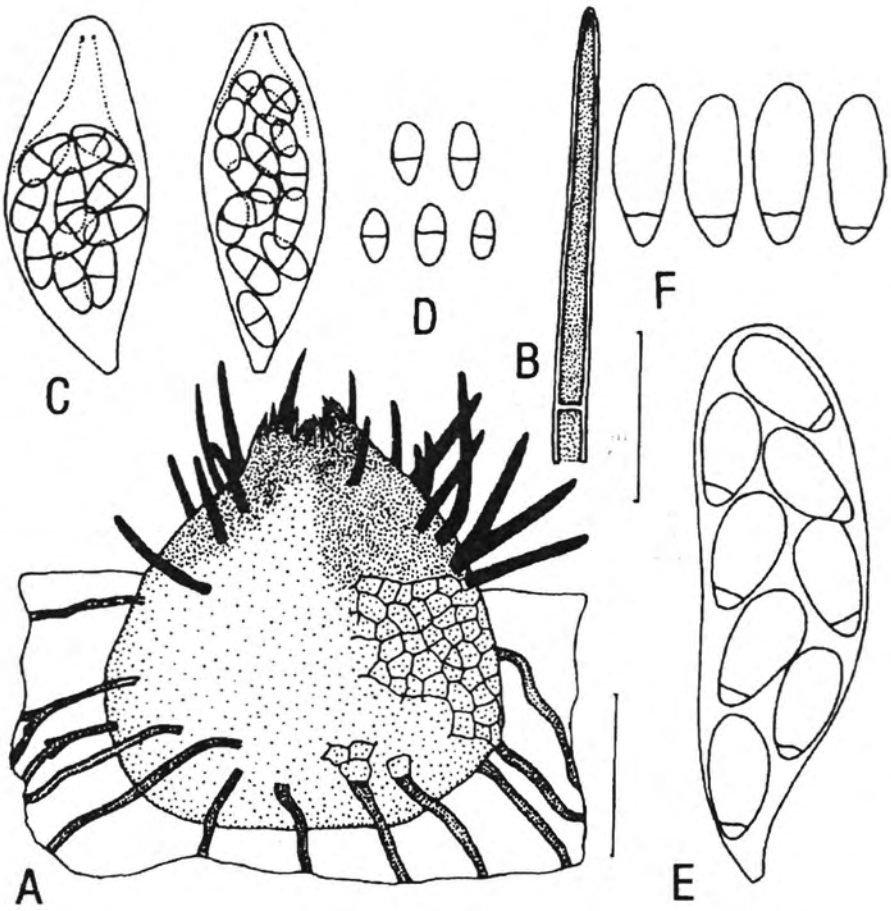


Fig. 8. A-D: *Pseudomassaria minor*. A – ascocarp, B – seta, C – polysporous asci, D – ascospores. E, F: *Pseudomassaria islandica*. E – ascus, F – ascospores. Scale bars: A: 50 µm, B-F: 25 µm

Pseudomassaria minor (Barr) Barr, Mycologia 56: 856, 1964.

BAS.: *Chaetapiospora minor* Barr, Contrib. Inst. Bot. Univ. Montreal 73: 70, 1959.

TYPE: Canada, Newfounland, "Hannah's Head", on leaves and peduncles of *D. integrifolia*, 30 July 1948, leg. E. Rouleau, n. 347 .

DESCRIPTION: Ascocarp partially immersed 140 µm diam., pallid internally, dark externally, apex setose (Fig. 8A), asci 12-16-spored (Fig. 8C) 38-45 x 15-18 µm, ascospores hyaline 2-celled (Fig. 8D) 9-12 x 4,2-5,5 µm. On dead pedicel of *D. octopetala*.

MATERIAL EXAMINED: POLAND: West Carpathians, Tatra Mts., Kalacka Crag, 3 IX 1954, leg. J. Mądalski (extracted from herb. Mądalski No. 17 389, a single ascocarp only.)

COMMENTS: Barr (1959, 1964) described it as having 8-spored asci. Booth *P. minor* and *Gnomonia dryadis* from Tatra Mts. have polysporous asci. According to Nograsek (1990) it is an Arcto-Alpine species known from North-America, Alps and Scandinavia.

Scleropleella hyperborea (Fuckel) L. Holm, Svensk Bot. Tidskr. 69: 155, 1975.

BAS.: *Pleospora hyperborea* Fuckel, Endophytische Pilze, – 2. dt. Nordpolfahrt in den Jahren 1869 und 1870 (2): 92, 1874.

SYN.: *Leptosphaerulina hyperborea* (Fuckel) Barr, Contr. Univ. Michigan Herb. 9: 542, 1972.

TYPE: Greenland, Shannon Island, on dead leaves of *Cassiope tetragona* (*Andromeda tetragona*).

DESCRIPTION: A very characteristic fungus with 3-septate, dark brown ascospores; on upper and lower sides of dead leaves.

MATERIAL EXAMINED: U.S.A.: Colorado: Rocky Mts., Boulder Co.: Niwot Ridge, southwest of Ward, between 3500-3650 m elevation, on *D. octopetala* var. *hookeriana*, 28 July 1965, leg. P. J. Salamun, KRAM-Chleb. 41 667; Wyoming: Rocky Mts.: Big Horn Mts., ca 38,5 air mi E of Greybull, ca 21,5 air mi NE of Hyattville in the vicinity of the spear vabm Alpine meadows, at 3500 m elevation, on *D. octopetala* var. *hookeriana*, 10 August 1979, leg. B. E. Nelson, KRAM-Chleb. 41 695.

COMMENTS: It occurs predominantly on dead leaves of *Cassiope tetragona*. Holm (1979) noted that mycoflora of *Dryas* is reminiscent of the fungal flora of *Cassiope tetragona*. It is notheworthy that participation of ericaceous microfungi in *Dryas* mycoflora is bigger in the nordic countries (Chlebicki in press).

Sphaerotheca volkartii Blumer, Beitr. Krypt.-Fl. Schweiz 7(1): 115, 1933.

TYPE: Switzerland, Graubünden, Fürstenalp, at 1800 m elevation, on *D. octopetala*, leg. A. Volkart.

DESCRIPTION: Perithecia superficial, ascospores circular 23-25 µm diam, on lower side of leaves.

MATERIAL EXAMINED: FRANCE: Pyrenees: Pic d'Astaron near Gavarnie, at 1900 m elevation, 28 July 1958, leg. A. Jasiewicz, KRAM-Chleb. 41 638; POLAND: West Carpathians: Tatra Mts., Mały (Little) Giewont Mt., at 1728 m elevation, 2 July 1912, leg . T. Wilczynski, KRAM-Chleb. 41 642.

COMMENTS: It has been reported from the Alps and Scandinavia (Holm 1979). Sałata et al. (1984) found it on Sarnia Skała Mt., Skupniów Upłaz (Tatra Mts., S-Poland).

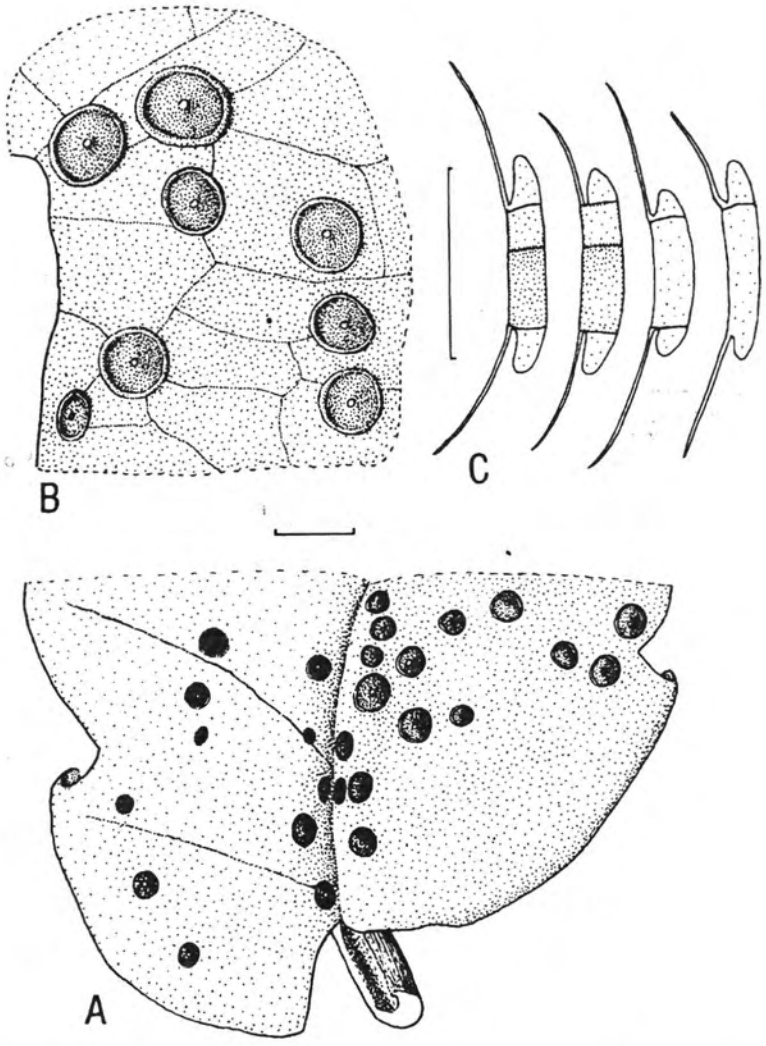


Fig. 9. *Discosia strobilina*. A – scattered conidiomata on upper side of leaf, B – conidiomata, C – conidia. Scale bars: B: 200 µm, C: 15 µm

Stomiopeltis dryadis (Rehm) L. Holm, Bot. Notiser 132: 88, 1979

BAS.: *Microthyrium microscopicum* var. *Dryadis* Rehm, Ann. Mycol. 7: 414, 1909;

SYN.: *Calothyrium Dryadis* (Rehm) von Höhnel, Ber. Deutsch. Bot. Ges. 37: 111, 1919.

TYPE: Germany, Bavaria Alps, Valepp, on *Dryas octopetala*, 880 m, VI 1904 (= Rehm, Asc. 1571)

DESCRIPTION: Thyrothecia 78-111 µm diam, asci 25-26 x 4,5-5,7 µm, ascospores 7,6-8,5 x 1,8-2,2 µm (Fig. 5G) It occurs on upper side of leaves, petioles and stipules.

MATERIAL EXAMINED: FRANCE: Pyrenees: Pic d'Astaron near Gavarnie, at 1900 m elevation, 28 July 1958, leg. A. Jasiewicz, KRAM-Chleb. 41 641; Cirque de Gavarnie, at 1600 m elevation, 11 July 1962, leg. S. Batko, KRAM-Chleb. 41 675; POLAND: West Carpathians: Tatra Mts., Bobrowiec Mt., 25 August 1938, leg. J. Mądalski, KRAM-Chleb. 41 608; Kopa Królowa Mała Mt., 12 September 1926, leg. ?, KRAM-Chleb. 41 672 (on stem); Sucha Valley near Giewont Mt., 13 July 1911, leg. J. Krol , KRAM-Chleb. 41 691; Giewont Mt., 5 July 1954, leg. K. Chronowska, KRAM-Chleb. 41 699; SLOVAKIA: West Carpathians: Tatra Mts., Niewcyrka Valley near Krywań Mt., September 1923, leg. Z. Kuleszyna.

COMMENTS: It has been reported from the Alps (Rehm 1904, Nograsek 1990), Scandinavia (Holm 1979, Nograsek 1990), Canadian Arctic (Barr 1959), Iceland and the Faeroes (Holm 1979).

Tubeufia alpina Holm & Nograsek in Nograsek, Bibliotheca Mycologica 133: 221, 1990.

TYPE: Norway, Oppland, Dovre, Grimsdalen, at 1200 m elevation, on *Dryas octopetala*, 22 August 1985, leg. L. Holm 3700 b (UPS-holotype).

DESCRIPTION: ascocarps partially immersed, asci 8-spored, 67-80 x 7,7-9,6 µm, ascospores hyaline, 4-septate, 36-44 x 2-3 µm (Fig. 5E).

METARIAL EXAMINED: POLAND: West Carpathians: Tatra Mts., Kopa Magury Mt., 1 August 1921, leg. J. Zabłocki, KRAM-Chleb. 41 718. (on slide only!)

COMMENTS: It is a recently described species, reported from the Alps and Scandinavia (Nograsek 1990).

Wettsteinina dryadis (Rostrup) Petrak, Sydowia 1: 322, 1947.

BAS.: *Massarina dryadis* Rostrup, Meddel. Grönland 3: 560, 1888;

SYN.: *Pleospora dryadis* Petrak, Hedwigia 68: 221, 1928, non P. dryadis Fuckel.

TYPE: Greenland, Shannon Island, on *D. octopetala*, Coll. 2nd German North Pole Exp. (c).

DESCRIPTION: Ascospores two-celled (30) 33-38 (42) x 12-13(15) µm surrounded by a gelatinous coating 1,5-2 µm wide (Fig. 5C), on upper and lower sides of leaves, petioles and hypanthium.

MATERIAL EXAMINED: BULGARIA: Pirin Mts..: Vihren Mt., at 2500 m elevation, 17 July 1957, leg. V. Velev, Sl. Petrov & Sl. Ganev, KRAM-Chleb. 41 654; ITALY: Lago di Garda, Monte Baldo, Cima delle Pazette, 29 July 1980, leg. A. Jasiewicz, KRAM-Chleb. 41 686; NORWAY: Norway Finse , August 1925, leg. W. Szafer, KRAM-Chleb. 43 200; POLAND: West Carpathians: Tatra Mts., Mułowa Valley, 25 July 1953, leg . T. Tacik, KRAM-Chleb. 41 689; Giewont Mt., Kirkor Chimney, 19 July 1917, leg. J. Król, KRAM- Chleb. 41 693; Kopa Magury Mt., 1 August 1921, leg. J. Zabłocki; Upłaz Meadow (an alpine meadow) in Kościeliska Valley, at 1700 m elevation, 17 July 1972, leg. R. Ochyra, KRAM-Chleb. 41 704; RUSSIA: East Siberia: Anadyrskij District, southern Tschukotka, northern part of Baralevo, on *Dryas incisa*, 8 August 1980, leg. N. L. Sepretareva, KRAM-Chleb. 41 663; Yakutia, southern part of Yakutia's Peninsula, 615 km from mouth of the Sinevetz River, on *D. integrifolia*, 24 July 1989, leg. A. E. Katenik & H. L. Sepretareva, KRAM-Chleb. 41 684; SLOVAKIA: West Carpathians: Tatra Mts., Murań Mt., 11 August 1878, leg. J. Szyszłowicz; SWITZERLAND: Jura, Noiraigue near Neuchâtel, Ie Soliat, at 1386 m elevation, 22 June 1967, leg. J. Mądalski, KRAM-Chleb. 41 606.

COMMENTS: Widespread fungus on different members of the genus *Dryas* in Arctic and Alpine regions.

Coelomycetes

Discosia strobilina Lib., Pl. Crypt. Ard. exs 346, 1837.

TYPE: on cone scales of *Abies* (ad dejectos *Abietum* in Arduensis), Belgium, (BR-lectotype)

DESCRIPTION: conidiomata flattened 200-230 µm diam. (Fig. 9 A, B), ostioles circular, conidiophores absent, conidia slightly curved 13,3-17 x 2,3-2,7 µm with filiform setules 10-13 µm long arising next to the subapical and suprabasal septa (Fig. 9C); on upper part of leaves of *Dryas octopetala*.

MATERIAL EXAMINED: POLAND: West Carpathians: Tatra Mts., Strążyska Valley near Giewont Mt., 1 April 1952, leg. A. Jasiewicz, KRAM-Chleb. 41 698; Sarnia Skała Mt., between Strążyska Valley and Biały Valley, June 1881, leg. K. Łapczyński, KRAM-Chleb. 41 721.

COMMENTS: *D. strobilina* belongs to the section *Strobilina* (Vanev 1991) which is characterized by the setules arising next to the two end septa. However in his drawing (Vanev 1991, fig. 5) the setules are formed on the distal parts of middle conidial cells. According to Morgan-Jones (1964) and Subramanian & Chandra Reddy (1974) these setules are located near the opposite side of septa on both ends of the conidium. In Polish material both kinds of location of setules have been observed (Fig. 9C). *D. strobilina* has been reported from Europe, Asia, Africa and North America (Subramanian & Chandra-Reddy 1974).

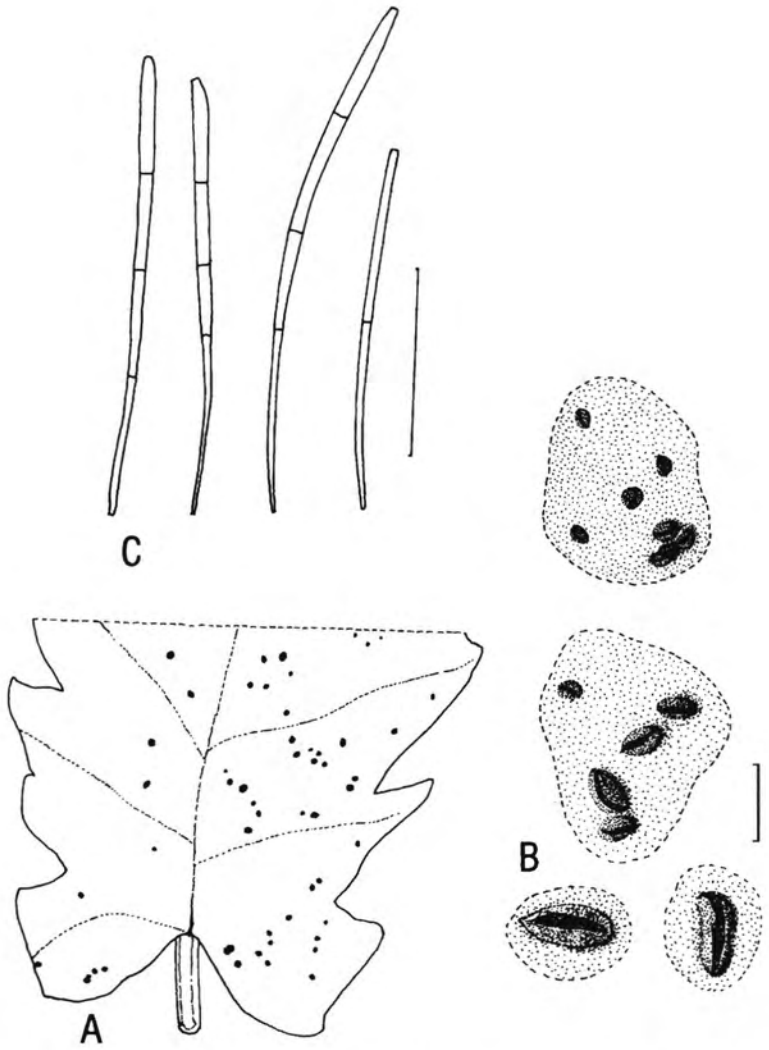
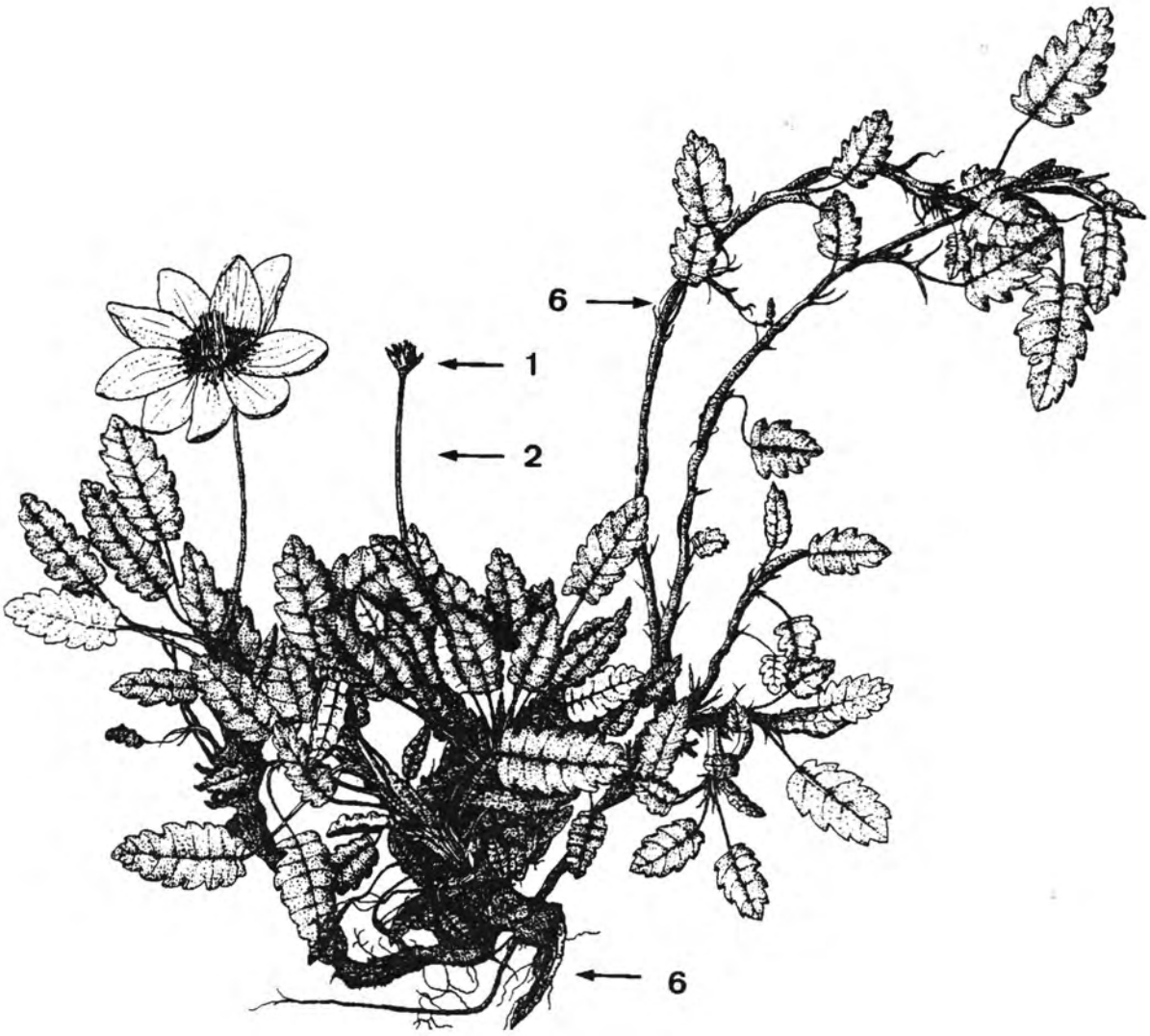


Fig. 10. *Septoria sp.* A – scattered conidiomata on upper side of leaf, B – conidiomata, C – conidia. Scale bars: B: 450 µm, C: 15 µm



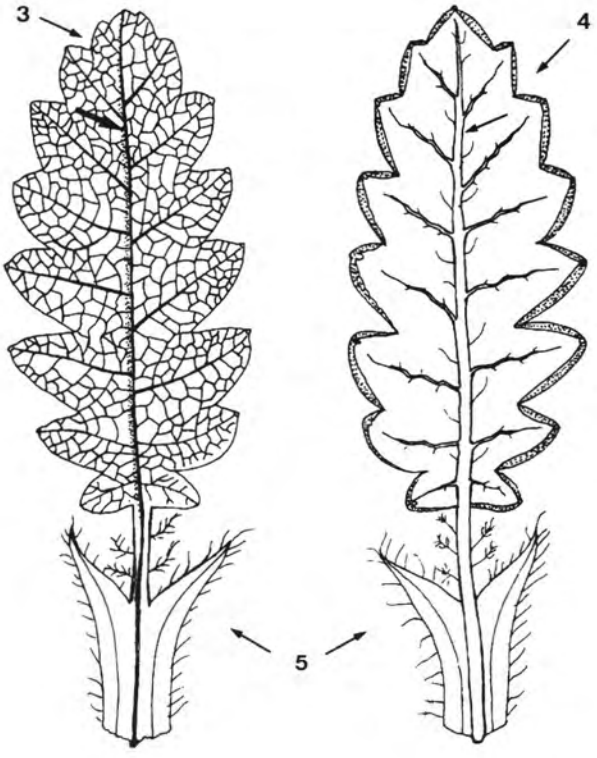


Fig. 11. Distribution pattern of microfungi inhabit several plant organs of *Dryas octopetala*

(1) hypanthium:
Melanomma dryadis, Wettsteinina dryadis

(2) pedicel:
Pseudomassaria minor

(3) upper side of leaves:
Cainiella johansonii, Discosia strobilina, Epipolaeum absconditum, Hypoderma dryadis, Isothea rhytismoides, Leptosphaerulina hyperborea, Mycosphaerella octopetalae, Phaeosphaeria dryadea, Pseudomassaria islandica, Pseudomassaria minor, Stomiopeltis dryadis, Pleospora ascodedicata, Septoria sp., Stomiopeltis dryadis, Wettsteinina dryadis

(4) lower side of leaves:
Cainiella johansonii, Brunnipila dryadis, Crocicreas dryadis v. dryadis, Crocicreas dryadis v. uniseptata, Leptosphaerulina dryadis, Scleropleella hyperborea, Odontotrema alpinum, Pseudomassaria islandica, Sphaerotheca volkartii

(5) petioles and stipules:
Cainiella johansonii, Gnomonia dryadis, Leptosphaerulina dryadis, Pseudomassaria islandica, Stomiopeltis dryadis, Wettsteinina dryadis

(6) decorticated wood of stems
Gnomonia dryadis, Lophiostoma macrostomum, Lophiostoma winteri, Otthia dryadis, "Patinella dryadea", Massarina balneiursi, Pleospora ascodedicata, Tubeufia alpina

Septoria sp.

DESCRIPTION: conidiomata scattered (Fig. 10A, B), pycnidial 100-200 µm diam., conidiophores absent, conidiogenous cells 3,5-4,6 x 2-4 µm, conidia hyaline, slightly curved 2-4(6)-celled 32-42 x 1,5-2 µm (Fig. 10C). It occurs on upper sides of leaves of *Dryas octopetala*.

MATERIAL EXAMINED: FRANCE: Pyrenees, Cirque de Gavarnie, at 1600 m elevation, 11 July 1962, leg. S. Batko, KRAM-Chleb. 41 675a; POLAND: West Carpathians: Pieniny Mts., Biała Woda Valley, 27 May 1968, leg. K. Zarzycki, KRAM-Chleb. 41 696; Tatra Mts., Giewont Mt., near Sucha Valley, 23 July ?, leg. J. Król, KRAM-Chleb. 41 706;

COMMENTS: Rostrup (after Moller 1958) described a similar coelomycetous fungus – *Melasmia dryadis* (vide Rostrup's diagn.) but spores of this species are different.
Melasmia dryadis Rostrup, Medd. on Grönland 3, 3 p. 575, 1888; Fungi p. 315, 1901.
"*Perithecia epiphylla, atra confluentia, maculas pustulosas efficientia. Stylosporae botuliformes, continue, hyaline, circiter 15 µm l. 3 µm cr. In foliis Dryadis integrifoliae*" Kangerdluarsuk 74 18 (Ryd. Exp.).

DISTRIBUTION OF MICROFUNGI ON PLANT ORGANS

The reproductive structures such as perithecia, apothecia and conidiomata showed definite patterns of distribution on plant organs. They are restricted to some particular part of the plant (Holm 1979). Only *Melanomma dryadis* is restricted to the inflorescence (Fig. 11. 1). The biggest group of microfungi inhabit leaves and petioles (Fig. 11). There are microfungi connected with upper side and lower part of leaves, among them *Epipolaeum absconditum* occurs only in the median furrow of upper side of leaf. Notheworthy are epixylic microfungi occuring on wood of dead stems (Fig. 11. 6).

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MIKROGRZYBY WYSTĘPUJĄCE NA DĘBIKU, WYIZOLOWANE Z POLSKICH ZIELNIKÓW ROŚLIN NACZYNIOWYCH

STRESZCZENIE

Praca zawiera opisy 27 taksonów mikrogrzybów występujących na dębiku. Przeanalizowano materiały z Austrii, Bośni i Hercegowiny, Kanady, Finlandii, Francji, Włoch, Korei, Norwegii, Polski, Rumanii, Rosji, Słowacji, Szwecji, Szwajcarii, Ukrainy, U.S.A. i Jugosławii zdeponowane w zielnikach WA, KRA, KRAM, i zielniku J. Mądalskiego. W Polsce odnotowano występowanie 15 taksonów grzybów. Podano drugie w świecie stanowisko *Brunnipila dryadis* w Pirenejach. *Patinella dryadea* opisana przez Velenowskiego w 1934 roku została zaliczona do grzybów lichenizujących (porostów). *Lophiostoma macrostomum* i *Discosia strobilina* nie były dotychczas notowane na dębiku.

SŁOWA KLUCZOWE: mikrogrzyby, *Dryas*, taksonomia, rozmieszczenie.