
Fungi of the genus *Botrytis* P. Micheli: Pers. plants in Lithuania

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Eight fungi species of the genus *Botrytis*: *B. allii*, *B. anthophila*, *B. cinerea*, *B. elliptica*, *B. fabae*, *B. gladiolorum*, *B. paeoniae*, *B. tulipae* recorded on 490 new plant species in Lithuania were identified. Data on the morphology of fungi, on the genera of injured plants or host plants, symptoms of disease, as well as on the distribution of fungi are presented. Together with the genus *Botrytis*, fungi of the *Alternaria*, *Cladosporium*, *Fusarium*, *Stemphylium*, *Trichothecium*, and other genera were identified on injured plants. The genus *Botrytis* fungi and their host-plants registered in 1995–2000 contributed to the material on these fungi. At present eight fungi species of the genus *Botrytis* on 687 host-plant taxa (677 plant species and 10 varieties) are known in Lithuania.

Key words: *Botrytis*, fungi, plants, Lithuania

INTRODUCTION

The species of the genus *Botrytis* P. Mich.: Pers. (*Hyphomycetes*) were known under the following generic names: *Acosporium* Corda, *Coccotrichum* Link, *Haplaria* Link ex Leman, *Polyactis* Link, etc. [1]. The most typical species of this genus is grey mould *Botrytis cinerea* Pers.: Pers. teleomorph-*Botryotinia* Whetzel. [2, 3]. Exhaustive investigations on fungi of this genus were performed in 1971–1980 [4–7]. From about 380 taxa referred to *Botrytis* at various times, only about 25 species can be recognized [7]. These fungi are characterised by grey colonies, thickish hyphae, septate, straight conidiophores, unicellular, ovoid, ellipsoidal conidia, dark sclerotia. Sclerotia hibernate in the ground, in plant debris. The grey mould develops from these sclerotia in spring. Optimum temperature for the growth of fungi is +25–30 °C, maximum +37–40 °C, minimum –1 °C, pH of the medium is around 5.5. Pathogens spread particularly in humid air (1998). Cultural plants are infected more often than plants of spontaneous flora. *B. cinerea*, growing on a wide range of host plants as a saprophyte or parasite, sometimes causes lethality of flower and vegetable plantlets or even seedlings of trees. The fungi parasitise seeds of vegetables [8] and weeds [9], they are detected in the soil and on polyamide materials [10].

There were no specialised investigations on the genus *Botrytis* in Lithuania. Some authors [11, 12] alongside other fungi have mentioned 4 species belonging to this genus. Later the pathogenicity and

biological characteristics of these fungi have been investigated. Eight species of the genus *Botrytis* have been revealed on 197 plant species [13].

The aim of the present research was to determine the diversity and morphologic characteristics of the genus *Botrytis* and to supplement the presently known data on these fungi by new host plants.

MATERIALS AND METHODS

The material for investigations was collected from introduced and cultivated plants in botanical gardens of Vilnius and Kaunas Vytautas Magnus Universities, Experimental Station of Field Agriculture, Kaunas and Vilnius district, as well as in various places of Lithuania. The investigation was carried out in 1995–2000. The fungi identification was based on numerous sources [2, 4–6, 13, 14]. Herbarium specimens are disposed in the Herbarium of the Institute of Botany (BILAS).

RESULTS AND DISCUSSION

Botrytis allii Munn, Bull. N. Y. St. Agric. Exp. Sta., 437: 1917.

Colonies grey or greyish brown. Conidiophores abundant, rather short, usually about 1 µm. Conidia narrowly ellipsoidal, pyriform, 6–12 x 3.5–6.0 (9.4–6.2) µm, (5–10 x 3–8) µm [4]. Sclerotia 1–5 µm diam., aggregated, frequently found on natural substrata and less in cultures. On various species of *Allium* L.: *A. altaicum* Pall., *A. angulosum* L., *A.*

caeruleum Pall., *A. cepa* L., *A. flavum* L., *A. glaciale* hort., *A. ledebourianum* Schult., *A. moly* L., *A. monodelphum* hort., *A. odorum* L., *A. sativum* L.

Neck rotting of *Allium cepa* L. is caused by *B. squamosa* Walker (*Botrytis* state of *Sclerotinia squamosa* (Viennot-Bourgin.) Dennis. [4]. Causes tip and leaf blight of onion and forms small black sclerotia on bulb scales. The neck of injured bulbs shrivels as a brown soft rot develops. *B. allii* also injures leaves and flowers. These inoculation sources are mostly soil-borne; seed transmission also occurs. The disease is favoured by wet conditions during harvesting and infection can only take place through wounds or damage caused by other pathogens. Rotting is caused by the production of pectolytic and cellulolytic enzymes [15].

Botrytis allii is often found with *Alternaria alternata* (Fr.) Keissl., *A. porri* (Ellis) Cif., *Cladosporium cladosporioides* (Fresen.) G. A. de Vries, *Cladosporium herbarum* (Pers.) Link ex Gray, *Stemphylium allii* Oud., *Peronospora destructor* (Berk.) Casp. ex Berk., *Puccinia porri* (Sow.) Winter, *Fusarium* sp., *Trichothecium roseum* (Pers.) Link ex Gray. [16].

Botrytis anthophila Bondartsev, Bolezn. Rast., 7,3: 1913.

Sclerotia not found. Conidia ellipsoidal, hyaline 6–9 x 3.5–6.5 (7.9–5.6) μm , (8.7–11.2 x 6.2–7.5) μm [13], (11–16 x 4–5) μm [4]. Grows systemically in shoots of red clover.

On *Trifolium pratense* L.

The disease cannot be detected until the flowers emerge, when the pollen is found to be wholly or partially replaced by *Botrytis* spores. The fungus found in a high proportion of seed samples [17].

Botrytis cinerea Pers.: Pers., Persoon, 1801. Teleomorph: (*Sclerotinia fuckeliana* (de Bary) Fuckel, Symb. mycol., 330: 1870, *Botryotinia fuckeliana* (de Bary) Whetzl (1945).

Colonies fast growing, grey or greyish brown. Conidiophores arising irregularly, often in patches, 2 μm or longer, mostly 16–30 μm thick, often septate, pigmented, smooth-walled, clear brown, apically branching and bearing numerous conidia. Conidia unicellular, ellipsoidal or ovoid, colourless to pale brown, smooth 6–18 x 3.5–12 (mostly 6–12 x 6–9) μm , 6–18 x 4–11 (mostly 8–14 x 6–9) μm [4]. Sclerotia frequently formed both in natural substrata and in culture.

Botrytis cinerea is a species aggregate distinct from others mainly by the size and shape of the conidia, and abundant and large sclerotia. *B. cinerea* damages stems, leaves, flowers, fruit and other parts of various plants, including many economically impor-

tant plants. The grey mould. *Botrytis cinerea* was most abundant on the ornamental plants of the families: *Apiaceae* Lindl., *Asteraceae* Dumort., *Balsaminaceae* A. Rich., *Brassicaceae* Burnett, *Campanulaceae* Juss., *Caryophyllaceae* Juss., *Fabaceae* Lindl., *Geraniaceae* Juss., *Lamiaceae* Lindl., *Papaveraceae* B. Juss., *Ranunculaceae* Juss., *Rosaceae* Juss., *Violaceae* Batsch. In cultivated habitats the agrophytocenotic plants are mostly damaged. Pulse and forage crops: *Vicia* L., *Phaseolus* L., *Pisum* L., *Trifolium* L.; vegetables and spice plants: *Allium* L., *Anethum* L., *Apium* L., *Archangelica* Hoffm., *Artemisia* L., *Asparagus* L., *Beta* L., *Brassica* L., *Cannabis* L., *Capsicum* L., *Carum* L., *Cichorium* L., *Cynara* L., *Cucumis* L., *Cucurbita* L., *Daucus* L., *Glycine* L., *Hyssopus* L., *Lactuca* L., *Lepidium* L., *Levisticum* Koch., *Lycopersicon* Mill., *Melissa* L., *Nigella* L., *Origanum* L., *Physalis* Brot., *Primula* L., *Rheum* L., *Rumex* L., *Ruta* L., *Scorzonera* L., *Solanum* L., *Thlaspi* L., *Tropaeolum* L., *Valerianella* L.; fruits: *Amelanchier* Med., *Aronia* Med., *Berberis* L., *Cerasus* Juss., *Cydonia* Mill., *Corylus* L., *Fragaria* L., *Malus* Mill., *Pyrus* L., *Podophyllum* L., *Prunus* L., *Ribes* L., *Rubus* L., *Sorbus* L., *Vitis* L. are damaged every year. On leaves and stems of nearly all mentioned plants fungi of the *Alternaria* Nees: Fr., *Cladosporium* Link: Fr., *Erysiphe* DC.: Fr., *Fusarium* Link: Fr., *Microsphaera* Lév., *Oidium* Link, *Podosphaera* Kunze, *Sphaerotheca* Lév., *Ramularia* Unger and other genera have been ascertained.

Botrytis elliptica (Berk.) Cooke J. R. Hort. Soc. 26: 1902.

Colonies grey, greyish brown. Conidiophores abundant, branched, clear brown, 2 μm or longer. Conidia large, ellipsoidal, abundant, 6.5–12 x 6–9.5 (9.8–7.2) μm , (22.5–30.0 x 17–22) μm [13], (6–35 x 10–24 (mostly 20–30 x 13–18) μm [4]. Sclerotia black, smooth, 1–1.5 μm diam. On *Lilium bulbiferum* L., *L. candidum* L., *L. martagon* L.

Symptoms on lilies vary considerably, depending on the weather conditions and parts of the plant attacked. Infection of leaves causes characteristic circular or oval spots from yellowish to reddish brown. In some spots the central part is light grey, while the outer region is dark purple, shading into the green, healthy tissue. The spots dry out in dry weather and the fungus stops spreading. In moist weather the spots merge so that the whole leaf may be blighted. The stems may break over at the point of infection. *B. elliptica* may attack the buds or opened flowers. The sclerotia seldom develop on the bulb. From leaf, flowers sclerotia fall to the ground during summer. The grey mould develops from these sclerotia in spring. The disease spreads rapidly

among lilies grown in places where nights are cold and dew is plentiful.

Botrytis fabae Sardina, Bol. Pat Veg. Entom. Agric Madrid 4 93: 1929.

Colonies greyish brown. Conidiophores abundant, about 1.5 μm . Conidia ellipsoidal, on flowers 3–9 x 3–6 (mostly 6.5–9.5 x 3.5–6 (8.6–5.6) μm , (10–12.5 x 7.5–8.7) μm [13]. Sclerotia abundant in cultures, discrete or sometimes confluent, mostly 1–1.7 μm diam. On stems, leaves, flowers of broad bean (*Vicia faba*) L.

If damp weather continues for several days without much sunshine, the grey mould is apt to attack leaves and flowers of *Vicia faba*. The disease prevails where the soil temperature is too low and especially where plants are not well aired. The spots developing on stems and leaves of broad beans are chocolate in colour. The fungus is thus spread through the air and in the soil. Seeds may also carry spores on their outer coats.

Botrytis gladiolorum Timmerm., Meded. Lab. Bloembollenond. Lisse, 67, 15: 1941.

Colonies grey or light brown. Conidiophores abundant, very branched. Conidia ellipsoidal, 6–9 x 3.5–6 (8.2–5.4) μm , (10–15 x 7.5–10) μm , [13], (10–22 x 8–13) μm [4]. Sclerotia abundant, aggregated in large masses. On gladiolus *Gladiolus communis* L.

Botrytis gladiolorum is the most common agent of corm rot, leaf, and flower spot. On gladiolus two types of leaf spot occur: one oblong brown with red margin, the other small, round, rust-coloured. This fungus may also cause rot of the stems at or just below the soil line. Rot develops very rapidly in storage, especially if the corms have not been thoroughly dried and cured before being stored. The lesions on the corms vary in colour from very light brown to tan.

Botrytis paeoniae Oudem., Meded. Kon. Akad. Wet. Amst. 464: 1897.

Colonies grey or greyish brown. Conidiophores often swollen at the base. Conidia broadly ellipsoidal, 6–9 x 3–6 (7.9–5.1) μm , (12–18 x 8–10) μm , [4]. Sclerotia dark, 1–2 μm diam. On *Paeonia* L., *P. anomala* L., *P. peregrina* Mill., *P. tenuifolia* L., *Paeonia* spp.

The symptoms appear on young leaf bases in spring. The leafy shoots wilt rather suddenly and fall over. When they are pulled out or cut off below the ground, a brown or blackish rot is seen at the base of leaves and the stem. Just above the ground level the stalk is usually covered with grey mould. Leaf blight with large irregular brown areas

usually occurs somewhat after the blooming season. Flowers that have recently opened are also attacked. The sclerotia of this fungus develop along the base of the rotting stalks.

Botrytis tulipae Lind, Dan. Fung., 650: 1913.

Colonies grey, effuse. Conidiophores abundant, very branched, dichotomous. Conidia ellipsoidal 3–12 x 3–9 (9.7 x 7.1) μm , (10–20 x 7.5–12.5) μm [13], (12–22 x 8–15) μm [4]. Sclerotia discrete or confluent, commonly 1–2 μm diam. On *Tulipa gesneriana* L.

The leaves and flowers become flecked with small brown spots. The spots are most noticeable on the light-coloured varieties. When the bulb is injured, the whole plant becomes dwarfed and turns pale yellowish-green, and the flower is blasted. The stems may rot off completely. In cold wet spring weather the diseased parts may be covered with a grey mould which produces large numbers of conidia. At the base of the stem and on the outer scales of the bulbs one finds many blackish or dark brown sclerotia.

Fungi of the genus *Botrytis* and their host-plants registered in 1995–2000 contributed to the material on these fungi. At present, eight genus *Botrytis* species on 687 host-plants taxa (677 plant species and 10 varieties) are known in Lithuania. The obtained data will be used in the edition “Mycota Lithuaniae”.

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BOTRYTIS P.MICH.: PERS. GENTIES GRYBAI ANT AUGALŲ LIETUVOJE

S a n t r a u k a

Patikslintos *Botrytis* P. Mich.: Pers. genties 8 grybų rūšys – *B. allii* Munn., *B. anthophila* A. Bond., *B. cinerea* Pers.: Pers., *B. elliptica* (Berk.) Cooke, *B. fabae* Sard., *B.*

gladiolorum Timm., *B. paeoniae* Oudem, *B. tulipae* (Lib.) Lind., aptiktos ant 490 naujų augalų rūšių Lietuvoje. Straipsnyje pateikiami šių grybų morfologiniai duomenys, pažeistų augalų gentys arba augalai šeiminiškai, ligos požymiai, grybų paplitimas. Ant pažeistų augalų kartu su *Botrytis* genties nustatyti *Alternaria* Nees: Fr., *Cladosporium* Link: Fr., *Fusarium* Link: Fr., *Stemphylium* Wallr., *Trichothecium* Link: Fr., *Erysiphe* DC.: Fr., *Sphaerotheca* Lév., *Oidium* Link *Ramularia* Unger ir kitų genčių grybai. 1995–2000 m. aptikti *Botrytis* genties grybai ir jų augalai šeiminiškai papildoma turimą medžiagą. Šiuo metu Lietuvoje yra žinomos 8 *Botrytis* genties grybų rūšys ant 687 augalų taksonų (iš jų 677 augalų rūšių ir 10 varietetų).