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THE OCCURRENCE OF THELEBOLACEAE IN ESTONIA

In this paper the annotated list of the species belonging to five genera of Thelebolaceae — *Ascozonus*, *Coprotus*, *Lasiobolus*, *Thelebolus* and *Trichobolus* — is given.

These fungi have been found during the investigations of the samples deposited in the Herbarium of the Institute of Zoology and Botany, Academy of Sciences of the Estonian SSR in Tartu. The fruit bodies naturally occurring on dung of herbivorous animals have also been examined and samples of dung have been incubated in a wet chamber under laboratory conditions in order to produce apothecia.

The dried apothecia have been examined in 5% KOH but fresh fruit bodies have been mounted in distilled water. Congo red has been used for the staining of the ascus walls.

In this paper short descriptions of the species found on the territory of Estonia are presented. In some cases they are accompanied by brief commentaries.

Ascozonus cunicularis (Boud.) Boud. — Tartu district, Variku, on dung of roe, Apr. 10, 1980, coll. V. Prokhorov.

Apothecia solitary, sessile, obconical, white or whitish, 0.17—0.22 mm in diameter. Ectal excipulum of textura angularis, smooth. Asci 64-spored, clavate, apex slightly triangular, papillate, with clearly visible apical ring in upper part of ascus, dehiscent by vertical slit in two lobe, inamyloid, apex above the ring, remaining hyaline in Congo red, tapering downwards into short stalk, $80.0\text{—}83.3 \times 18.3\text{—}24.9 \mu\text{m}$. Spores fusiform, pointed at both ends, hyaline, $11.6 \times 4.1 \mu\text{m}$, without inclusions. Paraphyses filamentous, septate, hyaline.

Ascozonus woolhopensis (Berk. et Br.) Boud. — Tartu district, Variku, on dung of hare, Apr. 10, 1980, coll. V. Prokhorov.

Apothecia scattered, almost cylindrical or obconical, sessile on slightly narrowed base, white, semitranslucent, yellowish when old, about 0.2 mm in diameter. Ectal excipulum of textura prismatica-epidermoidea. Asci 128-spored, clavate, with papillate apex, $91.0\text{—}100.0 \times 18.3 \mu\text{m}$. Spores fusiform with pointed ends, hyaline, smooth, $11.6 \times 4.0\text{—}4.6 \mu\text{m}$, without inclusions.

Note: The fruit bodies of both species, i. e. *Ascozonus cunicularis* and *A. woolhopensis* are recorded in our country for the first time. However, they have been obtained under laboratory conditions only. The data on their world-wide distribution are almost absent. These species are known from Great Britain (Clark, 1980), France and the USA (Kimbrough, 1966) only.

Coprotus aurora (Cr. et Cr.) Kimbr., Luck-Allen et Cain. — Pärnu district, Varbla, on dung of elk, Sept. 12, 1980, coll. A. Raitviir.

Apothecia orange-yellowish. Ectal excipulum of textura angularis. Asci 8-spored, clavate, narrowed downwards, $74.7\text{—}91.3 \times 17.8\text{—}19.9 \mu\text{m}$. Spores broadly ellipsoid, smooth, hyaline, $10.8\text{—}11.6 \times 6.9\text{—}7.0 \mu\text{m}$, each with one de Bary bubble. Paraphyses septate, branched, $2.5\text{—}3.3 \mu\text{m}$ in diameter, slightly uncinuate, with yellow droplets of oil in upper cells.

Coprotus dextrinoideus Kimbr., Luck-Allen et Cain. — Valga district, Lüllemäe, on dung of cow, Sept. 09, 1986, coll. V. Prokhorov; Põlva district, Mõtsküla, on dung of cow, Oct. 10, 1986, coll. L. Pihlik.

Apothecia solitary or in small groups, sessile, cylindrical or barrel-shaped, glabrous, white or with yellowish margin, 0.15–0.25 mm in diameter. Ectal excipulum of *textura angularis*. Asci 8-spored, cylindrical-clavate, with short stalk, $72.5\text{--}97.4 \times 14.9\text{--}17.7$ μm . Spores broadly ellipsoid, smooth, hyaline, $11.2\text{--}14.4 \times 8.7\text{--}9.6$ μm , each with one de Bary bubble. 4–5 abortive spores within the asci are sometimes presented. Paraphyses filamentous, septate, dichotomously branched in upper part, hyaline, 3.2 μm in diameter at the tips.

Coprotus granuliformis (Cr. et Cr.) Kimbr. — Pärnu district Kolbergi, on dung of cow, Aug. 18, 1963, coll. K. Kalamees; Haapsalu district, Penijõe, on dung of cow, Sept. 09, 1977, coll. A. Kollom.

Apothecia solitary, white-yellowish, sessile, 0.2–0.25 mm in diameter. Asci 8-spored, broadly clavate, $41.7\text{--}44.5 \times 16.6\text{--}20.3$ μm . Spores broadly ellipsoid, smooth, hyaline, $10.0\text{--}11.9 \times 6.9\text{--}7.8$ μm , each with one de Bary bubble. Paraphyses filamentous, septate, at the tips swollen to 3.5 μm .

Coprotus lacteus (Cooke et Phill.) Kimbr., Luck-Allen et Cain. — Kingissepa district, Viidumäe, on dung of roe, Aug. 29, 1960, coll. A. Raitviir; Haapsalu district, Puhtulaid, on dung of elk, June 18, 1974, coll. B. Kullman; Tartu district, on dung of elk, Sept. 15, 1976, coll. A. Raitviir; Pärnu district, Kurgja, on dung of roe, Oct. 10, 1976, coll. A. Raitviir; Põlva district, Mõtsküla, on dung of horse, Oct. 10, 1986, coll. L. Pihlik.

Apothecia solitary, though abundant, sessile, discoid, white or yellowish-white, 0.2–0.8 mm in diameter. Ectal excipulum of *textura angularis* or transitional to *globulosa-angularis*. Asci 8-spored, cylindrical-clavate, with rounded apex, $74.7\text{--}88.9 \times 8.3\text{--}9.8$ μm . Spores ellipsoid, smooth, hyaline, $8.3\text{--}9.9 \times 4.9\text{--}5.5$ μm , each with one de Bary bubble. Paraphyses filiform, simple or branched, septate, hyaline, 1.4–2.8 μm in diameter, not swollen at the tips, above uncinatae.

Coprotus leucopocillum Kimbr., Luck-Allen et Cain. — Harju district, Prangli Island, on dung of horse, Aug. 25, 1960, coll. P. Põldmaa; Pärnu district, Kilingi-Nõmme, on dung of cow, Apr. 01, 1986, coll. M. Saar; Valga district, Lüllemäe, on dung of cow, Sept. 9, 1986, coll. V. Prokhorov; Põlva district, Mõtsküla, on dung of cow, Oct. 10, 1986, coll. L. Pihlik; Tartu district, Variku, on dung of horse, Feb. 20, 1987, coll. A. Raitviir.

Apothecia scattered or in small groups, subglobose or pulvinate, sessile, white, 0.175–0.375 mm in diameter and approximately 0.175–0.2 mm in height. Ectal excipulum of *textura angularis*. Asci 8-spored, cylindrical-clavate, with rounded apex and abruptly narrowed into a short stalk, $(80.3\text{--})85.1\text{--}96.4 \times 14.5\text{--}22.9$ μm . Spores biseriate, hyaline, broadly ellipsoid, $14.5\text{--}16.8 \times 8.3\text{--}9.6$ μm , each with one de Bary bubble. Paraphyses filamentous, simple or branched dichotomously in apical part, septate, hyaline, 1.6–2.0 μm in diameter, somewhat swollen to 2.4–2.6 μm at the tips and sometimes uncinatae.

Coprotus luteus Kimbr., Luck-Allen et Cain. — Haapsalu district, Vormsi Island, on dung of horse, Sept. 13, 1980, coll. A. Kollom.

Apothecia solitary, discoid, sessile, rosy to pale orange, 0.4–0.5 mm in diameter. Ectal excipulum of *textura angularis*. Asci 8-spored, cylindrical-clavate, $66.0\text{--}70.1$ ($\text{--}75.0$) $\times 8.3\text{--}11.6$ μm . Spores ellipsoid, smooth, $9.1\text{--}10.0 \times 4.5\text{--}5.5$ μm , each with one de Bary bubble. Paraphyses filamentous, somewhat uncinatae, 1.8 μm in diameter.

Coprotus ochraceus (Cr. et Cr.) Larsen. — Rakvere district, Väike-Maarja, on dung of cow, July 30, 1964, coll. A. Raitviir.

Apothecia shallow cupulate, discoid, yellow, yellow-orange, 0.4—0.8 mm in diameter. Ectal excipulum of textura globulosa-angularis. Asci 8-spored, almost cylindrical, 165.0×13.3 — $14.8 \mu\text{m}$. Spores uniseriate, ellipsoid, 12.6 — 16.1×8.0 — $8.3 \mu\text{m}$, each with one de Bary bubble. Paraphyses filamentous, septate, with yellowish droplets of oil in upper cells, swollen to $4.5 \mu\text{m}$ at the tips.

Coprotus sexdecimsporus (Cr. et Cr.) Kimbr. — Haapsalu district, Vormsi Island, peninsula Rumpo, on dung of cow, September 20, 1986, coll. M. Saar.

Apothecia solitary, discoid, sessile, white or with beige tint, 0.25—0.375 mm in diameter. Ectal excipulum of textura globulosa-angularis. Asci 16-spored, broadly clavate, 112.9 — 119.2×21.3 — $22.9 \mu\text{m}$. Spores broadly ellipsoid, smooth, hyaline, $12.8 \times 8.0 \mu\text{m}$, each with one de Bary bubble. Paraphyses filamentous, slightly swollen to $3.5 \mu\text{m}$ at the tips.

Lasiobolus ciliatus (Schmidt: Fr.) Boud. — Pärnu district, Nigula, on dung of roe, Aug. 13, 1963, coll. P. Põldmaa; Pärnu district, Kolbergi, on dung of cow, Aug. 18, 1983, coll. K. Kalamees; Valga district, Lüllemäe, on dung of cow, Sept. 9, 1986, coll. V. Prokhorov; Põlva district, Taevaskoja, on dung of goat, May 10, 1980, coll. V. Prokhorov.

Setae ventricose at the base, stiff, nonseptate, pointed, hyaline, 276.4 — 574.0×15.7 — $33.0 \mu\text{m}$. Ectal excipulum of textura angularis at the lower part of apothecium and formed by elongated, horizontally oriented cells at the upper part of fruit body. Asci 8-spored, cylindrical-clavate, rounded above, gradually tapering into stalk, 150.6 — 204.0×20.4 — $30.5 \mu\text{m}$. Spores ellipsoid, smooth, hyaline, 19.1 — 24.5×10.8 — $12.5 \mu\text{m}$, each with one de Bary bubble. Paraphyses filamentous, septate, branched, 2.5 — $3.5 \mu\text{m}$ in diameter.

Lasiobolus cuniculi Vel. — Haapsalu district, Vormsi Island, Rumpo Peninsula, on dung of cow, Sept. 20, 1986, coll. M. Saar; Valga district, Lüllemäe, on dung of cow, Sept. 9, 1986, coll. V. Prokhorov.

Apothecia turbinate, setose, sessile on narrowed base, 0.1—0.2 mm in diameter, yellow to yellow-orange. Setae stiff, slightly ventricose at the base, hyaline, 125.8 — 174.9×9.3 — $13.8 \mu\text{m}$. Asci 8-spored, clavate-cylindrical or clavate, with short stalk, 138.9 — 177.8×27.8 — $41.0 \mu\text{m}$. Spores broadly ellipsoid, smooth, hyaline, 23.5 — 24.6×14.8 — $15.3 \mu\text{m}$, each with one de Bary bubble. Paraphyses filamentous, septate, hyaline, 2.7 — $3.0 \mu\text{m}$ in diameter at the tips.

Lasiobolus intermedius Bezerra et Kimbr. — Kingissepa district, Hari-laid, on dung of horse, Aug. 28, 1960, coll. A. Raitviir; Viidumäe, on dung of elk, June 15, 1974, coll. A. Raitviir; Hiiumaa district, Tahkuna, on dung of horse, Sept. 1, 1960, coll. A. Raitviir; Pärnu district, Nigula, on dung of elk, Aug. 13, 1963, coll. P. Põldmaa; Paide district, Sinisalu, on dung, Sept. 11, 1982, coll. B. Kullman; Pärnu district, Kolbergi, on dung of cow, Aug. 18, 1963, coll. K. Kalamees; Põlva district, on dung of roe, May 23, 1970, coll. A. Raitviir.

Apothecia obconical or turbinate, sessile on narrowed base, pale orange or yellow-orange, 0.125—0.21 mm in diameter. Setae slightly ventricose 231.0 — 561.0 — 627.0×15.0 — $23.2 \mu\text{m}$. Asci 8-spored, cylindrical-clavate, $(132.0$ — 166.0 — 182.6×14.9 — $23.2 \mu\text{m}$. Spores ellipsoid, smooth, hyaline, $(14.1$ — 17.4 — 20.7×8.3 — $10.4 \mu\text{m}$, each with one de Bary bubble. Paraphyses filamentous, simple or branched, septate, 2.0 — $2.5 \mu\text{m}$ in diameter at the tips.

Thelebolus crustaceus (Fuckel) Kimbr. — Pärnu district, Kurgja, on dung of roe, Oct. 10, 1976, coll. A. Raitviir; Tartu district, Variku, on dung of hare, Apr. 11, 1980, coll. V. Prokhorov; Tartu district, Kaagvere, on dung of deer, March 28, 1986, coll. M. Saar; Tartu district, Kaagvere, on dung of horse, Jan. 28, 1987, coll. M. Saar.

Apothecia subglobose, 0.1–0.16 mm in diameter. Asci 64-spored, 20–25 per apothecium, broadly clavate, $44.9\text{--}88.0 \times 19.3\text{--}28.0$ μm . Spores broadly ellipsoid, smooth, hyaline, $6.4\text{--}8.0 \times 4.3\text{--}4.6$ μm , without inclusions.

Thelebolus microsporus (Berk. et Br.) Kimbr. — Võru district, Vastseliina, on dung of sheep, Apr. 2, 1986, coll. M. Saar; Valga district, Lüllemäe, on dung of cow, Sept. 9, 1986, coll. V. Prokhorov; Haapsalu district, Vormsi Island, Rumpo Peninsula, on dung of cow, Sept. 20, 1986, coll. M. Saar; Põlva district, Mõtsküla, on dung, Oct. 10, 1986, coll. L. Pihlik.

Apothecia shortly cylindrical, subglobose to discoid, sessile, golden-yellow, 0.125–0.2 mm in diameter, smooth. Ectal excipulum of textura angularis. Asci 8-spored, numerous, narrow-cylindrical or cylindrical-clavate, with rounded apex and tapering downwards into short stalk, $51.0\text{--}65.9 \times 6.8\text{--}8.0$ μm . Spores ellipsoid, hyaline, smooth, $7.4\text{--}8.0 \times 3.8\text{--}4.5$ μm , without inclusions. Paraphyses strongly swollen at the tips to $5.6\text{--}8.0$ μm with yellow-greenish contents.

Thelebolus polysporus (Karst.) Sacc. — Tartu district, Variku, on dung of hare, Apr. 11, 1980, coll. V. Prokhorov; Valga district, Lüllemäe, on dung of cow, Sept. 9, 1986, coll. V. Prokhorov.

Apothecia with 5–10 asci, cylindrical-ovoid or subglobose, solitary, immersed, with strongly erumpent matured asci, colourless or pale yellowish, 0.08–0.1 mm in diameter. Ectal excipulum of textura angularis. Asci multispored (about or more than 256 spores), ovoid-saccate, with apex remaining hyaline in Congo red, $(80.3\text{--})91.6\text{--}128.0 \times 33.0\text{--}41.0$ μm . Spores ellipsoid, smooth, hyaline, 5.2×3.2 μm , without inclusions. Paraphyses filamentous, septate, hyaline, 2.2–2.5 μm in diameter.

Thelebolus stercoreus Tode: Fr. — Tartu district, Variku, on dung of horse, Apr. 10, 1980, coll. V. Prokhorov; Tartu district, Kaagvere, on dung of deer (roe), March 28, 1986, on dung of horse, March 28, 1986, coll. M. Saar; Võru district, Vastseliina, on dung of sheep, Apr. 2, 1986, coll. M. Saar.

Apothecia with one ascus only, 0.2–0.26 mm in diameter. Asci multi-spored (more than 1000 spores), ovoid, with thickened apex remaining hyaline in Congo red, $184.8\text{--}240.6 \times 153.1\text{--}199.6$ μm . Spores ellipsoid, smooth, hyaline, $6.4\text{--}7.7 \times 3.6\text{--}4.5$ μm , without inclusions.

Trichobolus sphaerosporus Kimbr. — Põlva district, Taevaskoja, on dung of goat, May 10, 1980, coll. V. Prokhorov.

Apothecia subimmersed, almost globular, setose, whitish or subtranslucent, uniascal, 0.18–0.2 mm in diameter. Setae 8–12 per apothecium, stiff, pointed, with 3 septa, hyaline, bulbous at the base, $130.0\text{--}153.0 \times 11.0\text{--}11.6$ μm , 6.6–7.0 μm wide at lower part of seta. Ectal excipulum of textura angularis. The ascus ovoid, multispored (more than 250 spores), $142.2\text{--}169.5 \times 109.4\text{--}127.8$ μm . Spores subglobose or spherical, smooth, hyaline, 9.1–9.5 μm in diameter, without inclusions.

Note: This species is recorded from the USSR for the first time. However, later it has been found in other regions of our country, although this species is evidently rare. It is known from the USA, Austria, Canada (Kimbrough, Korf, 1967; Krug, 1972), Poland (Chmiel, 1981).

The species enumerated in this paper are mostly common according to my observations. Most of these species are widely distributed in diffe-

rent regions of our country. They are known from Middle Asia, the Caucasus Republics, from Siberia and from the centre of the European part of the USSR. However, there are very few publications on these species in the USSR as well as from other countries.

The fruit bodies of most species of the Thelebolaceae are characterized by very minute dimensions, they are colourless (*Thelebolus*, *Trichobolus*). It is because of these characters that they are not easily found on dung in nature as well as under laboratory conditions. This accounts for the scanty data on the species of the family Thelebolaceae.

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SUGUKOND THELEBOLACEAE EESTIS

On esitatud andmed sugukonna Thelebolaceae 18 koprotroofse liigi kohta. ENSV TA Zoologia ja Botaanika Instituudi herbaariumist määratud ja laboratooriumis niiskes kambri väljakasvatatud seemned kuuluvad viide perekonda: *Ascozonus* — 2 liiki, *Coprotus* — 8 liiki, *Lasiobolus* — 3 liiki, *Trichobolus* — 1 liik ja *Thelebolus* — 4 liiki. Perekonna *Ascozonus* liigid, samuti *Coprotus dextrinoideus*, *C. granuliformis*, *C. leucopocillum*, *C. sexdecimsporus*, *Thelebolus polysporus* ja *T. sphaerosporus* on esmasleitud Eestis.

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СЕМЕЙСТВО THELEBOLACEAE В ЭСТОНИИ

Сообщаются сведения об обнаружении 18 видов копротрофных дисконицетов семейства Thelebolaceae. Идентифицированные в гербарном материале Института зоологии и ботаники АН ЭССР и полученные в лабораторных условиях виды грибов относятся к пяти родам: *Ascozonus* — 2, *Coprotus* — 8, *Lasiobolus* — 3, *Trichobolus* — 1, *Thelebolus* — 4 вида. Виды рода *Ascozonus*, а также *C. dextrinoideus*, *C. granuliformis*, *C. leucopocillum*, *C. sexdecimsporus*, *T. polysporus* и *T. sphaerosporus* описаны для Эстонии впервые. Однако все они найдены также в других регионах СССР.