

Checklist of the species of the genus *Tricholoma* (Agaricales, Agaricomycetes) in Estonia

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Abstract: 42 species of genus *Tricholoma* (Agaricales, Agaricomycetes) have been recorded in Estonia. A checklist of these species with ecological, phenological and distribution data is presented.

Kokkukvõte: Perekonna *Tricholoma* (Agaricales, Agaricomycetes) liigid Eestis

Esitatakse kriitiline nimestik koos ökoloogiliste, fenoloogiliste ja levikuliste andmetega heiniku perekonna (*Tricholoma*) 42 liigi (Agaricales, Agaricomycetes) kohta Eestis.

INTRODUCTION

The present checklist contains 42 *Tricholoma* species recorded in Estonia. All the species included (except *T. gausapatum*) correspond to the species conceptions established by Christensen and Heilmann-Clausen (2008) and have been proved by relevant exsiccates in the mycothecas TAAM of the Institute of Agricultural and Environmental Sciences of the Estonian University of Life Sciences or TU of the Natural History Museum of the Tartu University. In this paper *T. gausapatum* is understood in accordance with Huijsman, 1968 and Bon, 1991. The following taxa recorded in earlier mycological literature of Estonia (cf Kalamees, U., 1962; Urbonas et al, 1986; Kalamees, 1978, 2000; Järva & Parmasto, 1980; Järva, Parmasto & Vaasma, 1998), *Tricholoma acerbum* (Bull.: Fr.) Vent. 1872, *T. robustum* (Alb. & Schwein.: Fr.) Ricken 1915, *T. bufonium* (Pers.: Fr.) Gillet 1874, *T. sejunctum* (Sowerby: Fr.) Quél. 1872, *T. ustale* (Fr.: Fr.) P. Kumm. 1871, *T. caligatum* (Viv.) Ricken 1915, *T. coryphaeum* (Fr.) Gillet 1874, *T. elytroides* (Scop.) Fr. 1887 (= *Porpoloma elytroides* (Scop.) Singer 1973), *T. guttatum* (Schaeff.) Sacc. 1887, *T. inodermeum* (Fr.) Gillet 1874, *T. orirubens* Quél. 1873, *T. pardinum* Quél. 1873, *T. sciodes* (Pers.) C. Martin 1919, *T. subsejunctum* Peck 1912, *T. tridentinum* Singer 1943, are omitted in the checklist as no reliable specimens of the taxa supporting their presence in Estonia are found in our mycothecas.

This checklist also provides data on the ecology, phenology and occurrence of the species in Estonia (see also Kalamees, 1980a, 1980b, 1982, 2000, 2001b, Kalamees & Liiv, 2005, 2008). The following data are presented on each taxon: (1) the Latin name with a reference to the initial source; (2) most important synonyms; (3) reference to most important and representative pictures (iconography) in the mycological literature used in identifying Estonian species; (4) data on the ecology, phenology and distribution; (5) references to mycothecas specimens available in Estonia, using the internationally accepted abbreviations of the fungal collections TAAM or TU; (6) comments.

The checklist principally follows the Index Fungorum (1 June 2010). In the characterization of fungal habitats, the publication of Paal (1997) is used. The frequency of the occurrence of taxa is estimated according to a 6-point scale: very rare – 1–2 localities, rare – 3–5 localities, rather rare – 6–10 localities, rather frequent – 11–20 localities, frequent – 21–50 localities, very frequent – 51 and more localities.

Abbreviations of iconography are following:
BK - Breitenbach & Kränzlin, 1991
Bres27 – Bresadola, 1927
Bres28 – Bresadola, 1928
Chr&Noordel - Christensen & Noordeloos, 1999
CD – Courtecuisse & Duhem, 2000
CettoEnz – Cetto, 1987

D – Dähncke, 2001-2004
 Galli – Galli, 1999
 Korh&Kytöv, Korhonen & Kytövuori, 1998
 KL – Kalamees & Liiv, 2005, 2008
 KM – Konrad & Maublanc, 1927
 Kriegl – Krieglsteiner, 2001
 Kytöv – Kytövuori, 1988
 Lge – Lange, 1935
 March – Marchand, 1986
 Nyl – Nylén, 2001
 Phil – Phillips, 1988
 RH – Ryman & Holmåsén, 1984
 Riva88 – Riva, 1988
 Riva03 – Riva, 2003
 SNS – Salo, Niemelä & Salo, 2006

LIST OF SPECIES

TRICHOLOMA (Fr.) Staude, Schwämme Mitteldeutschl.: XXVIII, 125. 1857.

TRICHOLOMA AESTUANS (Fr.: Fr.) Gillet, Les Hyménomycètes ou description de tous les champignons (fungi) qui croissent en France (Alençon): 102. 1874

Agaricus aestuans Fr.: Fr., Syst. mycol. (Lundae) 1: 47. 1821.

Icon.: CD 390; D p.241; Galli p.137; Korh&Kytöv 3; KL 187; Kriegl p.558; Riva03, 40; SNS p.136. Ecol. & Distr.: In *Vaccinium vitis-idaea* and *V. myrtillus* oligo-mesotrophic boreal pine and spruce-pine forest site types, under *Pinus sylvestris* and *Picea abies*, August and September, rather frequent.

Voucher specimens studied: TAAM121669, 144795, 182873.

TRICHOLOMA ALBOBRUNNEUM (Pers.: Fr.) P.Kumm., Führ. Pilzk. (Zwickau): 130. 1871

Agaricus albobrunneus Pers., Syn. meth. fung. (Göttingen) 2: 293. 1801; *A. albobrunneus* Pers.: Fr., Syst. Mycol. (Lundae) 1: 37. 1821; *T. striatum* ss. auct. mult.; *T. stans* ss. auct. p.p.

Icon.: BK 434, as *T. stans*; KL 182; Lge 16A, as *T. striatum*; Nyl p.237; RH p.284.

Ecol. & Distr.: In coniferous forests, especially oligotrophic boreal heath, oligo-mesotrophic boreal and coastal dune pine forests, under coniferous trees, August to November, very frequent. Voucher specimens studied: TAAM146713, 123374, 124540; TU106242.

TRICHOLOMA ALBOCONICUM (J.E. Lange) Cléménçon, Mycol. helv. 1 (1): 26. 1983

T. myomyces var. *alboconicum* J.E. Lange, Fl. Agaric. Danic. 1: 55. 1935.

Icon.: Chr.&Noordel. p.331, as *T. argyraceum* var. *inocybeoides*; Lge 23B, as *T. myomyces* var. *alboconicum*.

Ecol. & Distr.: In deciduous and mixed forests, typically in disturbed habitats, roadsides, parks, gardens, grassy forest edges and groves, under deciduous and coniferous trees, May to November, very frequent, at places abundantly, one of the most common agarics in Estonia.

Voucher specimens studied: TAAM075931, 121538, 121571, 123591, 197366.

TRICHOLOMA ALBUM (Schaeff.: Fr.) P. Kumm., Führ. Pilzk. (Zwickau): 131. 1871

Agaricus albus Schaeff., Fung. Bavar. Palat 4: 68. 1774; *A. albus* Schaeff.: Fr., Syst. mycol. (Lundae) 1: 53. 1821; *T. album* f. *gracilis* Bres.,

Iconogr. Mycol. 3, tab. 108, 1928; *T. album* var. *thalliophilum* Bon, Bull. trimest. Soc. mycol. Fr. 85 (4): 486. 1970 [1969]; *T. lascivum* ss. auct. p.p.

Icon.: Bres28, 108, as *T. album* f. *gracilis*; Chr.&Noordel. p.323; March 840, as *resplendens*, 841, 843, as *T. album* var. *thalliophilum*.

Ecol. & Distr.: In oak and oak-mixed forests, under *Quercus robur*, in North and West Estonia and Saaremaa and Muhu Islands, August to October, rather frequent.

Voucher specimens studied: TAAM143551, 177374, 197347; TU106372.

Comments: real distribution poorly known because of the former taxonomic confusion with *T. lascivum*.

TRICHOLOMA APIUM Jul. Schäff., Z. Pilzk. 4: 65. 1925

T. helviodor Pilát et Svrček, Stud. Bot. Čechoslav. 7: 2. 1946.

Icon.: D p.250; Galli pp.188–189; Kriegl p.570, as *T. luteovirens*; March 879; Nyl p.244; RH p.290; Riva88, 52; Riva03, 62.

Ecol. & Distr.: In sandy and calcareous pine and pine-mixed forests, especially in *Arctostaphylos* alvar, *Vaccinium myrtillus* oligo-mesotrophic boreal and *Cladina* oligotrophic boreal heath forests, under *Pinus sylvestris*, mainly in North Estland and Saaremaa Island, also in Liiva-Putla Woodland Key Habitat in Saaremaa, August and September, rather rare.

Voucher specimens studied: TAAM 171993, 185677, 189600.

Comments: *T. apium* is protected by law (category II) and belongs to the Estonian Red List of threatened species (EN) (cf Järva et al., 1999; I ja II kaitsekategooriana, 2004; Estonian Red List..., 2009).

TRICHOLOMA ARGYRACEUM (Bull.) Gillet, Les Hyménomycètes ou description de tous les champignons (fungi) qui croissent en France (Alençon): 103. 1874

Agaricus argyraceus Bull., Herb. Fr.: tab. 423. 1779; *T. argyraceum* f. *inocybeoides* (A. Pearson) Mort. Chr. & Noordel., Persoonia 17 (2): 309. 1999; *T. inocybeoides* A. Pearson, Trans. Br. mycol. Soc. 22 (1-2): 29. 1938; *T. myomyces* var. *argyraceum* (Bull.) J.E. Lange, Dansk bot. Ark. 8 (3): 22. 1933; *T. scalpturatum* var. *argyraceum* (Bull.) Kühner & Romagn., Fl. Analyt. Champ. Supér. (Paris): 154. 1953;

T. terreum var. *argyraceum* (Bull.) P. Kumm., Führ. Pilzk. (Zwickau): 134. 1871.

Icon.: D p.266, as *T. inocybeoides*; Galli p.120, as *T. inocybeoides*; Riva88, 27, as *T. inocybeoides*; Riva03, 30, as *T. inocybeoides*.

Ecol. & Distr.: In herb-rich coniferous, deciduous and mixed forests and groves and bushes, in paludifying deciduous brushwood, typically in disturbed habitats: gravel pits, pasture woodlands, parks, on roadsides and forest edges, mainly under *Betula* spp., *Populus* spp., *Larix* spp., *Pinus sylvestris*, July to October, rare; in Estonia, only 5 localities (Muhu, Vormsi and Osmussaar Islands, Karula National Park in Valga Co.).

Voucher specimens studied: TAAM123401, 123575, 123588, 143384, 145784.

TRICHOLOMA ARVERNENSE Bon, Docums Mycol. 6 (nos 22-23): 168. 1976

T. sejunctoides P.D. Orton, Notes R. bot. Gdn Edinb. 44 (3): 495. 1987; *T. sejunctum* ss. auct. p.p. Icon.: BK 410; Galli p.145; KL 185; Korh&Kytöv 6; March 865; RH 289, as *T. sejunctum*; Riva88, 40; Riva03, 56.

Ecol. & Distr.: In oligotrophic boreal heath, oligomesotrophic boreal, oligotrophic *Polytrichum* paludifying and eutrophic alvar coniferous and mixed forests, under *Pinus sylvestris* and *Picea abies*, September and October, rather frequent. Voucher specimens studied: TAAM 142004, 143460, 172951, 176051.

Comments: According to Estonian mycological literature, all the finds from coniferous forests published under the name *T. sejunctum* belong to the species *T. arvernense*. The species *T. sejunctum*, growing under deciduous trees, has not been recorded in Estonia until the present day.

TRICHOLOMA ATROSQUAMOSUM (Chevall.) Sacc., Syll. fung. (Abellini) 5: 104. 1887 *Agaricus atrosquamosus* Chevall., Strauch- und Laubflechten Mitteleur. 1: 45. 1837; *T. nigromarginatum* Bres., Stud. Trent. 7 (1): 52. 1926.

Icon.: D p. 264; Galli p.133 (top); March 851; RH p.294.

Ecol. & Distr.: In pine forests, under *Pinus sylvestris*, October, very rare; only one locality: Saare Co., Muhu Island, Koguva, in young pine forest, 13 Oct 1983, K. Kalamees & M. Vaasma. Voucher specimens studied: TAAM123389.

TRICHOLOMA AURANTIUM (Schaeff.: Fr.) Ricken, Die Blätterpilze: 332. 1915

Agaricus aurantia Schaeff., Fung. Bavar. Palat. 4: 68. 1774; *A. aurantius* Schaeff.: Fr., Syst. Mycol. 1: 39. 1821.

Icon.: BK 412; CD 414; D p.228; Galli p.215; KL 184; KM 242; Kriegl p.526; Lge 18D; Nyl p.235; RH p.286; Riva88, 66; Riva03, 78; March 900.

Ecol. & Distr.: In spruce and spruce-mixed forests, wooded meadows and alvar juniper shrublands, especially in eutrophic alvar and *Corylus* boreo-nemoral hillock forest site types, under *Picea abies*, calciphilous, rather frequent in North and West Estonia, in spots abundant, rare in East Estonia, August to October.

Voucher specimens studied: TAAM074706, 142258, 141096a

TRICHOLOMA BATSCHII Gulden ex Mort. Christ. & Noordel., Persoonia 17 (2): 315. 1999

T. batschii Gulden, Musseronflora: 60. 1969 (inval.); *T. subannulatum* (Batsch) Bres., Iconogr. Mycol. 2: pl. 63. 1927; *T. albobrunneum* ss. auct. p.p.; *T. fracticum* ss. auct. pl.

Icon.: BK 419, as *T. fracticum*; Bres27, 63, as *T. subannulatum*; CD 412, as *T. fracticum*; Galli pp.218-219, as *T. fracticum*; Kriegl p. 531, as *T. fracticum*; March 890, as *T. fracticum*; Nyl. p.235, as *T. fracticum*; RH p.282; Riva03, 79; SNS p.138.

Ecol. & Distr.: In alvar coniferous forests and juniper shrublands, West Estonian islands (Saaremaa, Hiiumaa, Vormsi, Muhu), only one locality in North Estonia (Harju Co., Nissi, Ri-

isipere, 1975-1878, G. Shchukin), under *Pinus sylvestris*, calciphilous, August to October, rather rare.

Voucher specimens studied: TAAM076363, 123173, 182376, 182535.

TRICHOLOMA CINGULATUM (Almfelt) Jacobashch, Verh. bot. Ver. Prov. Brandenb. 33: 55. 1890

Agaricus cingulatus Almfelt in Fr., Linnaea 5: 507. 1830; *T. ramentaceum* ss. auct. Icon.: BK 416; CettoEnz p.294; D p.262; Kriegl p. 547; Lge 23C; Phil p. 107e; RH p.295; March 854; Nyl p.252.

Ecol. & Distr.: In humid places of forests and brushwoods, especially in eutrophic boreo-nemoral and drained peatland sites, under *Salix* spp., September and October, rather rare.

Voucher specimens studied: TAAM142137, 143420, 145583, 146147.

TRICHOLOMA COLOSSUS (Fr.) Quél., Mém. Soc. Émul. Montbéliard, Sér. 2 (5): 76. 1872

Agaricus colossus Fr., Epicr. syst. mycol. (Upsaliae): 38. 1838; *Armillaria colossus* (Fr.) Boud., Bull. Soc. mycol. Fr. 16: 18. 1900; *Megatricholoma colossus* (Fr.) G. Kost, Sydowia 37: 54. 1984. Icon.: CD 413; D p.227; Galli p.217; March 894; Riva88, 67; Riva03, 82.

Ecol. & Distr.: In oligotrophic boreal heath and oligo-mesotrophic boreal pine forests, under *Pinus sylvestris*, August and September, very rare; only two localities in North Estonia, Lahemaa National park: Harju Co., Kolga, Tagavälja, in oligo-mesotrophic *Vaccinium vitis-idaea* boreal pine forest, 4 Sept 1959, U. Kalamees; Lääne-Viru Co., Oandu, in oligotrophic *Cladina* boreal heath pine forest, 24 Aug 2009, K. Kalamees. Voucher specimens studied: TAAM051122, 197212.

Comments: *T. colossus* is protected by law (category III) and belongs to the Estonian Red List of threatened Species (CE) (cf Järva et al., 1999; III kaitsekategooria, 2004; Estonian Red List..., 2009).

TRICHOLOMA COLUMBETTA (Fr.: Fr.) P. Kumm., Führ. Pilzk. (Zwickau): 131. 1871

Agaricus columbetta Fr.: Fr., Syst. mycol. (Lundae) 1: 44. 1821.

Icon.: BK 417; CettoEnz p.275; CD 384; D p.254; Galli p.153; KL 201; KM 240; Lge 22B; Phil p.112c; RH p.292; Riva03, 43; SNS p.139. Ecol. & Distr.: In deciduous and mixed forests,

wooded meadows, especially under *Quercus robur*, August to October, rare.

Voucher specimens studied: TAAM095615, 121196, 142045.

TRICHOLOMA DULCIOLENS Kytöv., Karstenia 28 (2): 73. 1989 [1988]

Icon.: Kytöv p.75.

Ecol. & Distr.: In alvar spruce and pine-spruce forests, under *Picea abies*, calciphilous, September, very rare; only one locality in Estonia: Lääne Co., Vormsi Island, Fällarna, 2 Sep 1986, H. Tankler (det. I. Kytövuori).

Voucher specimens studied: TAAM143440.

TRICHOLOMA EQUESTRE (L.: Fr.) P. Kumm., Führ. Pilzk. (Zwickau): 130. 1871

Agaricus equestre L., Sp. Plantarum 2: 1173. 1753; *A. equestre* L.: Fr., Elenchus: 6. 1828; *T. equestre* var. *equestre*; *T. flavovirens* (Pers.: Fr.) S. Lundell in Lundell & Nannfeldt, Fungi Exsiccati Suecici 23-24: no. 1102. 1942; *T. auratum* (Paulet) Gillet, Les Hyménomycètes ou description de tous les champignons (fungi) qui croissent en France (Alezon): 92. 1874.

Icon.: BK 418; CD 379, as *T. auratum*; Galli pp. 165, as *T. equestre* & *T. auratum*, 166; KL 186; Korh&Kytöv 1, as *T. flavovirens* s.lat., *T. equestre* s.lat., *T. auratum*; Riva88 45, 45b; Phil p.105f; Riva03, 49; SNS 139.

Ecol. & Distr.: In sandy pine and pine-mixed forests, especially in oligotrophic boreal heath and oligo-mesotrophic boreal forests, in coastal dune pine forests, under *Pinus sylvestris*, September to November, mainly late in autumn, by first frosts, very frequent.

Voucher specimens studied: TAAM146118, 144775, 144922.

Comments: The taxonomic problems of *T. equestre* and closely related species, *T. ulvinenii* and *T. frondosae* are discussed in Kalamees (2001a).

TRICHOLOMA FOCALIS (Fr.) Ricken, Die Blätterpilze: 332. 1915

Agaricus focalis Fr., Epicr. syst. mycol. (Upsaliae): 20. 1838; *T. focale* var. *focale*; *T. focale* var. *caussetta* (Barla) Bon, Docums Mycol. 6 (nos 22-23): 273. 1976; *T. robustum* ss. auct. p.p. Icon.: CD 415; CettoEnz p.219; D p.226; KL 188; March 896, as *T. focale* var. *focale*; 897, as *T. focale* var. *caussetta*.

Ecol. & Distr.: In sandy pine and pine-mixed forests, especially in oligotrophic boreal heath and oligo-mesotrophic boreal forests, in wood-

ed oligotrophic boreal heath grasslands and wooded coastal dunes, under *Pinus sylvestris*, September and October, rather frequent. Voucher specimens studied: TAAM141867, 143711, 146326.

TRICHOLOMA FRONDOSAE Kalamees et Shchukin, Folia Cryptog. Estonica 38: 14. 2001

T. equestre ss. auct. pl. p.p.; *T. auratum* ss. auct. pl. p.p.; *T. equestre* var. *populinum* Mort. Chr. & Noordel., Persoonia 17 (2): 311. 1999; *T. flavovirens* ss. auct. pl. p.p. non ss. Bon; *T. frondosum* nom. prov. Kalamees & Shchukin, ined.

Icon.: Chr.&Noordel.p.331, as *T. equestre* var. *populinum*; Galli p.167 (top), as *T. equestre*; Korh&Kytöv, Sienilehti 50 (1), cover picture, as *T. flavovirens* s.lat., *T. equestre* s.lat., *T. frondosum*; Riva88, 45c, as *T. equestre*; Riva03, 51, as *T. equestre* var. *populinum*.

Ecol. & Distr.: In deciduous and mixed forests, especially eutrophic *Hepatica* and *Aegopodium* boreo-nemoral and mesotrophic *Oxalis* boreal site types, eutrophic alvar, oligotrophic paludifying and drained peatland forests, on rich and calcareous humid to wet soils, mainly under *Populus tremula*, August to October, frequent.

Voucher specimens studied: TAAM 124177 (holotypus), 043278, 146316, 146369a.

Comments: The taxonomic problems of *T. equestre* and closely related species, *T. ulvinenii* and *T. frondosae* are discussed in Kalamees (2001a).

TRICHOLOMA FUCATUM (Fr.: Fr.) P. Kumm., Führ. Pilzk. (Zwickau): 130. 1871

Agaricus fucatus Fr.: Fr., Syst. mycol. (Lundae) 1: 40. 1821.

Icon.: Galli p.173 (top), 173, as *T. fucatum* var. *subglobisporum* (bottom); Kriegl p. 561; March 871; RH p.289; Riva88, 43, 43b, as *T. fucatum* var. *subglobisporum*; Riva03, 59; SNS p.140.

Ecol. & Distr.: In eutrophic alvar and oligotrophic boreal heath coniferous forests, under *Pinus sylvestris* and *Picea abies*, September, rare, only in West Estonian islands – Saaremaa, Hiiumaa and Vormsi, especially common in alvar spruce forests of Vormsi Island, at places abundantly, also in Liiva-Putla Woodland Key Habitat in Saaremaa.

Voucher specimens studied: TAAM143424, 143509, 172940, 185752, 185790.

TRICHOLOMA FULVUM (Bull.: Fr.) Bigeard & H. Guill., Fl. Champ. Supér. France: 89. 1909

Agaricus fulvus Bull., Herb. Fr.12: tab. 555,

fig. 2. 1792; *A. fulvus* Bull.: Fr., Syst. mycol. (Lundae) 1: 37. 1821; *T. flavobrunneum* (Fr.) P. Kumm., Führ. Pilzk. (Zwickau): 130. 1871; *T. pseudonictitans* Bon, Docums Mycol. 13 (no. 52): 16. 1938; *T. nictitans* (Fr.) Gillet, Les Hyménomycètes ou description de tous les champignons (fungi) qui croissent en France (Alençon): 93. 1874.

Icon.: BK 420; CettoEnz: p.230, as *T. flavobrunneum*; CD 406, as *T. flavobrunneum*; KL 183; Kriegl p. 532, 533, as *T. fulvum* var. *pseudonictitans*; March 889; Phil p.110c-d; RH p.285; Riva88, 56, as *T. flavobrunneum*; Riva03, 68.

Ecol. & Distr.: In birch and birch-mixed forests, under *Betula pendula* und *B. pubescens*, August to November, very frequent.

Voucher specimens studied: TAAM071747, 072424, 073273.

TRICHOLOMA GAUSAPATUM (Fr.: Fr.) Quél., Mém. Soc. Émul. Montbéliard, Sér. 2, 5: 211. 1872

Agaricus gausapatatus Fr.: Fr., Syst. mycol. (Lundae) 1: 43. 1821; *T. terreum* ss. auct. pl. p.p.; *T. myomyces* ss. auct. plur. p.p.

Icon.: Galli p.112-113; Riva88, 17; Riva03, 18. Ecol. & Distr.: In pine coniferous and pine mixed forests, especially in herb rich forests, roadsides, sparse herb-rich pine groves, wooded heaths, alvar forests, under *Pinus sylvestris*, August to November, mainly late in autumn, rather frequent.

Voucher specimens studied: TAAM144112, 146148, 197129.

Comments: According to the material collected from Estonia, the species differs from the closely related species, *T. terreum*, by the greyish-brown densely shaggy or felty-intricate pileus, the soon greyish lamellae, which are extremely deeply emarginate, very broad, ventricose, thick and distant.

TRICHOLOMA IMBRICATUM (Fr.: Fr.) P. Kumm., Führ. Pilzk. (Zwickau): 133. 1871

Agaricus imbricatus Fr., Observ. mycol. (Havniae) 1: 27. 1815; *A. imbricatus* Fr.: Fr., Syst. mycol. (Lundae) 1: 42. 1821.

Icon.: BK 421; CD 400; D p.239; Galli p.192-193; KL 190; Kriegl p. 534; Lge 18B; Phil p.111f; RH p.286; Riva03, 67a-b; March 875.

Ecol. & Distr.: In dry coniferous and mixed, mainly pine forests, under *Pinus sylvestris*, September to November, frequent.

Voucher specimens studied: TAAM071968, 081515, 171713.

TRICHOLOMA INAMOENUM (Fr.: Fr.) Gillet, Les Hyménomycètes ou description de tous les champignons (fungi) qui croissent en France (Alençon): 112. 1874

Agaricus inamoenus Fr., Observ. mycol. (Havniae) 1: 10. 1815; *A. inamoenus* Fr.: Fr., Syst. mycol. (Lundae) 1: 111. 1821.

Icon.: BK 422; CD 380; Galli p.79; KL 193; Lge 29B; Nyl p.245; RH p.291; Riva88, 10; SNS p.142.

Ecol. & Distr.: In spruce and spruce-mixed forests, especially in oligo-mesotrophic boreal, mesotrophic boreal, eutrophic boreo-nemoral, eutrophic paludifying, oligotrophic paludifying and drained peatland forests, at places abundantly, under *Picea abies*, July to October, very frequent, one of the most common Estonian agarics.

Voucher specimens studied: TAAM071718, 072563, 123675.

TRICHOLOMA LASCIVUM (Fr.: Fr.) Gillet, Les Hyménomycètes ou description de tous les champignons (fungi) qui croissent en France (Alençon): 111. 1874

Agaricus lascivus Fr.: Fr., Syst. mycol. (Lundae) 1: 110. 1821; *T. album* ss. auct. p.p.

Icon.: BK 423; Bres. 94; KM 265; Lge 27C; Chr&Noordel p.327; Phil p.112b; Riva88, 7; Ecol. & Distr.: In eutrophic alvar oak and oak-mixed forests, under *Quercus robur*, in North and West Estonia, August to October, rare, only 3 localities (Lääne-Viru Co., Rakvere; Lääne Co., Hanikatsi Islet; Pärnu Co., Mihkli).

Voucher specimens studied: TAAM144823, 177964, 197354.

Comments: real distribution poorly known because of the taxonomic confusion with *T. album*.

TRICHOLOMA MATSUTAKE (S. Ito & S. Imai) Singer, Annals mycol. 41 (1/3): 77. 1943

Armillaria matsutake S. Ito & S. Imai, Bot. Mag., Tokyo 39: 327 (1925); *T. nauseosum* (A. Blytt) Kytöv., Karstenia 28 (2): 69. 1989 [1988]; *T. caligatum* var. *nauseosum* (A. Blytt) Bon, Docums Mycol. 20 (no. 78): 38. 1990; *T. caligatum* ss. auct. pl. eur. p.p., auct. Est.

Icon.: Galli p.229, as *T. nauseosum*; Kytöv p.75, as *T. nauseosum*; Nyl p.23, as *T. nauseosum*; Riva03, 84, *T. nauseosum* f. *nauseosum*; SNS p.142.

Ecol. & Distr.: In oligotrophic boreal heath and oligo-mesotrophic boreal pine forests, under *Pinus sylvestris*, in North and West Estonia (only

three localities), August and September, rare. Voucher specimens studied: TAAM114555, 121651.

TRICHOLOMA PESSUNDATUM (Fr.: Fr.) Quél., Mém. Soc. Émul. Montbéliard, Sér. 2, 5: 77. 1872

Agaricus pessundatus Fr.: Fr., Syst. mycol. (Lundae) 1: 38. 1821.

Icon.: CettoEnz p.234; March 881.

Ecol. & Distr.: In coniferous forests, especially in sandy oligotrophic boreal heath and oligo-mesotrophic boreal pine forests, especially in *Cladina* boreal heath site type, under *Pinus sylvestris*, mainly in East and South Estonia, September to November, frequent.

Voucher specimens studied: TAAM075966, 123492; TU106420.

TRICHOLOMA POPULINUM J.E. Lange, Dansk bot. Ark. 8 (no. 3): 14. 1933

Icon.: BK 427; CD 408; CettoEnz p.236; Galli p.212-213; Lge 17D; March 884, *T. populinum* f. *populinum*; Nyl p.236; Riva88, 62; SNS p.143.

Ecol. & Distr.: In wooded meadows and mixed forests, also on bog ground, under *Populus tremula*, August to October, rather frequent.

Voucher specimens studied: TAAM144809, 144850, 145997.

TRICHOLOMA PORTENTOSUM (Fr.: Fr.) Quél., Mém. Soc. Émul. Montbéliard, Sér. 2, 5: 338. 1872

Agaricus portentosus Fr.: Fr., Syst. mycol. (Lundae) 1: 39. 1821.

Icon.: BK 428; CD 376; D p.240; Galli p.177-179; KL 191; Kriegl p. 563; Lge 19B; Nyl p.239; Phil 107f; RH p.288; Riva88, 47; Riva03, 54; SNS p.143.

Ecol. & Distr.: In coniferous, mainly sandy pine forests, especially in *Vaccinium vitis-idaea* and *Vaccinium myrtillus* oligo-mesotrophic boreal and *Oxalis* mesotrophic boreal site types, at places abundantly, under coniferous trees, August to November, mainly late in autumn by frost, very frequent.

Voucher specimens studied: TAAM124529, 146159.

TRICHOLOMA PSAMMOPUS (Kalchbr.) Quél., Mém. Soc. Émul. Montbéliard, Sér. 2, 5: 433. 1872

Agaricus psammopus Kalchbr., Icon. Sel. Hymenomyc. Hung. 12: tab.3. 1873.

Icon.: BK 429; CD 405; Galli p.182-183; KL 200; Kriegl p.537; Lge 21B; March 877; Phil 113d; RH p.287; SNS p.144.

Ecol. & Distr.: In forests, parks, allees, roads, under *Larix* spp., one find under *Pinus sylvestris* (in Hiiumaa Island), August and September, rather rare.

Voucher specimens studied: TAAM114615, 114794, 171641.

TRICHOLOMA SAPONACEUM (Fr.: Fr.) P. Kumm., Führ. Pilzk. (Zwickau):133. 1871, var. SAPONACEUM *Agaricus saponaceus* Fr., Observ. mycol. (Havniae) 2: 101. 1818; *A. saponaceus* Fr.: Fr., Linnaea 5: 721. 1830 (Syst. mycol. (Lundae) 3, Index: 40. 1832); *Tricholoma saponaceum* var. *atrovirens* (Pers.: Fr.) P. Karst., Rysslands, Finlands och den Skandinaviska Halföns. Hattsvampar: 36. 1879; *Tricholoma saponaceum* var. *napipes* (Krombh.) J.E. Lange, Synops. Queensl. Fl. 5: 51. 1890.

Icon.: BK 430, as *T. saponaceum*; CD 363, as *T. saponaceum*; D 255, as *T. saponaceum* var. *napipes*; Galli p.61, as *T. saponaceum*; KL 192, as *T. saponaceum*; Krgl p. 571, as *T. saponaceum*; Lge 25B, as *T. saponaceum* var. *napipes*; March 833, as *T. saponaceum*, 835, as *T. saponaceum* var. *napipes*; Phil 108c, as *T. saponaceum*; RH p.292, as *T. saponaceum*; Riva88, 1, as *T. saponaceum*; Riva03, 1a, 1b.

Ecol. & Distr.: In coniferous and mixed forests, especially in *Vaccinium vitis-idaea* and *Vaccinium myrtillus* oligo-mesotrophic boreal, *Oxalis* mesotrophic boreal and *Aegopodium* boreo-nemoral site types, also in eutrophic alvar forests, under coniferous and deciduous trees, August to November, by frost, very frequent.

Voucher specimens studied: TAAM123441, 146263.

T. SAPONACEUM var. SQUAMOSUM (Cooke) Rea, Brit. basidiomyc. (Cambridge): 227. 1922.

Agaricus saponaceus var. *squamosus* Cooke, Handbook of British Fungi, 2nd Edn: 33. 1884; *T. saponaceum* f. *ardosiacum* (Bres.) Bon, Docums Mycol. 4 (no. 14): 65. 1974.

Icon.: CD 364, as *T. saponaceum* f. *ardosiacum*; Galli p.63; KM 245; Lge 26C, as *T. saponaceum* var. *ardosiacum*; Nyl p.247; Phil p.109e; March 834; Riva88, 2, 3, as *T. saponaceum* f. *ardosiacum*; Riva 03, 2, 3, as *T. saponaceum* f. *ardosiacum*.

Ecol. & Distr.: In pine forests, under *Pinus sylvestris*, October, very rare; in Estonia only one find: Jõgeva Co., Saare, by Kaiu Lake, 8 Oct 1993, B. Kullmann.

Voucher specimens studied: TAAM146125.

TRICHOLOMA SAPONACEUM var. LAVEDANUM Rolland, Bull. Soc. mycol. Fr. 7: 95. 1891.

Agaricus boudieri Barla, Bull. Soc. mycol. Fr. 3: 205. 1887; *T. boudieri* (Barla) Barla, Champ. Alpes-Mar: tab. 37. 1890.

Icon.: CD 365, as *T. boudieri*; Galli p.62; KM 246I; March 836, as *T. boudieri*; Riva88, 4; Riva03, 4.

Ecol. & Distr.: In coniferous forests, under coniferous trees, August, very rare; in Estonia only one locality: Tartu Co., Luunja, 11 Aug 1973, K. Kalamees.

Voucher specimens studied: TAAM082037.

TRICHOLOMA SCALPTURATUM (Fr.) Quél., Mém. Soc. Émul. Montbéliard, Sér. 2 (5): 232. 1872

Agaricus scalpturatus Fr., Epicr. syst. mycol. (Upsaliae): 31. 1838; ?*T. scalpturatum* var. *atrocinctum* Romagn., Bull. trimest. Soc. mycol. Fr. 90:

166. 1974; *T. argyraceum* ss. auct. p.p.

Icon.: BK 431; CD 396; Cetto p.292; D p.260; Galli, p.126, as *T. triste* var. *atrocinctum*; KL 195; March 852; Phil p.108a; Riva88, 24; Riva03, 34, as *T. scalpturatum* var. *atrocinctum*.

Ecol. & Distr.: In deciduous, coniferous and mixed forests, forest edges and roadsides, mainly in sparse grassy pine groves, in groups, often fasciculate, under deciduous and coniferous trees, May to November, rather rare.

Voucher specimens studied: TAAM113242, 121689, 123237, as cf. *T. scalpturatum* var. *atrocinctum*, 144831, 197372; TU106264.

Comments: A variety, *T. scalpturatum* var. *atrocinctum*, has been found in Estonia, but its systematic status is still indefinite: according to Galli (1999), it is *T. triste* var. *atrocinctus*, according to Riva (2003) – *T. scalpturatum* var. *atrocinctus*, according to Christensen & Noordeloos 1999, it is a forma of *T. argyraceum*.

TRICHOLOMA STANS (Fr.) Sacc., Syll. fung. (Abellini) 5: 94. 1887

Agaricus stans Fr., Hymenomyc. eur. (Upsaliae): 52. 1874; *T. albobrunneum* ss. auct. p.p; *T. pessundatum* ss. auct. p.p.

Ecol. & Distr.: In coniferous forests, under *Pinus sylvestris* and *Picea abies*, October, very rare, only one locality: Saare Co., Saaremaa Island, Leisi Comm., Triigi, 1 Oct 2007, V. Liiv.

Voucher specimens studied: TU106248.

Comments: real distribution of *T. stans* is poorly known because of the taxonomic confusion with *T. pessundatum* and *T. albobrunneum*.

T. stiparophyllum (S. Lundell) P. Karst., Meddn Soc. Fauna Flora fenn. 5: 42. 1879.

Agaricus stiparophullus S. Lundell, Monogr. Hymenomyc. Suec. (Upsaliae) 1: 29. 1857; *T. pseudoalbum* Bon, Bull. trimest. Soc. mycol. Fr. 85 (4): 486. 1970 [1969];

T. album ss. auct. p.p.

Icon.: BK 435; CettoEnz p.270, as *T. pseudoalbum*; Chr&Noordel p. 323; KL 202; Lge 27D, as *T. album*; March 842, as *T. pseudoalbum*; RH p.291, as *T. album*; Riva88, 9, as *T. pseudoalbum*; SNS p.145.

Ecol. & Distr.: In birch and birch-mixed forests, especially in eutrophic alvar, meso-eutrophic boreo-nemoral hillock, mesotrophic boreal, eutrophic boreo-nemoral, eutrophic paludifying and drained peatland forests, meso- to eutrophic boreo-nemoral wooded grasslands, under *Betula pendula* and *B. pubescens*, August to November, very frequent, at places abundantly; one of more common Estonian agarics.

Voucher specimens studied: TAAM072646, 124494, 197349.

TRICHOLOMA SUDUM (Fr.) Quél., Mém. Soc. Émul. Montbéliard, Sér. 2 (5): 340. 1873.

Agaricus sudus Fr., Epicr. syst. mycol. (Upsaliae): 38. 1838.

Icon.: Galli p.65; Lge 26D.

Ecol. & Distr.: In oligotrophic boreal heath and oligo-mesotrophic boreal pine forests, under *Pinus sylvestris*, October, very rare; only one find in Estonia: Põlva Co., Kiidjärve, 19 Oct 1969, M. Kask.

Voucher specimens studied: TAAM081530.

TRICHOLOMA SULPHURESCENS Bres., Annl. mycol. 3: 159. 1905

Icon.: BK 436; CD 366; Chr&Noordel p.325; CettoEnz p.264; Galli p.71; Krgl p. 573; March 838; Riva88, 6; SNS p.146.

Ecol. & Distr.: In eutrophic boreo-nemoral broadleaved deciduous forests, under deciduous trees, August, very rare; only one find in Estonia: Hiiu Co., Hiiumaa Island Landscape Reserve, Hanikatsi Islet, oak mixed forest, under *Quercus robur*, 24 Sept 2008, A. Bresinsky.

Voucher specimens studied: TU101436

TRICHOLOMA SULPHUREUM (Bull.: Fr.) P. Kumm., Führ. Pilzk. (Zwickau): 133. 1871

Agaricus sulphureus Bull., Herb. Fr. 4: tab. 168. 1784 [1783-84]; *A. sulphureus* Bull.: Fr., Syst. mycol. (Lundae) 1: 110. 1821; *T. sulphureum*

var. *coronaria* (Pers.) Sacc., Syll. Fung. (Abellini) 5: 112. 1887.

Icon.: BK 437; CD 381, 382, as *T. sulphureum* var. *coronaria*; CettoEnz p.260 (top); D p.248; Galli p.81; KL 197, 198; Korh&Kytöv. 4; Krgl p.574; Lge 25F; March 844; Nyl p.242; RH p.290; Phil 106a-b; Riva88, 11; Riva03, 12; SNS p.146.

Ecol. & Distr.: In deciduous and mixed forests, mainly in broadleaved forests in West-, North-Estonia and Islands, especially, in eutrophic *Aegopodium* boreo-nemoral oak forests, under deciduous trees, especially *Quercus robur*, August to November, rather rare.

Voucher specimens studied: TAAM073352, 073358, 080837, 144826.

TRICHOLOMA TERREUM (Schaeff.: Fr.) P. Kumm., Führ. Pilzk. (Zwickau): 134. 1871 *Agaricus terreus* Schaeff., Fung. Bavar. Palat 1: tab. 28. 1762; *A. terreus* Schaeff.: Fr., Syst. mycol. 3, Index: 44. 1832; *T. myomyces* (Pers.: Fr.) J.E. Lange, Dansk bot. Ark. 8 (no.3):21. 1933; *T. gausapatum* ss. auct. pl. p.p.

Icon.: BK 3, 438; CD 394, as *T. myomyces*; D p.263; Galli p.110; KL 196; Lge 21A, as *T. myomyces*; Phil 107g; Riva88, 18, as *T. myomyces*; Riv03, 17a, 19, as *T. myomyces*.

Ecol. & Distr.: In pine coniferous and pine mixed forests, especially in herb-rich forests, roadsides, in herb-rich young pine woods and pine groves, wooded heaths, in places abundantly, in large groups, under *Pinus sylvestris*, August to November, mainly late in autumn, very frequent; one of the most common agarics in Estonia.

Voucher specimens studied: TAAM123236, 143443, 185598.

Comments: According to the Estonian material, *T. terreum* is easily distinguishable from the closely related species *T. gausapatum*: pileus cuticle of *T. terreum* is grey or brownish-grey, velutinous-squamulosus or fibrillose-felty, lamellae rather white, angustate, narrowly emarginate, straight-edged, crowded, thin.

TRICHOLOMA TRISTE (Scop.) Quél., Mém. Soc. Émul. Montbéliard, Sér. 2 (5): 79. 1872

Agaricus tristis Scop., Fl. carniol., Edn 2 (Wien) 2: 483. 1772; *T. myomyces* var. *triste* (Scop.) J.E. Lange, Dansk bot. Ark. 8 (no. 3): 22. 1933. Ikon.: Galli p.127 (bottom); Riva03, 25.

Ecol. & Distr.: In deciduous and coniferous forests, September and October, very rare; only 2 localities: Lääne Co., Mihkli, oak forest, K.

Kalamees & G. Shtchukin; Saare Co., Saaremaa Island, Kaali, spruce forest, A. Kollom.

Voucher specimens studied: TAAM123348, 144821.

TRICHOLOMA ULVINENII Kalamees, Folia Cryptog. Estonica 38: 18. 2001

T. citrinum nom. prov. T. Ulvinen, ined.; *T. equestre* ss. auct. p.p.; *T. flavovirens* ss. auct. p.p. Icon.: Korh&Kytöv 2, as *T. flavovirens* s.l., *T. equestre* s.l.

Ecol. & Distr.: In sandy oligotrophic boreal heath and oligo-mesotrophic boreal pine forests, under *Pinus sylvestris*, September and October, rare. In Estonia three localities: Saare Co., Pammama, in *Vaccinium myrtillus* spruce-pine forest, 10 Oct 1966, K. Kalamees; Hiiuma Co., Hiiumaa Island, Kõrgessaare, Puski, in boreal pine heath forest, 14 Sept 2001, A. Kollom; Lääne-Viru Co., Lahemaa National Park, Kolga, Ulliallika, in *Cladina* boreal heath pine forest, 5 Oct 2009. Voucher specimens studied: TAAM076632, 128289, 197312.

Comments: *T. ulvinenii* has been described as a new species by the author: Koillismaa, Posio, Livojärvi, in sandy pine forest, 20.09.81, T. Ulvinen (OULU, holotypus; TAAM 122081, isotypus).

T. ulvinenii is a frequent fungus in boreal Finland and Lapland (see Kytövuori et al, 2005), but rare in South Finland, found by M. Korhonen, for example, at Uusimaa, Hanko in 1990 (H; M. Korhonen 10045).

The fungus was named after T. Ulvinen, Finnish botanist and mycologist, who was the first to show the author a fungus species with light yellow fruitbodies under the name *T. "citrinum"*, differing from *T. equestre*. *T. "citrinum"* was found at Koillismaa, near the Oulanka biological station in the *Vaccinium-vitis idaea* boreal and *Cladina* boreal heath forest site type on 9. 09. 1981 (TAAM122081).

The taxonomic problems of *T. equestre* and closely related species, *T. ulvinenii* and *T. frondosae* are discussed in Kalamees (2001a).

TRICHOLOMA USTALOIDES Romagn., Bull. Soc. nat. Oyonnax 8:76. 1954

Icon.: BK 440; CD 411; D p.229; Galli p.222–223; March 891; RH p.282; Riva88, 65; Riva03, 81.

Ecol. & Distr.: In eutrophic alvar oak forests, under *Quercus robur*, September, very rare, only one locality in Saaremaa Island: Saare Co., near Kuressaare, Loode, in oak forest, calciphilous,

13 Sep 1966, 5 Sep 1979, 24 Aug 1984, K. Kalamees.

Voucher specimens studied: TAAM076382, 120858, 123757.

TRICHOLOMA VACCINUM (Schaeff.: Fr.) P. Kumm., Führ. Pilzk. (Zwickau): 133. 1871

Agaricus vaccinum Schaeff., Fung. Bavar. Palat. 4: 13. 1774; *A. vaccinum* Schaeff.: Fr., Syst. mycol (Lundae) 1: 42. 1821; *T. vaccinum* var. *vaccinum*; *T. vaccinum* var. *fulvosquamosum* Bon, Bull. trimest. Soc. mycol Fr. 85 (4): 479. 1970 (1069).

Icon.: BK 441; CD 401; D p.238; Galli p.190–191; KL 189; Kriegl p. 543; Lge18A; Phil p.111e; RH 287; Riva88, 53; SNS p.147.

Ecol. & Distr.: In dry coniferous and mixed forests, especially in mesotrophic *Oxalis* boreal, eutrophic *Aegopodium* and *Hepatica* boreo-nemoral site types, under coniferous trees, August to November, frequent.

Voucher specimens studied: TAAM071883, 073305, 143435, as *T. vaccinum* var. *fulvosquamosum*, 147275.

TRICHOLOMA VIRGATUM (Fr.: Fr.) P.Kumm., Führ. Pilzk. (Zwickau): 134. 1871

Agaricus virgatus Fr., Observ. mycol. (Havniae) 2: 113. 1818; *T. virgatum* Fr.: Fr., Syst. mycol. (Lundae) 1: 48. 1821.

Icon.: BK 442; CD 387; D p.258; KL 194; Kriegl p. 557; RH p.293.

Ecol. & Distr.: In coniferous and mixed forests, especially in oligotrophic boreal heath, oligo-mesotrophic boreal, mesotrophic boreal and eutrophic alvar forests, especially in *Vaccinium vitis-idaea*, *Vaccinium myrtillus* and *Oxalis* site types, under *Picea abies* and *Pinus sylvestris*, August to November, very frequent, mainly in alvar spruce forests in Vormsi Island (Lääne Co.). Voucher specimens studied: TAAM128308, 141902, 172982, 171709 (det. M. Christensen).

TRICHOLOMA VIRIDILUTESCENS M. M. Moser, Fungorum Rariorum Icones Coloratae 7: 12-13. 1978 *T. subsejunctum* ss. Moser, Die Röhrlinge und Blätterpilze: 119. 1983 non ss. Peck 1912.

Icon.: CD 372; Galli p.160–161; Riva88, 39.

Ecol. & Distr.: In mesotrophic boreal and oligo-mesotrophic boreal coniferous and mixed forests, especially in *Oxalis* site type, under *Picea abies*, August and September, rare (4 localities). Voucher specimens studied: TAAM074681, 177752, 197237; TU 106550.

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