

# Diversity and distribution of aphylloroid fungi growing on Common Juniper (*Juniperus communis* L.) in Estonia

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**Abstract:** In the study we present a checklist of aphylloroid fungi growing on *Juniperus communis* in Estonia with the data of ecology, phenology and distribution. The paper summarizes results of study on 1026 specimens from fungus collections, and authors' observations. There are 104 species of aphylloroid fungi recorded growing on junipers in Estonia, 56 of them have only been found once. The most frequent species can be claimed to be *Peniophora junipericola*, followed in its frequency by *Amylostereum laevigatum*, *Hyphodontia juniperi*, *Hyphodontia alutaria*, *Basidioradulum crustosum* and *Hyphodontia arguta*. *Atheloderma mirabile* and *Sistotrema heteronemum* can be considered among rare species, which have only been found once in Estonia (also they are growing on juniper). Two species are listed in threat categories of the Estonian Red List: *Oxyporus philadelphii* and *Lindtneria trachyspora*. The former one is also protected by law in Estonia.

**Kokkuvõte:** Harilikul kadakal (*Juniperus communis* L.) kasvavate mittelehikseente mitmekesisus ja levik Eestis

Esitatakse Eestis harilikul kadakal (*Juniperus communis*) kasvavate mittelehikseente nimestik koos ökoloogiliste, fenoloogiliste ja levikuliste andmetega. Kirjutises on kokku võetud 1026 herbaareksemplari uurimise tulemused ja vaatlused. Eestist on kadakatel leitud kokku 104 liiki mittelehikseeni, neist 56 esinemist harilikul kadakal on meil täheldatud vaid korra. Kõige sagedasem kadakatel kasvav liik on kadakakirmik (*Peniophora junipericola*), sellele järgnevad *Amylostereum laevigatum*, *Hyphodontia juniperi*, *Hyphodontia alutaria*, *Basidioradulum crustosum* ja *Hyphodontia arguta*. Haruldasematest liikidest esinevad kadakal näiteks *Atheloderma mirabile* ja sistotreemi perekonda kuuluv liik *Sistotrema heteronemum*, mõlema esinemist on Eestis täheldatud vaid ühel korral. Kaks liiki, kadakatarjak (*Oxyporus philadelphii*) ja ogaeoseline ebapoorik (*Lindtneria trachyspora*), kuuluvad ka siinse Punase Nimestiku ohukategooriasse, lisaks öeldule on kadakatarjak meil looduskaitse all.

## INTRODUCTION

*Juniperus communis* is in Estonia (and in the other Baltic States) the only natural representative of the family Cupressaceae. *Juniperus communis* has the largest distribution of all the juniper species: it is the only one found in both the Eastern and Western Hemispheres (Adams, 2008). Almost 40 years ago, the area of juniper stands in Estonia was approximately 100,000 hectares, most of them were situating in Saaremaa Island (Kaar, 1965). However, this number may be overvalued and nowadays the situation has changed: some of the areas are forests now. According to recent data, this area is about 10,000 hectares (Kukk & Sammul, 2006).

The present article deals with two important life forms of aphylloroid macrofungi, including polypores and corticioids. 211 species of polypores are known to grow in Estonia (Parmasto, 2004). The number is slightly higher in Finland, viz. 230 species (Niemelä, 2005). The number

of corticioids in Finland is 422 (Kotiranta et al., 2009), while in Estonia it is slightly below 350. Most of the collections have been gathered from Norway Spruce (*Picea abies*) or from European Aspen (*Populus tremula*). Only some studies (Parmasto & Parmasto, 1992; Sell et al., 2011) focus particularly on aphylloroid fungi growing on juniper in Estonia; these deal with *Peniophora junipericola*. However, any up-to-date checklist of aphylloroid fungi growing on *Juniperus communis* in Estonia has not been published. The aim of the present study is to give an overview on the diversity and distribution of aphylloroid fungi growing on *Juniperus communis* in Estonia.

## MATERIALS AND METHODS

The study is based on specimens preserved at the fungal collection of the Institute of Ag-

ricultural and Environmental Sciences of the Estonian University of Life Sciences (TAAM) and on the reference fungal collection of Heikki Kotiranta (H. K.). The conventional methods for the mycological field work and light microscopy were used. The decay stage of the juniper twigs was estimated using a Renvall's (1995) five-point scale modified by Sell et al. (2011). Forest types were classified according to the Estonian forest site type groups (Paal, 1997; Lõhmus, 2004). However, eutrophic alvar forests were divided into two groups: eutrophic alvar forests and eutrophic alvar juniper shrublands. Also oligotrophic boreal heath forests were divided into two groups: oligotrophic boreal heath forests and oligotrophic boreal heath juniper shrublands. The collections and observations originate from the following forest type groups:

- eutrophic alvar forests;
- eutrophic alvar juniper shrublands;
- oligotrophic boreal heath forests;
- oligotrophic boreal heath juniper shrublands;
- oligo-mesotrophic boreal forests;
- mesotrophic boreal forests;
- eutrophic boreo-nemoral forests;
- eutrophic paludified forests;
- oligotrophic paludified forests.

The taxa in the species list are arranged in alphabetic order. Nomenclature follows the Index Fungorum (4 May 2011). The following data is given on each species: Latin name, data on the ecology, phenology, distribution and references to the specimens available in the fungal collections of TAAM or H. K. (reference fungal collection of Heikki Kotiranta).

## RESULTS

Altogether 1026 collections and observations were obtained in the study. 104 species were detected from Estonia; of them 56 species (53.8%) were found only once growing on juniper, and 12 species (11.5%) were discovered twice.

74 rare species (1–3 specimens or observations per species) make up 71.1% of all the species and 9.8% of all the observations, whereas 15 common species (over 10 observations) form 81.9% and the rest of the species (4–10 observations) 8.3%, respectively. The six common species include 61.9% of all observations.

## LIST OF SPECIES

AMPHINEMA BYSSOIDES (Pers.) J. Erikss.

46 records from *Juniperus communis*.

Basidiocarps seen from July to November; in eutrophic alvar forests, eutrophic alvar juniper shrublands, oligotrophic boreal heath forests, *Oligo-mesotrophic boreal forests*, mesotrophic boreal forests; in Hiiu, Järva, Lääne, Lääne-Viru, Põlva, Pärnu, Saare, Tartu, Võru Counties.

Substrate diameter: 0.2–4.5 cm (average 2.1 cm, N=39).

Decay stages: 1 (66.7%), 2 (25.6%), 3 (5.1%), 4 (2.6%), N=39.

AMYLOCORTICELLUM CREMEOISABELLINUM (Litsch.) Spirin & Zmitr.

Single record from *Juniperus communis*.

Basidiocarps seen in October; in Lääne-Viru County.

Voucher specimen studied: TAAM 009643.

AMYLOCORTICELLUM MOLLE (Fr.) Spirin & Zmitr.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar juniper shrubland; in Hiiu County.

Substrate diameter: 6.0 cm (N=1).

Decay stage: 3 (N=1).

Voucher specimen studied: HK 21916.

AMYLOSTEREUM LAEVIGATUM (Fr.) Boidin

110 records from *Juniperus communis*.

Basidiocarps seen from May to November; in eutrophic alvar forests, eutrophic alvar juniper shrublands, oligotrophic boreal heath forests, oligo-mesotrophic boreal forests and mesotrophic boreal forests; in Harju, Hiiu, Järva, Lääne, Lääne-Viru, Põlva, Pärnu, Rapla, Saare, Tartu, Valga, Viljandi, Võru Counties.

Substrate diameter: 0.3–6.0 cm (average 3.0 cm, N=29).

Decay stages: 1 (64.5%), 2 (25.8%), 3 (6.5%), 4 (3.2%).

ATHELIA EPIPHYLLA Pers.

Single record from *Juniperus communis*.

Basidiocarps seen in November; in oligotrophic boreal heath forest; in Lääne-Viru County.

Substrate diameter: 0.1 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21516.

ATHELIA PYRIFORMIS (M.P. Christ.) Jülich

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar juniper shrubland; in Hiiu County.

Substrate diametre: 3.0 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21914.

*ATHELODERMA MIRABILE* Parmasto

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar forest; in Rapla County.

Voucher specimen studied: TAAM 196155.

*ATHELOPSIS GLAUCINA* (Bourdot & Galzin) Oberw.  
ex Parmasto

Single record from *Juniperus communis*.

Basidiocarps seen in October; in eutrophic alvar juniper shrubland; in Saare County.

Substrate diametre: 2.0 cm (N=1).

Decay stage: 3 (N=1).

Voucher specimen studied: HK 21128.

*BASIDIODENDRON PINI* (H.S. Jacks. & G.W. Martin)  
Luck-Allen

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar forest; in Lääne County.

Substrate diametre: 1.5 cm (N=1).

Decay stage: 3 (N=1).

Voucher specimens studied: HK 21721.

*BASIDIODENDRON RADIANS* (Rick) P. Roberts

2 records from *Juniperus communis*.

Basidiocarps seen in November; in oligotrophic boreal heath forests; in Lääne-Viru County.

Substrate diametre: 2.0–3.0 cm (average 2.5 cm, N=2).

Decay stages: 1 (100%), 2 (0%), 3 (0%), 4 (0%), N=2.

Voucher specimens studied: HK 21512, HK 21526.

*BASIDIODENDRON RIMOSUM* (H.S. Jacks. & G.W. Martin) Luck-Allen

2 records from *Juniperus communis*.

Basidiocarps seen from October to November; in eutrophic alvar juniper shrublands; in Harju and Lääne Counties.

Substrate diametre: 1.5–2.5 cm (average 2.0 cm, N=2).

Decay stages: 1 (0%), 2 (50.0%), 3 (0%), 4 (50.0%), N=2.

Voucher specimens studied: HK 21205, TAAM 196086.

*BASIDIORADULUM CRUSTOSUM* (Pers.) Zmitr., Malyshva & Hjortstam

54 records from *Juniperus communis*.

Basidiocarps seen from July to November, once in May; in eutrophic alvar forests, eutrophic alvar juniper shrublands, oligotrophic boreal heath forests, oligo-mesotrophic boreal forests and mesotrophic boreal forests; in Harju, Hiiu, Lääne, Lääne-Viru, Rapla, Saare, Võru Counties. Substrate diametre: 0.3–7.0 cm (average 1.8 cm, N=46).

Decay stages: 1 (63.6%), 2 (27.3%), 3 (4.5%), 4 (4.5%), N=44.

*BJERKANDERA ADUSTA* (Willd.) P. Karst.

3 records from *Juniperus communis*.

Basidiocarps seen in October; in eutrophic alvar juniper shrublands; in Lääne County.

Substrate diametre: 6.0 cm (N=1).

Voucher specimens studied: TAAM 006957, TAAM 158351, TAAM 196581.

*BOTRYOBASIDIUM CANDICANS* J. Erikss.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in Rapla County.

Voucher specimen studied: TAAM 153639.

*BORTYOBASIDIUM SUBCORONATUM* (Höhn. & Litsch.)  
Donk

Single record from *Juniperus communis*.

Basidiocarps seen in September; in Järva County.

Voucher specimen studied: TAAM 164641.

*BOTRYOBASIDIUM VAGUM* (Berk. & M.A. Curtis)  
D.P. Rogers

6 records from *Juniperus communis*.

Basidiocarps seen from August to September; in mesotrophic boreal forests; in Lääne, Saare, Tartu and Valga Counties.

Substrate diametre: 1.4–1.5 cm (average 1.5 cm, N=2).

Decay stages: 1 (100%), 2 (0%), 3 (0%), 4 (0%), N=1.

Voucher specimens studied: TAAM 152705, TAAM 153705, TAAM 167224, TAAM 167362, TAAM 167364, TAAM 167837.

*BREVICELLICCIUM OLIVASCENS* (Bres.) K.H. Larss. & Hjortstam

9 records from *Juniperus communis*.

Basidiocarps seen from July to October; in eutrophic alvar juniper shrublands and oligotrophic boreal heath forests; in Harju, Hiiu, Lääne-Viru and Saare Counties.

Substrate diametre: 0.5–4.0 cm (average 2.2 cm, N=7).

Decay stages: 1 (14.3%), 2 (14.3%), 3 (71.4%), 4 (9.1%), N=7.

Voucher specimens studied: TAAM 052942, TAAM 105833, TAAM 196080 (HK 21478), TAAM 196090 (HK 21491), TAAM 196094 (HK 21497), HK 21498, HK 21512, HK 21943.

CABALODONTIA CRETACEA (Romell ex Bourdot & Galzin) Piątek

Single record from *Juniperus communis*.

Basidiocarps seen in September; in oligotrophic boreal heath forest; in Saare County.

Voucher specimen studied: TAAM 174226.

CERACEOMYCES SERPENS (Tode) Ginns

2 records from *Juniperus communis*.

Basidiocarps seen in October to November; in oligo-mesotrophic boreal forest; in Järva and Põlva Counties.

Substrate diametre: 2.5 cm (N=1).

Decay stages: 1 (100%), 2 (0%), 3 (0%), 4 (0%), N=1.

Voucher specimens studied: TAAM 164923, TAAM 201110.

CERACEOMYCES ELUDENS K.H. Larss.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in Harju County.

Voucher specimen studied: TAAM 153733.

CERATOBASIDIUM CORNIGERUM (Bourdot) D.P. Rogers

Single record from *Juniperus communis*.

Basidiocarps seen in September; in oligotrophic boreal heath forest; in Pärnu County.

Substrate diametre: 3.0 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21657.

CERIPORIOPSIS MUCIDA (Pers.) Gilb. & Ryvarden

2 records from *Juniperus communis*.

Basidiocarps seen in May and November; in eutrophic alvar forests; in Saare and Rapla Counties.

Voucher specimens studied: TAAM 003391, TAAM 101366.

CONIOPHORA ARIDA (Fr.) P. Karst.

12 records from *Juniperus communis*.

Basidiocarps seen from August to October; in eutrophic alvar juniper shrublands, oligotrophic boreal heath forests, mesotrophic boreal forests and eutrophic paludifying forests; in Hiiu, Lääne, Saare Counties.

Substrate diametre: 2.0–7.0 cm (average 3.4 cm, N=11).

Decay stages: 1 (36.4%), 2 (27.3%), 3 (27.3%), 4 (9.1%), N=11.

CONIOPHORA OLIVACEA (Fr.) P. Karst.

2 records from *Juniperus communis*.

Basidiocarps seen in September; in mesotrophic boreal forests; in Hiiu County.

Substrate diametre: 2.5–4.0 cm (average 3.3 cm, N=2).

Decay stages: 1 (0%), 2 (50.0%), 3 (50.0%), 4 (0%), N=2.

Voucher specimens studied: HK 21928, HK 21929.

CONIOPHORA PUTEANA (Schumach.) P. Karst.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar juniper shrubland; in Hiiu County.

Substrate diametre: 3.0 cm (N=1).

Decay stage: 3 (N=1).

Voucher specimen studied: HK 21902.

CONOHYPHA ALBOCREMEA (Höhn. & Litsch.) Jülich

Single record from *Juniperus communis*.

Basidiocarps seen in September; in Rapla County.

Voucher specimen studied: TAAM 153648.

CORTICIUM CONFINE Bourdot & Galzin

5 records from *Juniperus communis*.

Basidiocarps seen from September to October; in mesotrophic boreal forests and oligotrophic boreal heath forests; in Lääne and Saare Counties.

Substrate diametre: 1.5–4.0 cm (average 2.5 cm, N=5).

Decay stages: 1 (0%), 2 (60%), 3 (40%), 4 (0%), N=5.

Voucher specimens studied: HK 21061, HK 21069, HK 21958, HK 21972.

CRISTINIA HELVETICA (Pers.) Parm.

Single record from *Juniperus communis*.

Basidiocarps seen in August; in Saare County.

Voucher specimen studied: TAAM 167937.

GLOBULICIUM HYEMALE (Laurila) Hjortstam

Single record from *Juniperus communis*.

Basidiocarps seen in August; Valga County.

Voucher specimen studied: TAAM 167838.

GLOEOCYSTIDIELLUM POROSUM (Berk. & M.A. Curtis) Donk

Single record from *Juniperus communis*.

Basidiocarps seen in October; in mesotrophic boreal forest; in Tartu County.

Voucher specimen studied: TAAM 007111.

GLOIOTHELE CITRINA (Pers.) Ginns & G.W. Freeman  
28 records from *Juniperus communis*.

Basidiocarps seen from August to November; in eutrophic alvar forests, eutrophic alvar juniper shrublands, oligotrophic boreal heath forests, oligo-mesotrophic boreal forests, mesotrophic boreal forests, eutrophic paludifying forests; in Hiiu, Põlva, Saare Counties.

Substrate diametre: 1.0–9.0 cm (average 3.6 cm, N=24).

Decay stages: 1 (52.0%), 2 (24.0%), 3 (16.0%), 4 (8.0%), N=25.

HETEROBASIDIUM ANNOSUM (Fr.) Bref.

7 records from *Juniperus communis*.

Basidiocarps seen from September to November; in oligo-mesotrophic boreal forests and eutrophic alvar forests; in Põlva, Saare and Võru Counties.

Voucher specimens studied: TAAM 101913, TAAM 180295, TAAM 201134, TAAM 201142, TAAM 201143, TAAM 201144.

HYDNOCRISTELLA HIMANTIA (Schwein.) R.H. Petersen  
Single record from *Juniperus communis*.

Basidiocarps seen in October; in Tartu County.  
Voucher specimen studied: TAAM 118202.

HYPHODERMA ARGILLACEUM (Bres.) Donk

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar forest; in Rapla County.

Voucher specimen studied: TAAM 153651.

HYPHODONTIA ALUTARIA (Burt.) J. Erikss.

57 records from *Juniperus communis*.

Basidiocarps seen from September to November, also in July; in eutrophic alvar forests, eutrophic alvar juniper shrublands, oligotrophic boreal heath forests, mesotrophic boreal forests and once in oligotrophic bog forests; in Harju, Hiiu, Lääne, Saare Counties.

Substrate diametre: 0.5–6.0 cm (average 2.2 cm, N=55).

Decay stages: 1 (54.5%), 2 (38.2%), 3 (7.3%), 4 (0%), N=55.

HYPHODONTIA ARGUTA (Fr.) J. Erikss.

53 records from *Juniperus communis*.

Basidiocarps seen from July to November; in eutrophic alvar forests, eutrophic alvar juniper shrublands, oligotrophic boreal heath juniper

shrublands, mesotrophic boreal forests and eutrophic boreo-nemoral forests; in Harju, Hiiu, Lääne, Lääne-Viru, Rapla, Saare Counties.

Substrate diametre: 0.5–7.0 cm (average 2.2 cm, N=48).

Decay stages: 1 (53.8%), 2 (32.7%), 3 (13.5%), 4 (0%), N=52.

HYPHODONTIA ASPERA (Fr.) J. Erikss.

3 records from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar forests; in Hiiu County.

Substrate diametre: 5.0–7.0 cm (average 6.0 cm, N=3).

Decay stages: 1 (66.7%), 2 (33.3%), 3 (0%), 4 (0%), N=3.

Voucher specimens studied: TAAM 196194, TAAM 196195, TAAM 196199.

HYPHODONTIA BOREALIS Kotir. & Saaren.

2 records from *Juniperus communis*.

Basidiocarps seen in November; in oligotrophic boreal heath forest and oligo-mesotrophic boreal forest; in Lääne-Viru and Põlva Counties.

Substrate diametre: 0.5–2.0 cm (average 1.3 cm, N=2).

Decay stages: 1 (100%), 2 (0%), 3 (0%), 4 (0%), N=2.

Voucher specimens studied: HK 21522, TAAM 201120.

HYPHODONTIA BREVISETA (P. Karst.) J. Erikss.

4 records from *Juniperus communis*.

Basidiocarps seen from September to October; in mesotrophic boreal forests and oligo-mesotrophic boreal forests; in Harju, Hiiu, Järva and Saare Counties.

Substrate diametre: 1.5–3.5 cm (average 2.5 cm, N=2).

Decay stages: 1 (50.0%), 2 (50.0%), 3 (0%), 4 (0%), N=2.

Voucher specimens studied: TAAM 164643, TAAM 164808, HK 21085, HK 21953.

HYPHODONTIA CINERACEA (Bourdot & Galzin) J. Erikss. & Hjortstam

3 records from *Juniperus communis*.

Basidiocarps seen from September to October; in eutrophic alvar juniper shrublands; in Järva and Saare Counties.

Substrate diametre: 2.0 cm (N=1).

Decay stages: 1 (0%), 2 (50.0%), 3 (50.0%), 4 (0%), N=2.

Voucher specimens studied: TAAM 164608, TAAM 164742, HK 21161.

*HYPHODONTIA ERASTII* Kotir. & Saaren.

8 records from *Juniperus communis*.

Basidiocarps seen in November; in eutrophic alvar juniper shrublands and oligotrophic boreal heath forests; in Harju and Lääne-Viru Counties.

Substrate diametre: 0.3–2.0 cm (average 0.7 cm, N=8).

Decay stages: 1 (75.0%), 2 (25.0%), 3 (0%), 4 (0%), N=8.

Voucher specimens studied: TAAM 196085 (HK 21486), TAAM 196091 (HK 21492), TAAM 196093 (HK 21493), HK 21496, HK 21499, HK 21503, HK 21521, HK 21523.

*HYPHODONTIA HALONATA* J. Erikss. & Hjortstam

Single record from *Juniperus communis*.

Basidiocarps seen in September; in oligotrophic boreal heath forest; in Hiiu County

Substrate diametre: 3.5 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21959.

*HYPHODONTIA HASTATA* (Litsch.) & J. Erikss.

2 records from *Juniperus communis*.

Basidiocarps seen from September to November; in oligotrophic boreal heath forests; in Hiiu and Põlva Counties.

Substrate diametre: 3.5 cm (N=1).

Decay stages: 1 (100%), 2 (0%), 3 (0%), 4 (0%), N=1.

Voucher specimens studied: HK 21952, TAAM 069658.

*HYPHODONTIA JUNIPERI* (Bourdot & Galzin) J. Erikss. & Hjortstam

59 records from *Juniperus communis*.

Basidiocarps seen from August to November; in eutrophic alvar forests, eutrophic alvar juniper shrublands, oligotrophic boreal heath forests and mesotrophic boreal forests; in Harju, Hiiu, Lääne, Lääne-Viru, Saare Counties.

Substrate diametre: 0.5–6.0 cm (average 2.3 cm, N=52).

Decay stages: 1 (53.8%), 2 (32.7%), 3 (13.5%), 4 (0%), N=52.

*HYPHODONTIA PALLIDULA* (Bres.) J. Erikss.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in mesotrophic boreal forest; in Hiiu County.

Substrate diametre: 4.0 cm (N=1).

Decay stage: 3 (N=1).

Voucher specimen studied: HK 22014.

*HYPHODONTIA SAMBUCI* (Pers.) J. Erikss.

30 records from *Juniperus communis*.

Basidiocarps seen from September to November, also collected in May; in eutrophic alvar forests and eutrophic alvar juniper shrublands; in Harju, Hiiu, Lääne, Saare, Tartu Counties.

Substrate diametre: 0.2–6.0 cm (average 1.8 cm, N=29).

Decay stages: 1 (50.0%), 2 (39.3%), 3 (10.7%), 4 (0%), N=28.

*HYPHODONTIA SUBALUTACEA* (P. Karst.) J. Erikss.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in Rapla County.

Voucher specimen studied: TAAM 153642.

*HYPOCHNICIELLUM OVOIDEUM* (Jülich) Hjortstam & Ryvarde

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar juniper shrubland; in Hiiu County.

Substrate diametre: 0.5 cm (N=1).

Decay stage: 4 (N=1).

Voucher specimen studied: HK 21994.

*HYPOCHNICIUM EICHLERI* (Bres. ex Sacc. & P. Syd) J. Erikss. & Ryvarde

Single record from *Juniperus communis*.

Basidiocarps seen in November; in oligo-mesotrophic boreal forest; in Põlva County

Substrate diametre: 3.0 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: TAAM 201131.

*HYPOCHNICIUM LUNDELLI* (Bourdot) J. Erikss.

Single record from *Juniperus communis*.

Basidiocarps seen in October; in mesotrophic boreal forest; in Saare County.

Substrate diametre: 0.4 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21091.

*INTEXTOMYCES CONTIGUUS* (P. Karst.) Erikss. & Ryvarde

Single record from *Juniperus communis*.

Basidiocarps seen in July; in Lääne County.

Voucher specimen studied: TAAM 152396.

*LEPTOSPOROMYCES GALZINII* (Bourdot) Jülich

7 records from *Juniperus communis*.

Basidiocarps seen from September to November; in mesotrophic boreal forests, oligotrophic boreal heath forests, eutrophic alvar forests and oligo-mesotrophic boreal forests; in Hiiu, Lääne, Lääne-Viru, Põlva and Saare Counties.

Substrate diametre: 0.5–3.0 cm (average 1.4 cm, N=5).

Decay stages: 1 (75.0%), 2 (25.0%), 3 (0%), 4 (0%), N=4.

Voucher specimens studied: TAAM 167363, TAAM 167371, TAAM 167387, TAAM 196530, TAAM 201103, HK 21520, HK 21965.

LEUCOGYROPHANA ROMELLII Ginns

Single record from *Juniperus communis*

Basidiocarps seen in November; in eutrophic alvar juniper shrubland; in Harju County.

Substrate diametre: 2.0 cm (N=1).

Decay stage: 2 (N=1).

Voucher specimen studied: HK 21509.

LITSCHAUERELLA CLEMATITIS (Bourdot & Galzin) J. Erikss. & Ryvardeen

5 records from *Juniperus communis*.

Basidiocarps seen from July to November; in eutrophic alvar juniper shrublands, oligotrophic boreal heath juniper shrublands and mesotrophic boreal forests; in Harju, Lääne and Saare Counties.

Substrate diametre: 1.0–2.0 cm (average 1.4 cm, N=4).

Decay stages: 1 (0%), 2 (100%), 3 (0%), 4 (0%), N=4.

Voucher specimens studied: TAAM 166475, HK 21105, HK 21117, HK 21209, HK 21500.

MELZERICIUM UDICOLA (Bourdot) Hauerslev

Single record from *Juniperus communis*.

Basidiocarps seen in May; in Harju County.

Voucher specimen studied: TAAM 153897.

METULODONTIA NIVEA (P. Karst.) Parmasto

Single record from *Juniperus communis*.

Basidiocarps seen in October; in mesotrophic boreal forest; in Lääne-Viru County.

Voucher specimen studied: TAAM 04996.

MYCOLINTNERIA TRACHYSPORA (Bourdot & Galzin) Rauschert

4 records from *Juniperus communis*.

Basidiocarps seen from September to October; in eutrophic alvar juniper shrublands; in Lääne and Saare Counties.

Substrate diametre: 1.0–1.5 cm (average 1.3 cm, N=3).

Decay stages: 1 (66.7%), 2 (33.3%), 3 (0%), 4 (0%), N=3.

Voucher specimens studied: TAAM 180280, HK 21208, HK 21214, HK 21220.

OXYPORUS PHILADELPHI (Parmasto) Ryvardeen  
28 records from *Juniperus communis*.

Basidiocarps seen from July to October; in eutrophic alvar forests, eutrophic alvar juniper shrublands and oligotrophic boreal heath forests; in Harju, Hiiu, Lääne, Saare Counties. Substrate diametre: 0.5–6.0 cm (average 2.2 cm, N=20).

Decay stages: 1 (40.0%), 2 (45.0%), 3 (10.0%), 4 (5.0%), N=20.

PENIOPHORA JUNIPERICOLA J. Erikss.

302 records from *Juniperus communis*.

Collected in January, from April to November; in eutrophic alvar forests, eutrophic alvar juniper shrublands, oligotrophic boreal heath forests and mesotrophic boreal forests; in Harju, Järva, Lääne, Lääne-Viru, Pärnu, Rapla, Saare, Tartu, Viljandi Counties.

Substrate diametre: 0.2–5.0 cm (average 1.1 cm, N=291).

Decay stages: 1 (60.4%), 2 (28.7%), 3 (9.6%), 4 (1.4%).

PENIOPHORA PITHYA J. Erikss.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar forest; in Hiiu County.

Substrate diametre: 3.5 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 22006.

PENIOPHORELLA PALLIDA (Bres.) K.H. Larss.

2 records from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar juniper shrubland; in Hiiu County.

Substrate diametre: 3.0 cm (average 3.0 cm, N=2).

Decay stages: 1 (0%), 2 (50%), 3 (50%), 4 (0%), N=2.

Voucher specimens studied: HK 21903, HK 21910.

PENIOPHORELLA PRAETERMISSA (Bres.) K.H. Larss.

4 records from *Juniperus communis*.

Basidiocarps seen from August to November; in eutrophic alvar juniper shrublands; in Harju, Hiiu, Lääne and Saare Counties.

Substrate diametre: 1.5–7.0 cm (average 4.5 cm, N=3).

Decay stages: 1 (33.3%), 2 (33.3%), 3 (0%), 4 (33.3%), N=3.

Voucher specimens studied: TAAM 174077, TAAM 196089 (HK 21490), TAAM 196170.

PENIOPHORELLA PUBERA (Fr.) P. Karst.

3 records from *Juniperus communis*.

Basidiocarps seen from September to November; in eutrophic alvar juniper shrublands and mesotrophic boreal forests; in Harju, Pärnu and Saare Counties.

Substrate diametre: 2.0–3.0 cm (average 2.5 cm, N=2).

Decay stages: 1 (0%), 2 (50.0%), 3 (50.0%), 4 (0%), N=2.

Voucher specimens studied: TAAM 153748, HK 21067, HK 21505.

PHANEROCHAETE SORDIDA (P. Karst.) J. Erikss. & Ryvardeen

2 records from *Juniperus communis*.

Basidiocarps seen in June and September; in oligo-mesotrophic boreal forest and eutrophic paludifying forest; in Saare and Põlva Counties. Substrate diametre: 0.9 cm (N=1).

Decay stages: 1 (100%), 2 (0%), 3 (0%), 4 (0%), N=1.

Voucher specimens studied: TAAM 154288, TAAM 153977.

PHLEBIA SERIALIS (Fr.) Donk

Single record from *Juniperus communis*.

Basidiocarps seen in September; in Tartu County.

Voucher specimen studied: TAAM 167227.

PHYLLOPORIA RIBIS (Schumach.) Ryvardeen

Single record from *Juniperus communis*.

Basidiocarps seen in July; in Lääne County.

Voucher specimen studied: TAAM 095657.

PILODERMA BYSSINUM (P. Karst.) Jülich

11 records from *Juniperus communis*.

Basidiocarps seen from August to November; in eutrophic alvar juniper shrublands, oligotrophic boreal heath forests and oligo-mesotrophic boreal forests; in Hiiu, Saare, Tartu and Võru Counties.

Substrate diametre: 0.5–6.5 cm (average 3.1 cm, N=7).

Decay stages: 1 (100%), 2 (0%), 3 (0%), 4 (0%), N=7.

Voucher specimens studied: HK 21952, HK 21955, HK 21979, TAAM 166936, TAAM 167874, TAAM 169168, TAAM 201147, TAAM 201151, TAAM 201156, TAAM 201157.

PILODERMA LANATUM (Jülich) J. Erikss. & Hjortstam

Single record from *Juniperus communis*.

Basidiocarps seen in November; in oligo-mesotrophic boreal forest; in Põlva County

Substrate diametre: 4.5 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: TAAM 201140.

POROTHELEUM FIMBRIATUM (Pers.) Fr.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar forest; in Lääne-Viru County.

Voucher specimen studied: TAAM 196122.

POSTIA CAESIA (Schrad.) P. Karst.

4 records from *Juniperus communis*.

Basidiocarps seen from August to October; in mesotrophic boreal forests; in Hiiu and Saare Counties.

Substrate diametre: 2.0–3.0 cm (average 2.3 cm, N=3).

Decay stages: 1 (0%), 2 (33.3%), 3 (33.3%), 4 (33.3%), N=3.

Voucher specimens studied: TAAM 167792, HK 21089, HK 22018.

POSTIA FRAGILIS (Fr.) Jülich

Single record from *Juniperus communis*.

Basidiocarps seen in October; in eutrophic alvar juniper shrubland; in Saare County.

Substrate diametre: 4.0 cm (N=1).

Decay stage: 2 (N=1).

Voucher specimen studied: HK 21132.

POSTIA HIBERNICA (Berk & Broome) Jülich

Single record from *Juniperus communis*.

Basidiocarps seen in September; in oligotrophic boreal heath forest; in Saare County.

Voucher specimen studied: TAAM 174223.

POSTIA SERICEOMOLLIS (Romell) Jülich

3 records from *Juniperus communis*.

Basidiocarps seen from July to October; in eutrophic alvar juniper shrublands and eutrophic alvar forests; in Harju, Lääne and Saare Counties.

Substrate diametre: 6.0 cm (N=1).

Decay stages: 1 (66.7%), 2 (33.3%), 3 (0%), 4 (0%), N=3.

Voucher specimens studied: TAAM 100265, TAAM 184380, HK 21726.

RADULOMYCES CONFLUENS (Fr.) M.P. Christ.

17 records from *Juniperus communis*.

Basidiocarps seen from August to November; in eutrophic alvar juniper shrublands, oligo-mesotrophic boreal forests, oligotrophic boreal heath forests and mesotrophic boreal forests;



in Harju, Hiiu, Lääne, Lääne-Viru, Põlva, Saare, Tartu, Võru Counties.

Substrate diametre: 1.0–6.0 cm (average 2.4 cm, N=17).

Decay stages: 1 (71.4%), 2 (14.3%), 3 (0%), 4 (14.3%), N=14.

RESINICIUM BICOLOR (Alb. & Schwein.) Parmasto  
22 records from *Juniperus communis*.

Basidiocarps seen from August to November; in eutrophic alvar juniper shrublands, oligo-mesotrophic boreal forests, oligotrophic boreal heath forests and mesotrophic boreal forests; in Harju, Hiiu, Lääne, Lääne-Viru, Põlva, Saare, Tartu, Võru Counties.

Substrate diametre: 1.0–8.0 cm (average 3.1 cm, N=15).

Decay stages: 1 (71.4%), 2 (14.3%), 3 (0%), 4 (14.3%), N=14.

SEBACINA INCRUSTANS (Pers.) Tul. & C. Tul.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic boreo-nemoral forest; in Hiiu County

Substrate diametre: 2.0 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: TAAM 196475.

SISTOTREMA ALBOLUTEUM (Bourdot & Galzin) Bondartsev & Singer

Single record from *Juniperus communis*.

Basidiocarps seen in November; in oligo-mesotrophic boreal forest; in Põlva County.

Substrate diametre: 4.0 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: TAAM 201106.

SISTOTREMA BRINKMANNII (Bres.) J. Erikss.

Single record from *Juniperus communis*.

Basidiocarps seen in October; in mesotrophic boreal forest; in Saare County.

Substrate diametre: 2.0 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21060.

SISTOTREMA EFIBULATUM (J. Erikss.) Hjortstam

Single record from *Juniperus communis*.

Basidiocarps seen in October; in eutrophic alvar juniper shrubland; in Lääne County.

Substrate diametre: 1.5 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21204.

SISTOTREMA MUSCICOLA (Pers.) S. Lundell

Single record from *Juniperus communis*.

Basidiocarps seen in September; in oligotrophic

boreal heath forest; in Pärnu County.

Substrate diametre: 2.0 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21714.

SISTOTREMA OCTOSPORUM (J. Schröt. ex Höhn. & Litsch.) Hallenberg

Single record from *Juniperus communis*.

Basidiocarps seen in November; in oligotrophic boreal heath forest; in Lääne-Viru County.

Substrate diametre: 0.2 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21515.

SISTOTREMELLA PERPUSILLA Hjortstam

Single record from *Juniperus communis*.

Basidiocarps seen in October; in eutrophic alvar juniper shrubland; in Saare County.

Substrate diametre: 0.7 cm (N=1).

Decay stage: 3 (N=1).

Voucher specimen studied: HK 21106.

STECCHERINUM FIMBRIATUM (Pers.) J. Erikss.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in mesotrophic boreal forest; in Hiiu County.

Substrate diametre: 4.0 cm (N=1).

Decay stage: 3 (N=1).

Voucher specimen studied: HK 21927.

STYPELLA DUBIA (Bourdot & Galzin) P. Roberts

Single record from *Juniperus communis*.

Basidiocarps seen in October; in eutrophic alvar juniper shrubland; in Saare County.

Substrate diametre: 1.5 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21007.

SUBULICIUM LAUTUM (H.S. Jacks.) Hjortstam & Ryvarden

Single record from *Juniperus communis*.

Basidiocarps seen in September; in oligotrophic boreal heath forest; in Pärnu County.

Substrate diametre: 2.0 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21712.

THANATEPHORUS FUSISPORUS (J. Schröt.) Hauerslev & P. Roberts

13 records from *Juniperus communis*.

Basidiocarps seen from August to November; in eutrophic alvar juniper shrublands and mesotrophic boreal forests; in Harju, Hiiu, Lääne, Saare Counties.

Substrate diametre: 1.0–5.0 cm (average 2.0 cm, N=12).

Decay stages: 1 (50.0%), 2 (41.7%), 3 (8.3%), 4 (0%), N=12.

TRAMETES HIRSUTA (Wulfen) Lloyd

2 records from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar juniper shrublands; in Hiiu Counties.

Substrate diametre: 8.0 cm (average 8.0 cm, N=2).

Decay stages: 1 (100%), 2 (0%), 3 (0%), 4 (0%), N=2.

Voucher specimen studied: HK 21922.

TRECHINOTHUS SMARDAE (Pilát) E.C. Martini & Trichies

4 records from *Juniperus communis*.

Basidiocarps seen from September to October; in eutrophic alvar juniper shrublands and mesotrophic boreal forests; in Hiiu, Lääne and Saare Counties.

Substrate diametre: 0.5–6.0 cm (average 2.5 cm, N=3).

Decay stages: 1 (50%), 2 (25%), 3 (0%), 4 (25%), N=4.

Voucher specimens studied: TAAM 196584, HK 21167, HK 21170, HK 21926.

TRECHISPOA BYSSINELLA (Bourdot) Liberta

Single record from *Juniperus communis*.

Basidiocarps seen in November; in oligo-mesotrophic boreal forest; in Põlva County.

Substrate diametre: 5.0 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: TAAM 201100.

TRECHISPOA COHAERENS (Schwein.) Jülich & Stalpers

3 records from *Juniperus communis*.

Basidiocarps seen from September to October; in mesotrophic boreal forests and oligotrophic boreal heath forests; in Pärnu and Saare Counties.

Substrate diametre: 1.0–3.0 cm (average 1.8 cm, N=3).

Decay stages: 1 (33.3%), 2 (33.3%), 3 (33.3%), 4 (0%), N=3.

Voucher specimens studied: HK 21055, HK 21092, HK 21658.

TRECHISPOA FARINACEA (Pers.) Liberta

3 records from *Juniperus communis*.

Basidiocarps seen from July to September; in Saare County.

Voucher specimens studied: TAAM 101417, TAAM 154306, 167907.

TRECHISPOA STEVENSONII (Berk. & Broome) K.H. Larss.

Single record from *Juniperus communis*.

Basidiocarps seen in October; in mesotrophic boreal forest; in Saare County.

Substrate diametre: 1.5 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21066.

TRECHISPOA TENUICOLA (Litsch.) K.H. Larss.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in oligotrophic boreal heath forest; in Pärnu County.

Substrate diametre: 0.3 cm (N=1).

Decay stage: 3 (N=1).

Voucher specimen studied: HK 21699.

TUBULICRINIS CALOTHRIX (Pat.) Donk

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic paludifying forest; in Saare County.

Voucher specimen studied: TAAM 167392.

TUBULICRINIS CONFUSUS K.H. Larss. & Hjortstam

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic alvar forest; in Rapla County.

Voucher specimen studied: TAAM 153658.

TUBULICRINIS MEDIUS (Bourdot & Galzin) Oberw.

Single record from *Juniperus communis*.

Basidiocarps seen in August; in mesotrophic boreal forest; in Saare County.

Substrate diametre: 0.5 cm (N=1).

Voucher specimen studied: TAAM 174013.

TUBULICRINIS SORORIUS (Bourdot & Galzin) Oberw.

8 records from *Juniperus communis*.

Basidiocarps seen from September to October; in eutrophic alvar juniper shrublands, oligotrophic boreal heath forests and mesotrophic boreal forests; in Hiiu, Lääne, Saare Counties.

Substrate diametre: 0.8–3.5 cm (average 1.8 cm, N=8).

Decay stages: 1 (50.0%), 2 (12.5%), 3 (37.5%), N=8.

Voucher specimens studied: TAAM 152784, HK 21083b, HK 21145, HK 21168, HK 21174, HK 21178, HK 21210, HK 22022.

TYLOSPORA ASTEROPHORA (Bonord.) Donk

Single record from *Juniperus communis*.

Basidiocarps seen in November; in oligotrophic boreal heath forest; in Lääne-Viru County.

Substrate diametre: 1.0 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21524.

*TYROMYCES CHIONEUS* (Fr.) P. Karst.

Single record from *Juniperus communis*.

Basidiocarps seen in September; in eutrophic boreo-nemoral forest; in Ida-Viru County.

Voucher specimen studied: TAAM 002252.

*VARARIA CREMEOAVELLANEA* Pouzar

Single record from *Juniperus communis*.

Basidiocarps seen in November; in eutrophic alvar juniper shrubland; in Harju County.

Substrate diameter: 0.2 cm (N=1).

Decay stage: 1 (N=1).

Voucher specimen studied: HK 21506.

*VARARIA OCHROLEUCA* (Bourdot & Galzin) Donk

2 records from *Juniperus communis*.

Basidiocarps seen in October; in eutrophic alvar juniper shrublands and eutrophic alvar forests; in Rapla and Saare Counties.

Substrate diameter: 3.0 cm (N=2).

Decay stages: 1 (100%), 2 (0%), 3 (0%), 4 (0%), N=1.

Voucher specimens studied: TAAM 006963, HK 21173.

*XENASMATELLA VAGA* (Fr.) Stalpers

10 records from *Juniperus communis*.

Basidiocarps seen from August to November; in mesotrophic boreal forests, oligotrophic boreal heath forests, oligo-mesotrophic boreal forests and eutrophic paludifying forests; in Harju, Hiiumaa, Põlva, Pärnu, Saare and Viljandi Counties.

Substrate diameter: 0.5–4.0 cm (average 2.8 cm, N=7).

Decay stages: 1 (85.7%), 2 (14.3%), 3 (0%), 4 (0%), N=7.

*XYLODON PRUNI* (Lasch) Hjortstam & Ryvarde

2 records from *Juniperus communis*.

Basidiocarps seen from September to October; in eutrophic alvar forests; in Lääne and Rapla Counties.

Substrate diameter: 1.5 cm (N=1).

Decay stages: 1 (0%), 2 (0%), 3 (100%), 4 (0%), N=1.

Voucher specimens studied: HK 21723, TAAM 196529.

## DISCUSSION

*Peniophora junipericola* is the most common species of aphylloroid fungi found on juniper in Estonia (302 records in total). Its frequent occurrence is caused by wide ecological amplitude: the fungus can grow on thin as well as thick branches; on hard, newly dead branches, and on more or less decayed twigs (Sell et al., 2011). Although *Peniophora junipericola* is also found in Estonian inland, it is very rare there and does not grow in South Estonia. In southeastern and southern Estonia (Põlva, Valga and Võru Counties), *Amylostereum laevigatum* is the most common species growing on juniper. On average, *Peniophora junipericola* prefers thinner branch substrates (mean diameter 1.1 cm, n=291) than *Amylostereum laevigatum* (3.0 cm, n=29, respectively). *Amylostereum laevigatum* can be regarded as the most common wood-rotting fungus on junipers in Finland (authors pers. comm.). But in Estonia, it is three times less frequent than *Peniophora junipericola*.

In one case, *Phylloporia ribis* was reported growing on *Juniperus communis* in a juniper shrubland on a small islet of Kumarilaid in Matsalu Nature Reserve, Estonia. The identification of the host is doubtful, because *Phylloporia ribis* has never been found on conifers, e.g. in Finland (Niemi, 2005; Kotiranta et al., 2009). Likewise *Ribes alpinum* is a common plant on Kumarilaid Islet, and this might be a more probable host.

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