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Peniophora junipericola (Aphyllophorales, Corticiaceae): distribution and spore variability

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Peniophora junipericola J. Erikss. is a possibly xerothermic species. It is very common on the western islands of Estonia and near the Baltic Sea in Latvia, frequent in some eastern parts of Sweden, and rare or very rare elsewhere. The spore size and form do not differ significantly in specimens collected in Estonia, the Crimea, the Tianschan or other localities.

Key words: *Peniophora junipericola*, variability of basidiospores, xerothermic distribution.

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Peniophora is a genus with a rather large number of closely related species. For the differentiation of the related species incompatibility tests are sometimes essential, but it is also possible to find some micromorphological characters which enable distinction of sibling species in dry material.

One of the species is *Peniophora junipericola* J. Erikss., which was distinguished from *P. pithya* 40 years ago (Eriksson, 1950: 47, 52). It was found to be incompatible with *P. pithya* and is differentiated from that species by the lack of sulfocystidia, larger spores and rolling-off margins in older basidiocarps.

Host relationships and distribution

Most of the *Peniophora* species are specialized on the wood of one tree genus, but are sometimes found on others, too. In Europe *P. junipericola* has been found mainly on dead, still attached branches or dead trunks of *Juniperus communis*. In the Northwest Caucasus, in Spain and in the Crimea, it mainly inhabits *J. oxycedri*, but also grows on *J. excelsa* in the Crimea, and on *J. semiglobatus* in the Tianschan. The other *Peniophora* species found on *Juniperus communis* are *P. pithya* (in Sweden) and *P. cinerea* (Fr.) Cke. (in the Netherlands), but they are extremely rare on this substrate. *Amylostereum laevigatum* (Fr.) Boid. is ecologically similar to *P. junipericola*, but grows on trunks lying on the ground or at the base of dead trunks of *Juniperus*. *Peniophora junipericola* is found only exceptionally on such substrates in places where the species is very common (for example, on the island Vilsandi in Estonia).

Most of the Aphyllophorales which are known to have a distinctly limited distribution are either rare species or have been described recently and may be found in further places later. One of the few exceptions is *P. junipericola*, which has a well-defined area in North Europe, where it is very common, and a few scattered localities in Southwest Europe and Asia.

In Estonia (Fig. 1) this species is very common on the western islands, occurring on Saaremaa (Ösel), Hiiumaa (Dagö) and Muhu (Mohn), and the small islands Vilsandi (Felsland), Abruka (Abro), Vormsi (Worms) and Kessulaid; it is common on the West and Northwest Estonian mainland up to 50 km from the Baltic Sea, and scattered or in some places common in North Estonia near the Gulf of Finland (up to 25 km from the seashore). There are also a few scattered localities in Central Estonia, where only single specimens have been found. On the island Ruhnu, lying in the centre of Riga Bay, about 40 km from the mainland (Kolka Peninsula, Latvia), the fungus was found abundantly in the southwestern part, viz. in a *Juniperus* stand, damaged by fire and exposed to western winds, and was represented by

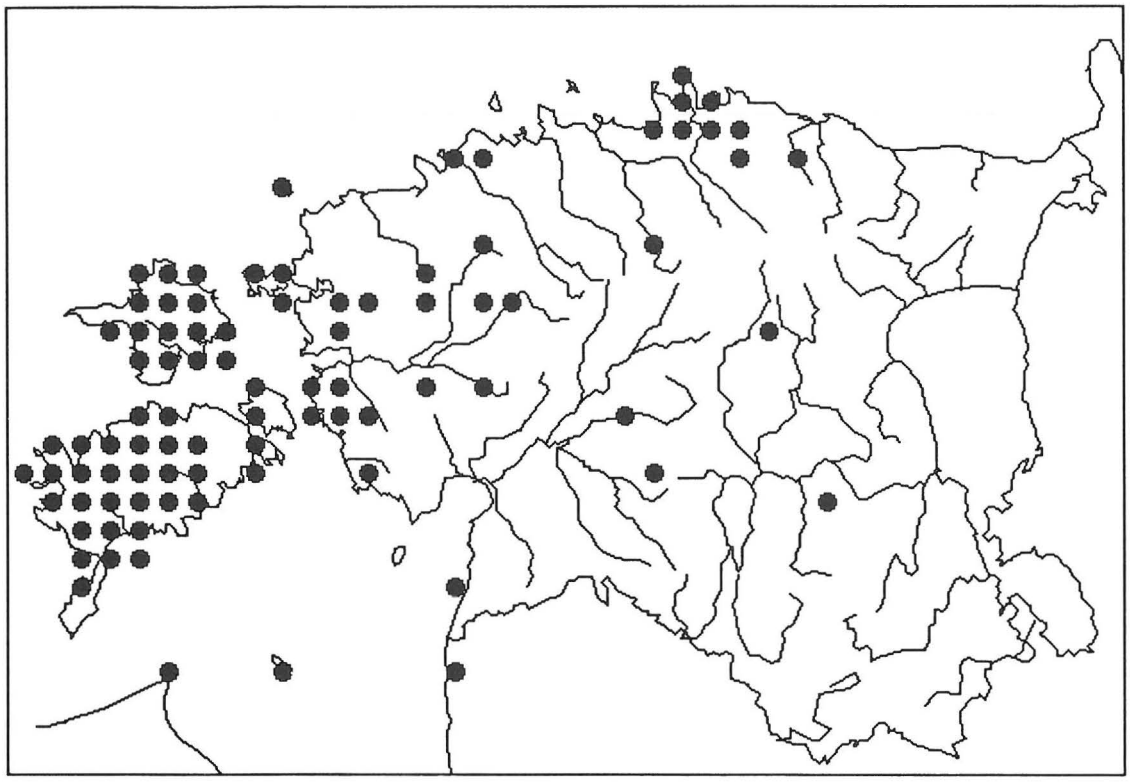

Fig. 1. The distribution of *Peniophora junipericola* in Estonia and North Latvia.

some rare specimens in other parts of the island. This distribution on Ruhnu possibly indicates that the species has colonized this small island fairly recently.

The most favorable places for the fungus in Estonia are dry pine forests, mainly of alvar type, with abundant stunted *Juniperus* trees up to 5 m tall. Near the seashore (up to 3 km from the sea) it may also be found on dry treeless alvars, on small *Juniperus* bushes.

In Estonia more than 1 000 square kilometers of the country are covered with *Juniperus* stands (Kaar 1965); the tree is more or less common all over Estonia, including several regions in the southeast, and dead bushes or trees are numerous everywhere. Consequently, the rather limited distribution of *P. junipericola* in Estonia is not caused by a lack of suitable substrata, but by some other factors.

In Latvia *P. junipericola* is more or less common near the Baltic Sea from Kolkasrags in the north to the Lithuanian boundary in the south. One locality is also known near Riga, not far from the shore of Riga Bay. In the interior of both Latvia and Estonia, however, the species has been searched for without result in many places and for many years.

In Sweden *P. junipericola* seems to be frequent in the eastern parts of the country from Blekinge to Uppland and on Öland and Gotland, and also by the great lakes of Central Sweden (Vänern, Mälaren, Hjälmaren). It is apparently much less frequent on the western coast of Sweden, where it has also been looked for (Eriksson, Hjortstam & Ryvarden 1978: 941).

In Finland the fungus has been found in the southwestern part of the country (Varsinais-Suomi), in Kustavi, Kiperluoto and in Kakskerta, Prinkkala.

In France the species has been found three times in the southeastern part and once in the southwestern part (Drôme, Vaucluse and Dordogne: J. Boidin *in litt.*).

In Spain the species has been mentioned only once (on *J. oxycedrus* near La Mierla, Guadalajara: García–Manjón & Moreno 1981). Surprisingly, it has also been collected in the Tianschan Mountains, NW

Table 1 (Right). Spores of *Peniophora junipericola*. No. = number of the herbarium specimen in TAA; Reg = region of locality: C – Crimea, E – Estonia, F – France, L – Latvia, S – Finland, T – Tianschan. Mean spore size: L = length, W = width, Q = length/width quotient, V = volume (cub µm), D = equivalent spore diameter in µm.

No.	Reg	L	W	Q	V	D
101327	E	8.86	2.87	3.09	51.1	4.61
105455	E	8.90	2.88	3.09	51.7	4.62
125779	E	9.03	2.93	3.08	54.3	4.70
104077	E	9.11	3.10	2.94	61.0	4.88
107238	E	9.17	2.83	3.24	51.7	4.62
LY8892	F	9.21	2.89	3.19	54.1	4.69
105403	L	9.29	3.02	3.08	59.3	4.84
52935	E	9.35	2.85	3.28	53.6	4.68
151720	C	9.36	3.21	2.92	67.1	5.04
104031	E	9.38	3.05	3.08	61.1	4.89
126530	S	9.39	2.94	3.20	57.1	4.78
105411	L	9.40	3.06	3.07	61.6	4.90
150559	E	9.41	3.07	3.07	62.1	4.91
112684	E	9.41	3.35	2.81	73.1	5.19
112684	E	9.41	3.35	2.81	73.1	5.19
125558	E	9.44	2.96	3.19	58.2	4.81
105466	E	9.49	3.03	3.13	61.2	4.89
T29836	S	9.54	2.97	3.22	59.2	4.84
150560	E	9.56	2.80	3.41	53.1	4.66
97443	E	9.68	3.35	2.89	75.5	5.24
97443	E	9.68	3.35	2.89	75.5	5.24
104042	E	9.69	3.44	2.82	79.4	5.33
104065	E	9.71	2.95	3.29	59.7	4.85
63574	T	9.73	3.02	3.23	62.5	4.92
105470	E	9.75	3.04	3.21	63.4	4.95
105398	L	9.77	2.99	3.27	61.6	4.90
52923	E	9.78	2.69	3.64	50.5	4.59
105407	L	9.78	2.89	3.38	57.8	4.80
105489	L	9.78	2.89	3.38	57.8	4.80
104001	E	9.79	3.05	3.21	64.1	4.97
104026	E	9.81	3.34	2.94	76.2	5.26
104014	E	9.89	3.20	3.09	71.0	5.14
151729	C	9.89	3.21	3.08	71.4	5.15
104078	E	9.93	3.17	3.13	70.0	5.11
104009	E	9.93	3.02	3.29	63.9	4.96
105469	E	9.95	3.06	3.25	65.7	5.01
104027	E	9.96	3.44	2.90	81.9	5.39
104033	E	9.96	3.04	3.28	64.9	4.99
105467	E	9.97	2.93	3.40	60.6	4.87
126436	E	10.01	3.07	3.26	66.5	5.03
52923	E	10.01	3.34	3.00	78.0	5.30
101959	E	10.03	2.87	3.49	58.7	4.82
105421	L	10.03	2.96	3.39	62.2	4.92
102837	E	10.05	3.17	3.17	71.0	5.14
126432	E	10.07	3.10	3.25	68.2	5.07
105464	E	10.13	3.04	3.33	66.2	5.02
105408	L	10.15	3.14	3.23	70.5	5.13
105409	L	10.16	3.05	3.33	66.8	5.03
112685	E	10.16	3.50	2.90	86.5	5.49
112685	E	10.16	3.50	2.90	86.5	5.49
151726	C	10.19	3.19	3.19	72.9	5.18
104024	E	10.21	3.29	3.10	77.5	5.29
105465	E	10.21	2.98	3.43	64.3	4.97
107270	E	10.32	2.88	3.58	61.0	4.88
100787	E	10.34	3.32	3.11	79.9	5.34
104016	E	10.36	3.34	3.10	81.0	5.37
104030	E	10.46	3.22	3.25	76.4	5.27
104017	E	10.46	3.53	2.96	90.9	5.58
52940	E	10.51	3.32	3.17	81.4	5.38
105402	L	10.69	3.05	3.50	70.7	5.13
105462	E	10.80	3.05	3.54	71.5	5.15
101779	E	11.02	3.59	3.07	99.4	5.75
102838	E	11.56	3.61	3.20	106.0	5.87

Caucasus (one sterile specimen) and on the Crimean peninsula, where it is common near Yalta, which is the only region of the Crimea studied by us.

The species has further been searched for in Norway, the Netherlands, West Germany, and many parts of the Soviet Union, but in vain.

Until we identified the specimens collected in the Crimea and Asia, we considered *P. junipericola* to be a representative of the subatlantic "floral" element. Most of the localities in Europe are situated in the region where the degree of phytogeographic oceanity is OC1 or in region OC2 near its boundary with OC1 (Jäger 1972). The localities in the Crimea, Caucasus and Tianschan, however, contradict such a conclusion. The distribution pattern of *P. junipericola* is much more similar to that of *xerothermic* species. The western islands of Estonia, where *P. junipericola* is common, are characterized by warm and dry summers, mild autumns and (compared with Central, East and South Estonia) fairly mild winters. However, the number of xerothermic Aphyllophorales is rather low in North and Central Europe; *Phellinus torulosus* (Pers.) Bourd. & Galz. seems to be the only species whose distribution has been studied in detail in this respect.

The specimens of *P. junipericola* (outside Estonia and Latvia) studied by us:

Finland. *Varsinais-Suomi:* Kakskerta, Prinkkala, Kokkila, on dead branches of Juniperus, 19.VII.1934 Lauri E. Kari ("Peniophora laevigata (Fr.) Massee ", TUR 29836). Kustavi, Kiparluoto, S margin of Riihivainio, 12.XI.1989 I. Parmasto (TAA 126530).

U.S.S.R. *Caucasus*: Regio Krasnodar, distr. Gelendzhik, Archipo–Ossipovka, ad ramum emortuum Juniperi oxycedri frequentissime, E. Parmasto 24.IX.1966 (TAA 18848). *Crimea*: Livadia, Juniperus excelsa, ad ramum emortuum, 25.V.1989 V.P. Isikov (TAA 151719, 151729); Juniperus oxycedrus, ad ramum emortuum, 25.V.1989 I. Parmasto (TAA 151713, 151720, 151726, 151727). *Kazakhstan*: montes Tianschanici, Zailiiski Alatau, apud vallim fluvii Turgen, Juniperus semiglobatus, A. Raitviir 20.VI.1976 (TAA 63574).

Variability of spores

We have taken 30 spore prints from freshly collected basidiocarps of *P. junipericola* to examine the variability of spore size and spore form in this species. In addition, spores from some herbarium specimens collected in France, the Caucasus and Finland were used. The spores were measured in 2 per cent KOH solution using an eyepiece micrometer at a magnification x 700; 50 spores were measured from each spore sample. The results are given in Table 1. The 90% expected tolerance limits of the means of all specimens and spore prints studied by us (calculated as described in Parmasto & Parmasto 1987) are as follows: L = 9.02–10.70 µm; W = 2.76–3.47 µm; Q = 2.85–3.50; D = 4.72–5.51 µm.

The spores of *P. junipericola* may be characterized as moderately variable: the coefficients of variability (CV) of mean spore length, width, length/width quotient and volume (transformed into equivalent sphere diameter D) are 5.1; 6.8; 6.1 and 5.5. According to the Chi-square test and Kolmogorov–Smirnov test, the distribution curves of all these four data sets are approximately normal. According to the analysis of variance, the spore size and form do not differ significantly between the groups of specimens collected in different parts of Estonia, the Crimea, the Tianschan, France or Finland. There are no remarkable differences in other morphological characters, either.

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