

The species of the former *Toninia coeruleonigricans* group in Estonia

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Abstract: The Estonian specimens originally named *Toninia coeruleonigricans* auct. (= *Toninia caeruleonigricans*), formally revised as *Toninia sedifolia* were checked again recently. Two species, *T. physaroides* (Opiz) Zahlbr. and *T. sedifolia* (Scop.) Timdal were recognized. A key for determination of sterile specimens of the closely related taxa *T. opuntiooides* (Vill.) Timdal, *T. physaroides* and *T. sedifolia* is provided.

Kokkuvõte: *Toninia coeruleonigricans* rühm Eestis

Vaadati üle Eestist kogutud varem sinakaks nappsamblikuks (*Toninia sedifolia*) määratud herbaareksemplarid. Osutus, et herbaariumis säilitatav materjal esindab tegelikult kaht nappsambliku (*Toninia*) liiki – *T. physaroides* (Opiz) Zahlbr. and *T. sedifolia* (Scop.) Timdal. Artiklis esitatakse kolme sarnase liigi (*T. opuntiooides* (Vill.) Timdal, *T. physaroides* ja *T. sedifolia*) steriilsete eksemplaride määramistabel.

INTRODUCTION

Two species of the genus *Toninia*, namely *Toninia sedifolia* (Scop.) Timdal and *T. verrucarioides* (Nyl.) Timdal, are currently known from Estonia. Specimens originally named *T. coeruleonigricans* auct. (= *T. caeruleonigricans*), formally revised as *T. sedifolia* were checked again recently in TU by the first author. The reexamination of the *T. sedifolia* specimens revealed that the material consisted of two species – *T. physaroides* and *T. sedifolia*. Both species grow in rather similar habitats, i.e. on calcareous grasslands (alvars) with thin soils, being members of the *Fulgensietum bracteatae* community (Paal, 1998). The species are usually associated with cyanophilic lichens, especially species of the genera *Leptogium* and *Collema* (Timdal, 1992; Ott et al., 1995). As the morphology of the thalli of the two species is quite similar, and one of the species, *T. physaroides*, remains often sterile, the distinction of these species is often difficult, especially in the field. Since the key to the *Toninia* species in the monograph of Timdal (1992) uses mainly apothecial characters, the identification of sterile thalli of these species is

almost impossible. Only studying the detailed species descriptions of the monograph led the first author to characters important for differentiating them. In this paper we (1) summarize all data available for the *T. physaroides* and *T. sedifolia* in Estonia and (2) present a simple key to three common European terricolous species with squamulose-bullate thallus – *T. opuntiooides* (Vill.) Timdal, *T. physaroides* and *T. sedifolia*.

MATERIAL AND METHODS

All specimens previously determined as *Toninia sedifolia* in TU, TBA, ICEB (40 specimens) and two additional specimens of *T. opuntiooides* from VBI were checked over using routine methods described in Jüriado et al. (2004). The lichen substances were determined with thin layer chromatography (TLC) method following the standard procedure (Orange et al., 2001) and using solvent system A. The lichen substances are only determined for chemical groups, since their chemical nature is not known precisely.

THE SPECIES

Key for squamulose-bullate European species of *Toninia*

1. Squamules bullate to columnar, green, olivaceous green, with pseudocyphellae (Fig. 1a); wall of the medullary hyphae 2–4(–5) µm (Fig. 2a); lichen substances absent. *Toninia physaroides*
 - Squamules more or less flattened, orbicular to irregularly lobed, more or less imbricate, olivaceous green to brown, without pseudocyphellae; wall of the medullary hyphae 1–1.5 µm (Fig. 2b); lichen substances present. 2
2. Squamules often flattened and widening towards end, imbricate (Fig. 1c), dark olivaceous to reddish brown, pruinose along and near the margin on both the upper and lower side. Unspecified lichen substance Y present, unspecified lichen substance C absent or present (TLC; Fig. 3). *Toninia opuntioides*
 - Squamules more or less flattened, orbicular to irregularly lobed, sometimes imbricate (Fig. 1b), olivaceous green to brown, often pruinose. Unspecified lichen substance Y absent, unspecified substance C present (TLC; Fig. 3). .. *Toninia sedifolia*

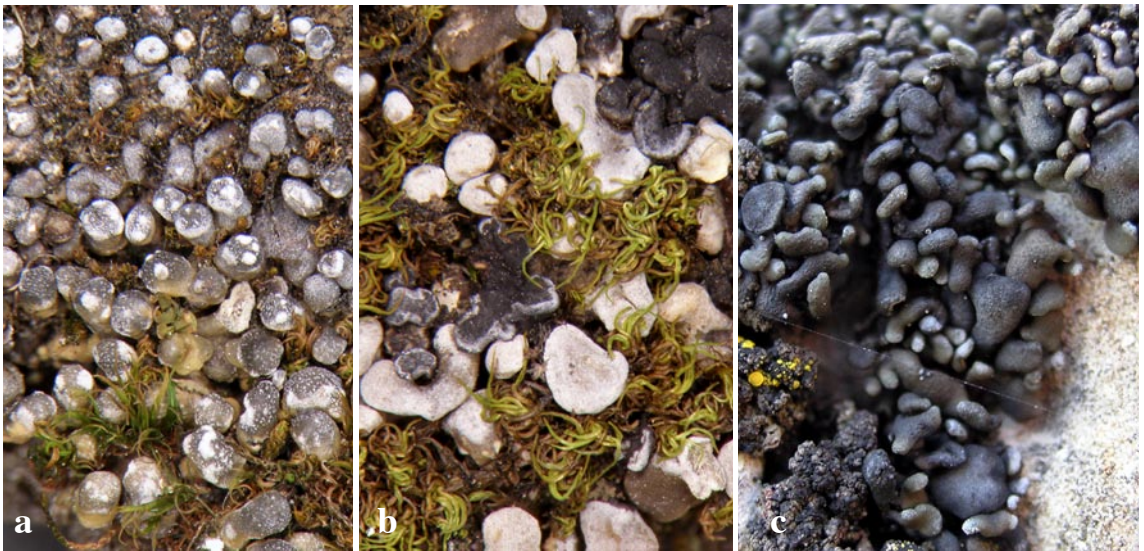


Fig. 1. a – *Toninia physaroides* (TU-38582, magnification 1×, photo A. Suija); b – *T. sedifolia* (TU-38592, magnification 1×, photo A. Suija); c – *T. opuntioides* (photo E. Farkas).

***Toninia physaroides* (Opiz) Zahlbr.**

Description. Thallus squamulose, squamules bullate to columnar, sometimes branched, scattered to contiguous (Fig. 1a), green, olivaceous green, epruinose to densely pruinose, usually with pseudocyphellae (the pseudocyphellae are not always clearly visible on pruinose thalli). Medullary hyphae thick-walled, the wall 2–4(5) µm wide (Fig. 2a). Apothecia rare, noted only at two specimens (TU-38585; L. Kannukene coll. no. 6214, TBA). Apothecia lecideine, black, marginate when young, epruinose; epithecium grey,

K+ violet, N+ violet; hypothecium colourless to pale brown; the rim of the true excipulum grey, the inner part colourless. Ascospores two-celled, fusiform; according to Timdal (1992) 11.5–18.5 × 3.5–5 µm (Estonian material 11–16 × 3–4 µm, n = 10).

Chemistry. Lichen substances usually absent; no substances is detected in Estonian specimens.

Distribution. Widely distributed in the Northern Hemisphere (Timdal, 1992); recorded from North- and West-Estonian islands in Estonia.

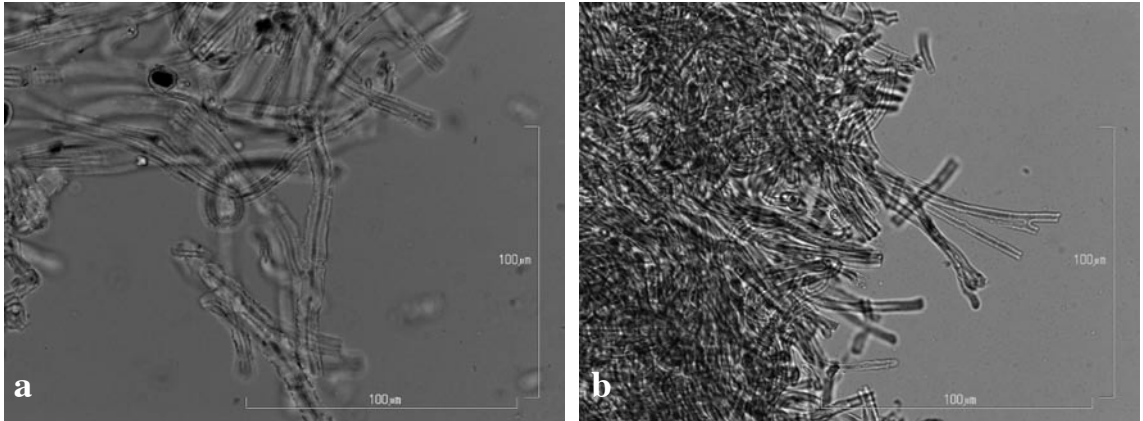


Fig. 2. Medullary hyphae (in Lactophenol Cotton Blue). a – *Toninia physaroides* (TU-32542, photo A. Suija); b – *T. sedifolia* (TU-38593, photo A. Suija).

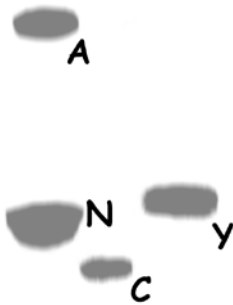


Fig. 3. Chromatogram (part) developed in solvent system A. From left to right: reference; *T. sedifolia* (TBA; Nilson, 1980); *T. opuntiooides* (VBI; Farkas & Lökös, 27 Aug 2006). N – norstictic acid; A – atranorin; C – lichen substance C; Y – lichen substance Y.

Specimens studied. Harju county, Suur-Pakri island (59°19'N 23°55'E), leg. H. Trass 14 July 1960 (TU); Väike-Pakri island (59°21'N 23°57'E), leg. H. Trass, 14 July 1960 (TU); Väike-Pakri island, northern part (59°21'N 23°57'E), on klint, leg. S. Pärn, 14 July 1960 (TU-38591); Väike-Pakri island (59°20'52"N 23°59'42"E), leg. A. Suija coll. no. 25, 29 July 2007 (TU); Pakri, leg. H. Trass, 14 July 1969 (TU); Hiiu county, Hiiumaa, island, at the road between Heltermaa and Suuremõisa (58°51'N 23°00'E), leg. collector unknown (TU-38579); Vahtrepa Landscape Reserve, Vohilaid islet, alvar at the ruins of the house (58°54'N 23°01'E), leg. A. Suija & I. Jüriado coll. no. 651, 7 July 2004 (TU-39241); Lääne county, Vormsi island, ca 1 km from Hullo towards Rumpo (58°58'N 23°15'E), beach barrier, leg. H. Trass 12 July 1960 (TU-38580); Osmussaar island, close to military barracks (59°17'N

23°22'E), leg. T. Randlane & I. Jüriado coll. no. 26, 28 July 1993 (TU-38590); Kirimäe (58°55'N 23°45'E), leg. P. Wasmuth, 1910 (TU-38578); Saare county, Saaremaa island, Asva alvar (58°25'N 23°00'E), leg. H. Trass, 19 June 1959 (TU); Saaremaa island, Asva (58°25'N 23°00'E), leg. H. Trass, 19 June 1959 (TU); Saaremaa, Saare, leg. S. Pärn, 19 June 1959 (TU); Saaremaa island, Karala (58°15'N 21°53'E), leg. H. Trass, July 1983 (TU-32541); Saaremaa island, Pilguse alvar (58°16'N 21°59'E), leg. H. Trass, 19 July 1983 (TU-32542); Saaremaa island, Tagamõisa peninsula, ca 1 km from Tagamõisa towards Veere (58°28'N 22°01'E), alvar pine forest, leg. H. Trass, 29 Aug 1991 (TU-38581); Saaremaa island, Sörve peninsula (58°00'N 22°05'E), leg. H. Trass coll. no. 146, July 1982 (TU-38582; TU-38583); Saaremaa island, Sörve peninsula, Kaugatoma cliffs, on mosses (together with *T. sedifolia*, leg. L. & J. Martin coll. no. 296 (ICEB); Saaremaa island, Sörve peninsula, Lõpe alvar (58°04'N 22°11'E), leg. T. Randlane coll. no. 7, 20 June 1983 (TU-38586); Saaremaa island, Võrsna alvar (58°24'N 22°45'E), leg. H. Trass, 23 June 1959 (TU); Same locality, leg. H. Trass, 1 July 1965 (TU-38584); Same locality, leg. T. Randlane coll. no. 294, 5 July 1980 (TU-38585); Saaremaa island, between the villages Reo and Kuusiku (58°19'N 22°39'E), alvar shrublands with junipers, on ground, leg. L. Kannukene coll. no. 6531, 3 May 1979 (TBA); Saaremaa island, from the road between Kuressaare (Kingissepa) and Kihelkonna ca 0.5 km towards Orikäla (58°19'N 22°19'E), gravel alvar, on ground, leg. L. Kannukene coll. no. 6221 and coll. no. 62141, 21 Aug 1979 (TBA); Undva peninsula, between village Tammese and Kehila (58°25'N 22°02'E), alvar shrublands with junipers, on ground, leg. L. Kannukene, 23 July 1966 (TBA); Saaremaa island, SW direction from the Asva stronghold (58°25'N 23°01'E), alvar shrublands with junipers, leg. L. Kannukene coll. no. 6581, 4 Oct 1979 (TBA); Saaremaa island, S direction from the Undu manor (58°28'N 23°10'E), alvar shrublands with

junipers, leg. L. Kannukene coll. no. 6679, 2 Oct 1979 (TBA); Muhumaa island, at the village Võiküla (58°33'N 23°23'E), on alvar grassland, leg. T. Randlane coll. no. 57, 14 June 1986 (TU-38587); Muhumaa island, Üügu cliffs (58°40'N 23°15'E), leg. A. Suija 30 May 2004 (TU-38589); Muhumaa island, between Rässä and Tümena (58°32'N 23°21'E), alvar shrublands with junipers, on ground, leg. L. Kannukene coll. no. 7588, 4 Aug 1979 (TBA); Muhumaa island, Kantsi village (58°35'N 23°14'E), alvar shrublands with junipers, on ground, leg. L. Kannukene coll. no. 7296, 4 Aug 1979 (TBA).

***Toninia sedifolia* (Scop.) Timdal**

Toninia caeruleonigricans auct., non (Lightf.) Th. Fr.

Description. Thallus squamulose, squamules imbricate, scattered to contiguous (Fig. 1b), olivaceous green to brown epruinose to densely pruinose, pseudocyphellae absent. Medullary hyphae with narrow wall, the wall 1(–1.5) µm wide (Fig. 2b). Apothecia common, lecideine, black, sometimes pruinose, marginate when young; epithecium grey, K+/- violet, N+/- violet (Estonian material exclusively K+ violet); hypothecium medium brown to dark reddish brown; excipulum uniformly coloured, medium to dark reddish brown. Ascospores two-celled, fusiform to narrowly fusiform, according to Timdal (1992), 12–24 × 3–5 µm (Estonian material 8–21.5 × 2.5–4 µm, n = 24).

Chemistry. Only lichen substance (chemotype) C, which is possibly a depside according to Timdal (1992) from the three chemotypes of the species has been detected in Estonian material. The lichen substance C forms a greenish grey spot (Rf class 3) in solvent system after treatment with sulphuric acid (Fig. 3).

Distribution. Widely distributed in both hemispheres (Timdal, 1992); recorded from seven scattered localities in northern part of Estonia and West-Estonian islands.

Specimens studied. Harju county, Vasalemma, Rummu old strip mine (59°13'N 24°12'E), leg. S. Pärn, 6 Aug 1960 (TU-38592); Vasalemma, old strip mine (59°13'N 24°12'E), leg. S. Pärn, 6 Aug 1960 (TU-38593); Saare county, Muhumaa island, exact locality unknown, leg. A. Bruttan (TU-38576); Muhumaa island, Üügu cliffs (58°40'N 23°14'E), alvar, leg. T. Randlane coll. no. 44, 12 June 1984 (TU-38588); Locality unknown, leg. A. Bruttan (TU-38577); Saaremaa island, from the road between Kuressaare (Kingsissepa) and Kihelkonna ca 0.5 km towards Oriküla (58°19'N 22°19'E), gravel

alvar, on ground, leg. L. Kannukene coll. no. 6221 and coll. no. 62141, 21 Aug 1979 (TBA); Saaremaa island, Sörve peninsula, Kaugatoma pank, on mosses (together with *T. physaroides*), leg. L. & J. Martin coll. no. 296, det. L. Martin (ICEB); Saaremaa island, Pilguse alvar (58°16'N 21°59'E), leg. H. Trass, 19 July 1983 (TU-32536); Vilsandi island (58°23'N 21°51'E), on ground, leg. E. Nilson, 7 Aug 1980 (TBA).

Specimens used for comparison.

Toninia opuntioides (Vill.) Timdal Hungary, Bükk Mts, Mt. Kemesnye-kő, 2 km SSE of Mályinka, S slope (48°08'02,2"N, 20°30'05,8"E), on calcareous rocks/soil, leg. E. Farkas & L. Lökös, 27 Aug 2006, det. E. Farkas (VBI; dupl. in TU); Vértes Mts, Mt. Kopasz-hegy, on S slope and plateau, c. 1.5 km W of Csákberény (47°20'55,8"N 18°18'41,6"E), on calcareous rocks/soil, leg. E. Farkas & L. Lökös, 19 Aug 2006, det. E. Farkas (VBI; dupl. in TU).

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