

Species within Orthotrichaceae family (Bryophyta) in the National Nature Reserves of northern Moravia and Silesia (Czech Republic)

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Abstract: The paper compares historical and recent records of bryophytes within Orthotrichaceae family recorded in 10 National Nature Reserves of north-eastern part of the Czech Republic. Field survey was carried out in 2013. Altogether 15 species of Orthotrichaceae family were recorded. For data comparison were used the collection efforts of the author, historical and recent herbarium specimens and the available historical literature.

Keywords: National Nature Reserve, *Nyholmiella*, *Orthotrichum*, *Ulota*, *Zygodon*, Czech Republic.

Introduction

The genus *Orthotrichum* Hedw. is a widespread moss group that includes approximately 155 species (Goffinet et al. 2007). Taxa belonging to this genus are found throughout the world, from the Arctic to the Antarctic, except in deserts and wet tropical forests. Species of the genus *Orthotrichum* grow on trees and rocks to a height of approximately 5000 m above sea level (Lewinsky 1993).

The studied areas of northern Moravia and Silesia are located in the northeastern part of the Czech Republic and the compared areas were National Nature Reserves (hereafter NNR), especially in Protected Landscape Areas Beskydy and Jeseníky, one of the Nature Reserves was located also in the Protected Landscape Area Poodří and the last one in the eastern tip of the Czech Republic, next to the town of Jablunkov. Altogether 10 areas were researched.

Overview of historical findings

The first data on the occurrence of mosses from *Orthotrichaceae* family in NNRs located in northern Moravia and Silesia were made by Josef Paul, at the end of the 19th century in 1896. One *Orthotrichum* species was mentioned by him: *O. speciosum*, from NNR Skřítek (Vondráček 1993). Altogether 15 members of the *Orthotrichaceae* family were described in the study areas, the ten of which were already described by the end of the 70's of the 20th century. Only the first collections are stated and they are ordered from the oldest to the newest: 1896 *O. speciosum* (cf. Vondráček 1993), 1900 *Ulota bruchii* (cf. Vondráček 1994), 1903 *O. pumilum* (cf. Číhal & Plášek 2012), 1904 *O. alpestre* (cf. Plášek 2007, Podpěra 1905, Šmarda 1952, Vondráček 1993), 1904 *O. patens* (cf. Vondráček 1993), 1904 *O. rupestre* (cf. Vondráček 1993), 1904 *Ulota crispa* (cf. Vondráček 1994), 1905 *O. stramineum* (cf. Číhal & Plášek 2012), 1916 *O. striatum* (cf. Vondráček 1993) and 1946 *Nyholmiella obtusifolia* (cf. Vondráček 1994).

Also some interesting literature data are known from the study areas, but they have not been successfully verified, thus they are not included in this study. These data include for example *Ulota coarctata* from the moorland in the area of Rejvíz or *Orthotrichum alpestre* collected by Laus in Velká Kotlina (Šmarda 1952). Some other species also include *O. tenellum* from NNR Mionší (Vězda 1955), *O. rupestre* from NNR Salajka (Kalmus & Niessl 1871) and *U. drummondii* from Rejvíz (Hein 1874).

Recent collections began in 2000 when the first contemporary collection is dated from the studied localities - *Orthotrichum stramineum* from NNR Čantorja (cf. Plášek & Stebel 2002). This is followed by next 10 species found in this period, ordered from the oldest to the newest and only the first collection is always stated: 2001 *O. pallens* (cf. Plášek 2011), 2002 *O. affine* (cf. Teichmanová 2004), 2002 *O. diaphanum* (cf. Teichmanová 2004), 2002 *O. pumilum* (cf. Teichmanová 2004), 2003 *Nyholmiella obtusifolia* (cf. Teichmanová 2004), 2003 *Ulota bruchii* (cf. Teichmanová 2004), 2005 *O. speciosum* (cf. Plášek 2005b), 2005 *O. striatum* (cf. Plášek 2005a, Plášek 2011, Plášek & Cimalová 2008), 2006 *Zygodon rupestris* (cf. Plášek 2011) and 2007 *O. anomalum* (cf. Číhal & Plášek 2012).

The last complete research was carried out in 2013 by the first author of the article and in total 6 species were recorded: *Orthotrichum affine*, *O. diaphanum*, *O. pallens*, *O. pumilum*, *O. speciosum* and *O. stramineum*.

Altogether 15 species were described from the studied areas from the *Orthotrichaceae* family in various time periods. The development of the number of collections in particular time periods as well as numbers of found and newly discovered species are given in graph No.1.

Out of the summary of historical and recent collections we can see evolution of the number of bryophytes in the studied areas, which culminates dramatically since 2000, mainly thanks to the efforts of Číhal, Plášek and Teichmanová. Summarizing historical sampling efforts of mosses, we can see four distinct peaks in the frequency of finding of *Orthotrichaceae* species recorded in studied localities. First three peaks between years 1900-1910, 1940-1950 and 1960-1970 can be explained by more intensive bryological survey carried out by Hruby, Laus, Matouschek, Milde, Paul and Podpěra in 1900-1910, by Duda, Jedlička, Pospíšil, Šmarda and Vlach in 1940-1950 and by Pospíšil and Šmarda in 1960-1970. Last peak represents recent bryological survey implemented mainly by Číhal, Plášek and Teichmanová (see Fig. 1.)

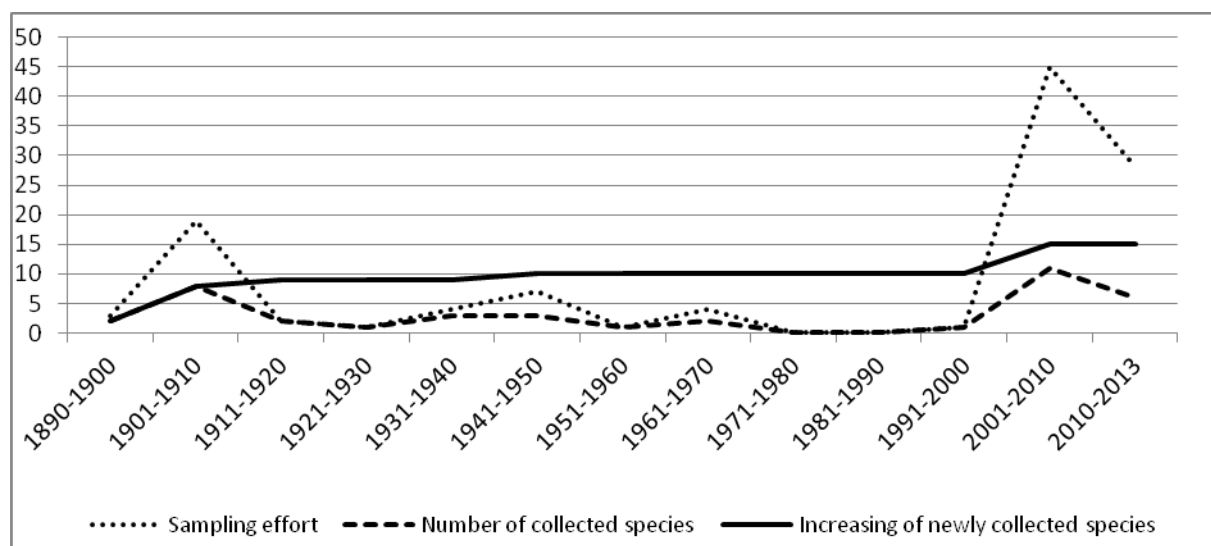


Fig 1: Summarization of historical and recent sampling efforts of mosses from *Orthotrichaceae* family in studied areas.

Methods

The excerption of the literature data together with the author's collection efforts and revision of the herbarium material (mainly from OP) was made in 2013, but research focused on family *Orthotrichaceae* in National Nature Reserves of northern Moravia and Silesia has been conducted continuously since 2000. For better summarizing of the information the database in MS Access was created. The most recent field survey was carried out in 2013 by the first author of the article.

In the List of localities there are always stated: name of the NNR, number of locality, type of locality, **H:** historical, **R1:** recent findings of different collectors (since 2000), **R2:** collections of the first author in 2013, name of the particular locality and, if available, the information on sea level and GPS position.

List of localities:

Čantoria National Nature Reserve

1 - R1 - Čantoria National Nature Reserve.

2 - R1 - Primeval forest on S slope of Velká Čantoryje Mt, 4 km NNE of Nýdek village; 900 m a.s.l.; GPS 49°40'35.3"N, 18°47'39.4"E.

Kněhyně - Čertův mlýn National Nature Reserve

3 - R1 - 400 m NNE of the top of Čertův Mlýn Mt. & 800 m SW of the top of Kněhyně Mt.; 1152 m a.s.l.; GPS 49°29'54.3"N, 18°18'14.3"E.

4 - R1 - Between Čertův Mlýn Mt. and Kněhyně Mt. valley of Kněhyňský potok stream; 1030 m a.s.l.; GPS 49°29'48.1"N, 18°18'39.9"E.

5 - H - Čertův mlýn Mt.; 650 m a.s.l.

6 - R1 - Primeval forest on Čertův mlýn hill; 1046 m a.s.l.; GPS 49°29'40.12"N, 18°18'4.28"E.

7 - R2 - Primeval forest on Čertův mlýn hill; 1199 m a.s.l.; GPS 49°29'49.261"N, 18°18'56.642"E.

8 - R1 - Upper part of Kněhyňský potok stream; 1108 m a.s.l.

9 - R2 - W edge of reservation, path to Pustevny; 1018 m a.s.l.; GPS 49°29'31.473"N, 18°17'17.086"E.

Mionší National Nature Reserve

- 10 - R1 - 400 m under spring area of Menší potok stream; 550 m a.s.l.; GPS 49°32'5.8"N, 18°39'95.2"E.
- 11 - R1 - E slope of Menší vrch hill; 700 m a.s.l.; GPS 49°32'1.6"N, 18°39'62.5"E.
- 12 - R1 - NE slope of Menší vrch hill; 850 m a.s.l.; GPS 49°32'12.6"N, 18°39'27.5"E.
- 13 - R2 - Primeval forest on top of Menší vrch hill; 884 m a.s.l.; GPS 49°32'17.917"N, 18°39'25.424"E.
- 14 - R1 - Top of Menší vrch hill, "Velká polana" meadow; 880 m a.s.l.; GPS 49°32'10.4"N, 18°39'29.9"E.
- 15 - R2 - Top of Mionší vrch hill, close to the cottage, loc. "Velká polana" meadow; 862 m a.s.l.; GPS 49°32'9.434"N, 18°39'21.206"E.

Polanská niva National Nature Reserve

- 16 - R1 - 1210 m W of Proskovice village, 1150 m SE of railway, S edge of Polanská niva National Nature Reserve; 221 m a.s.l.
- 17 - R1 - 2 km SE of Polanka nad Odrou village, valley of Odra river, edge of a forest; 205 m a.s.l.; GPS 49°45'66.7"N, 18°11'47.6"E.
- 18 - R1 - 2 km SE of Polanka nad Odrou village, valley of Odra river, edge of a forest; 205 m a.s.l.; GPS 49°45'88.9"N, 18°11'49.7"E.
- 19 - R1 - Polanka nad Odrou town, 330 m SSE of bridge across Odra river, N edge of reserve; 219 m a.s.l.
- 20 - R1 - Polanka nad Odrou town, 350 m S of bridge across Odra river, N edge of reserve; 219 m a.s.l.
- 21 - R1 - Polanka nad Odrou town, 420 m SE of bridge across Odra river, E edge of reserve; 219 m a.s.l.
- 22 - R1 - Polanka nad Odrou town, 470 m SSE of bridge across Odra river, E edge of reserve; 220 m a.s.l.
- 23 - R1 - Polanka nad Odrou town, 510 m S of a bridge across the Odra river, E edge of reserve; 220 m a.s.l.
- 24 - R1 - Polanka nad Odrou town, 960 m SE of a railway, 270 m SW of a road towards Stará Bělá village, NE edge of reserve; 220 m a.s.l.
- 25 - R2 - Polanka nad Odrou town, close to Malý Vaček pond; 220 m a.s.l.; GPS 49°45'50.502"N, 18°11'17.078"E.
- 26 - R2 - Polanka nad Odrou town, close to Velký Vaček pond; 217 m a.s.l.; GPS 49°46'10.259"N, 18°11'22.926"E.
- 27 - R2 - Polanka nad Odrou town, close to Zimní rybník pond; 218 m a.s.l.; GPS 49°46'6.465"N, 18°10'53.674"E.

Praděd National Nature Reserve

- 28 - H - Praděd Mt., Divoký důl valley; 1000 m a.s.l.
- 29 - H - Praděd Mt., loc. Mechová stráň.
- 30 - H - Praděd Mt., loc. Švýcarů.
- 31 - H - Praděd Mt.
- 32 - H - Praděd Mt., Velká kotlina corrie.
- 33 - H - Praděd Mt., Velká kotlina corrie; 1200 m a.s.l.
- 34 - R2 - Praděd Mt., Velká kotlina corrie; 1222 m a.s.l.; GPS 50°3'23.02"N, 17°14'19.08"E.
- 35 - R1 - Praděd Mt., Velká kotlina corrie, valley of Moravice stream.
- 36 - H - Velký máj mt.; 1000 m a.s.l.

Radhošť National Nature Reserve

- 37 - H, R1 - Area along upper part of Velký Škaredný potok stream valley.
- 38 - R1 - Primeval forest along a mountain ridge.
- 39 - R2 - Primeval forest along a mountain ridge; 1100 m a.s.l.; GPS 49°29'19.258"N, 18°13'34.319"E.

Rejvíz National Nature Reserve

- 40 - H - Rejvíz peat-bog.
- 41 - H - Rejvíz peat-bog; 750 m a.s.l.

Salajka National Nature Reserve

- 42 - R1 - 290 m NE of Bumbálka border settlement, edge of reserve; 862 m a.s.l.; GPS 49°24'2.9"N, 18°24'80.1"E.
- 43 - R1 - 380 m ENE of Bumbálka border settlement; 800 m a.s.l.; GPS 49°24'5."N, 18°24'50."E.
- 44 - H - Salajka Reserve; 780 m a.s.l.

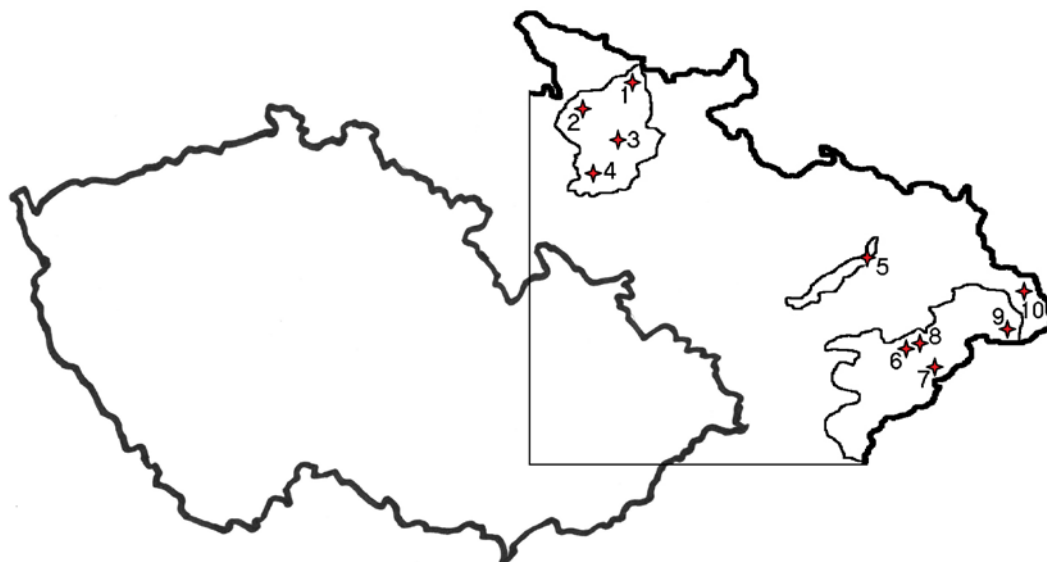
Skřítek National Nature Reserve

- 45 - H - Skřítek peat-bog; 900 m a.s.l.
- 46 - H - Skřítek peat-bog; 800 m a.s.l.
- 47 - H - Skřítek peat-bog; 880 m a.s.l.

Šerák – Keprník National Nature Reserve

- 48 - H - E slope of Šerák Mt. (towards Keprník Mt.); 1200 m a.s.l.
- 49 - H - Keprník mt.; 1400 m a.s.l.
- 50 - H - Path to Šerák mt.; 609 m a.s.l.
- 51 - R1 - SE slope of Šerák Mt., 300 m of cottage "Chata Jiřího"; 1256 m a.s.l.; GPS 50°11'52.9"N, 17°6'34.2"E.

- 52 - H - Šerák Mt., in the summit of the Mt.; 1350 m a.s.l.
 53 - H - Šerák mt., peak of the mountain; 1256 m a.s.l.
 54 - H - Šerák Mt.
 55 - H - Vozka rocks.



Map 1: Studied National Natural Reserves of northern Moravia and Silesia. **1.** Rejvíz, **2.** Šerák - Keprník, **3.** Praděd, **4.** Skřítek, **5.** Polanská niva, **6.** Radhošť, **7.** Salajka, **8.** Kněhyně – Čertův mlýn, **9.** Mionší, **10.** Čantoria.

A LIST OF RECORDED SPECIES

The taxa are given in alphabetical order. Numbers of localities are written in bold font and are increasing separately for historical (**H**), recent records different collectors since 2000 (**R1**) and the first author's collection efforts in 2013 (**R2**). The phorophyte species from which the moss specimens were collected is written in italic font. Sources of literature data are in brackets.

The nomenclature of bryophytes follows Kučera, Váňa & Hradílek (2012). Each species placed on the list contains threat status according to Kučera, Váňa & Hradílek (2012), which is presented in brackets after its Latin name.

Nyholmiella obtusifolia (Brid.) Holmen et E. Warncke [**LC**]:

- H:** 45 (leg. Šmarda J., 16.VII.1946, *Sorbus aucuparia*, BRNM, [Vondráček 1994])
R1: 14 (leg. Plášek, V., 29.VII.2005, det. Plášek, V., *Fagus sylvatica*, OP, [Plášek 2005a, Plášek 2011]);
 16 (leg. Teichmannová, Z., 5.VI.2003, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]);
 42 (leg. Plášek, V., 9.XII.2006, det. Plášek, V., *Fraxinus excelsior*, OP, [Plášek 2011])

Orthotrichum affine Schrad. ex Brid. [**LC**]:

- R1:** 1 (leg. Plášek, V., 20.IX.2013, det. Plášek, V., [Plášek 2013]); 14 (leg. Plášek, V., 29.VII.2005, det. Plášek, V., *Fagus sylvatica*, OP, [Plášek 2005a, Plášek 2011]); 20 (leg. Teichmannová, Z., 31.X.2002, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 38 (leg. Plášek, V., 2011, det. Plášek, V., [Plášek 2012])
R2: 9 (leg. Číhal L., 14.VIII.2013, *Acer* sp., OP); 25 (leg. Číhal L., 10.VIII.2013, *Fraxinus*, OP)

Orthotrichum alpestre Hornsch. ex Bruch et Schimp. [**CR**]:

- H:** 32 (leg. Podpěra J., VII.1904, [Plášek 2007, Podpěra 1905, Šmarda 1952])

***Orthotrichum anomalum* Hedw. [LC]:**

- R1:** 1 (leg. Plášek, V., 20.IX.2013, det. Plášek, V., [Plášek V. 2013]); 51 (leg. Číhal L., 6.X.2007, det. Plášek, V., *Acer pseudoplatanus*, OP, [Číhal & Plášek V. 2012])

***Orthotrichum diaphanum* Schrad. ex Brid. [LC]:**

- R1:** 16 (leg. Teichmannová, Z., 5.VI.2003, det. Teichmannová, Z., *Populus* sp., OP, [Teichmannová 2004]); 16 (leg. Teichmannová, Z., 5.VI.2003, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 16 (leg. Teichmannová, Z., 5.VI.2003, det. Teichmannová, Z., *Sambucus nigra*, OP, [Teichmannová 2004]); 17 (leg. Sovík, Z., X.2004, det. Plášek, V., *Salix viminalis*, OP, [Sovík 2004]); 19 (leg. Teichmannová, Z., 31.X.2002, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 20 (leg. Teichmannová, Z., 31.X.2002, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 21 (leg. Teichmannová, Z., 14.IX.2003, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 23 (leg. Teichmannová, Z., 25.X.2003, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 24 (leg. Teichmannová, Z., 18.VIII.2003, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004])
- R2:** 27 (leg. Číhal L., 10.VIII.2013, *Salix*, OP)

***Orthotrichum pallens* Bruch ex Brid. [LC]:**

- R1:** 1 (leg. Plášek, V., 20.IX.2013, det. Plášek, V., [Plášek 2013, Plášek]); 14 (leg. Plášek, V., 29.VII.2005, det. Plášek, V., *Fagus sylvatica*, OP, [Plášek 2005a, Plášek 2011]); 34 (leg. Kučera J., 3.VIII.2002, det. Kučera J., *Acer pseudoplatanus*, [Číhal & Plášek 2012]); 35 (leg. Zmrhalová M., 23.IX.2001, det. Zmrhalová M., *Acer pseudoplatanus*, [Plášek 2011]); 38 (leg. Plášek, V., 2011, det. Plášek, V., [Plášek 2012])
- R2:** 12 (leg. Číhal L., 2.XI.2013, *Fagus sylvatica*, OP); 15 (leg. Číhal L., 2.IX.2013, *Tilia* sp., OP); 27 (leg. Číhal L., 10.VIII.2013, *Salix* sp., OP); 34 (leg. Číhal L., 2.IX.2013, *Acer* sp., OP)

***Orthotrichum patens* Bruch ex Brid. [LR-nt]:**

- H:** 32 (leg. Podpěra J., VII.1904, PR, [Vondráček 1993])

***Orthotrichum pumilum* Sw. ex Anon. [LC]:**

- H:** 32 (leg. Hruby J., 28.III.1905, *Sorbus aucuparia*, *Picea abies*, [Číhal & Plášek 2012]); 32 (leg. Laus H., 24.III.1905, *Sorbus aucuparia*, *Picea abies*, [Číhal & Plášek 2012]); 41 (leg. Pospíšil, V., 7.VII.1966, Vondráček M., *Fraxinus excelsior*, BRNM, [Vondráček 1993]); 46 (leg. Paul J., 28.V.1903, det. Paul J., *Sorbus aucuparia*, *Picea abies*, PRC, SUM, [Číhal & Plášek 2012]); 53 (leg. Kalmus J., 9.VI.1938, det. Kalmus J., *Sorbus aucuparia*, *Picea abies*, BRNU, [Číhal & Plášek 2012]); 53 (leg. Podpěra J., 1.VIII.1905, det. Podpěra J., *Sorbus aucuparia*, *Picea abies*, PR, BRNM, [Číhal & Plášek 2012])
- R1:** 1 (leg. Plášek, V., 20.IX.2013, det. Plášek, V., [Plášek V. 2013]); 16 (leg. Teichmannová, Z., 5.VI.2003, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 20 (leg. Teichmannová, Z., 30.X.2002, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 20 (leg. Teichmannová, Z., 31.X.2002, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 22 (leg. Teichmannová, Z., 14.IX.2003, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 23 (leg. Teichmannová, Z., 25.X.2003, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 23 (leg. Teichmannová, Z., 25.X.2003, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 24 (leg. Teichmannová, Z., 18.VIII.2003, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 51 (leg. Číhal L., 6.X.2007, det. Plášek, V., *Salix* sp., OP, [Číhal L & Plášek 2012])
- R2:** 9 (leg. Číhal L., 14.VIII.2013, *Acer* sp., OP); 26 (leg. Číhal L., 10.VIII.2013, *Salix* sp., OP); 39 (leg. Číhal L., 15.VIII.2013, *Fagus sylvatica*, OP)

***Orthotrichum rupestre* Schleich. ex Schwägr. [VU]:**

- H:** 33 (leg. Podpěra J., VII.1904, PR, [Vondráček 1993])

***Orthotrichum speciosum* Nees [LC]:**

- H:** 30 (leg. Podpěra, J., 1.VI.1906, det. Vondráček, M., PR, [Vondráček 1993]); 31 (leg. Paul J., 2.VIII.1900, det. Paul J., *Acer* sp., PRC, SUM, BRNM, [Vondráček 1993]); 32 (leg. Schenk, F., 1.VIII.1933, det. Vondráček, M., OLM, [Vondráček 1993]); 40 (leg. Podpěra J., VII.1904, PR, [Vondráček M. 1993]); 41 (leg. Pospíšil, V., 7.VII.1966, *Fraxinus excelsior*, BRNM, [Vondráček M. 1993]); 44 (leg. Pospíšil, V., 26.VII.1968, BRNM, [Vondráček 1993]); 47 (leg. Paul J., 3.VIII.1896, *Sorbus aucuparia*, PR, [Vondráček 1993]); 47 (leg. Paul J., VIII.1905, PRC, SUM, [Vondráček 1993]);

- 47 (leg. Podpěra J., VIII.1909, PR, BRNM, [Vondráček 1993]); 47 (leg. Schenk, F., VIII.1930, PR, OLM, [Vondráček 1993]); 47 (leg. Schenk, F., VIII.1933, BRNM, OL, OP, [Vondráček 1993]); 47 (leg. Šmarda J., 16.VII.1964, BRNM, OP, [Vondráček 1993]); 50 (leg. Milde J., 4.II.1905, [Číhal & Plášek 2012]); 52 (leg. Kalmus J., sine dato, det. Kalmus, J., *Sorbus aucuparia*, BRNU, [Vondráček 1993]); 52 (leg. Podpěra, J., 1.VIII.1905, det. Podpěra, J., *Sorbus aucuparia*, PR, BRNM, [Vondráček 1993])
- R1:** 1 (leg. Plášek, V., 20.IX.2013, det. Plášek, V., [Plášek 2013]); 3 (leg. Plášek, V., 6.IX.2005, det. Plášek, V., *Sorbus* sp., OP, [Plášek 2005b, Plášek 2011]); 6 (leg. Plášek, V., 2005, det. Plášek, V., [Plášek 2005b]); 14 (leg. Plášek, V., 29.VII.2005, det. Plášek, V., *Fagus sylvatica*, OP, [Plášek 2005a, Plášek 2011]); 37 (leg. Plášek, V., 2011, det. Plášek, V., [Plášek 2012]); 38 (leg. Plášek, V., 2011, det. Plášek, V., [Plášek 2012]); 42 (leg. Plášek, V., 9.XII.2006, det. Plášek, V., *Malus domestica*, OP, [Plášek 2011]); 51 (leg. Číhal L., 6.X.2007, det. Plášek, V., *Acer pseudoplatanus*, OP, [Číhal & Plášek 2012])
- R2:** 9 (leg. Číhal L., 14.VIII.2013, *Acer*, OP)

***Orthotrichum stramineum* Hornsch. ex Brid. [LC]:**

- H:** 5 (leg. Jedlička J. 11.VIII.1950, BRNM, [Vondráček 1993]); 32 (leg. Laus H., 24.III.1905, *Sorbus aucuparia*, *Picea abies*, [Číhal & Plášek 2012]); 36 (leg. Šmarda J., 1.VIII.1949, det. Vondráček M., *Fagus sylvatica*, BRNM, [Vondráček 1993]); 37 (leg. Hruby J., 28.III.1905, *Sorbus aucuparia*, *Picea abies*, [Číhal & Plášek 2012]); 45 (leg. Šmarda J., 16.VII.1946, *Sorbus aucuparia*, BRNM, [Vondráček 1993]); 49 (leg. Matouschek F., 18.III.1905, *Acer* sp., [Číhal & Plášek 2012]); 55 (leg. Podpěra J., 27.III.1905, det. Hrubý J., *Sorbus aucuparia*, [Číhal & Plášek 2012])
- R1:** 1 (leg. Plášek, V., 20.IX.2013, det. Plášek, V., [Plášek V. 2013]); 2 (leg. Plášek, V., 21.IX.2000, det. Plášek, V., *Fagus sylvatica*, [Plášek & Stebel 2002]); 4 (leg. Plášek, V., 6.IX.2005, det. Plášek, V., *Acer pseudoplatanus*, OP, [Plášek 2005b, Plášek 2011]); 4 (leg. Plášek, V., 6.IX.2005, det. Plášek, V., *Fagus sylvatica*, OP, [Plášek 2005b, Plášek 2011]); 8 (leg. Plášek, V., 2005, det. Plášek, V., [Plášek 2005b]); 12 (leg. Sovík, Z., 16.VI.2004, det. Plášek, V., *Acer pseudoplatanus*, OP, [Plášek 2011]); 18 (leg. Sovík, Z., 8.X.2004, det. Plášek, V., *Salix fragilis*, OP, [Sovík 2004]); 38 (leg. Plášek, V., 2011, det. Plášek, V., [Plášek 2012]); 42 (leg. Plášek, V., 9.XII.2006, det. Plášek, V., *Malus domestica*, OP, [Plášek 2011]); 43 (leg. Plášek, V., 9.XII.2006, det. Plášek, V., *Fagus sylvatica*, OP, [Plášek 2011])
- R2:** 7 (leg. Číhal L., 14.VIII.2013, *Acer* sp., OP); 7 (leg. Číhal L., 14.VIII.2013, *Fagus* sp., OP); 13 (leg. Číhal L., 2.XI.2013, *Acer* sp., OP); 13 (leg. Číhal L., 2.XI.2013, *Tilia* sp., OP); 15 (leg. Číhal L., 2.XI.2013, *Tilia* sp., OP); 25 (leg. Číhal L., 10.VIII.2013, *Fraxinus excelsior*, OP)

***Orthotrichum striatum* Hedw. [LC-att]:**

- H:** 41 (leg. Schenk, F., VI.1916, det. Schenk, F., *Fraxinus excelsior*, OP, [Vondráček 1993])
- R1:** 14 (leg. Plášek, V., 29.VII.2005, det. Plášek, V., *Fagus sylvatica*, OP, [Plášek 2005a, Plášek 2011, Plášek & Cimalová 2008])

***Ulotia bruchii* Hornsch. ex Brid. [LC]:**

- H:** 32 (leg. Paul, J., 2.VIII.1900, det. Paul, J., *Acer* sp., BRNM, [Vondráček 1994]); 32 (leg. Podpěra, J., 8.V.1905, det. Podpěra, J., *Sorbus aucuparia*, PR, [Vondráček 1994])
- R1:** 4 (leg. Plášek, V., 6.IX.2005, det. Plášek, V., *Fagus sylvatica*, OP, [Plášek 2005b, Plášek 2011]); 11 (leg. Plášek, V., 28.VII.2005, det. Plášek, V., *Acer pseudoplatanus*, OP, [Plášek 2005a, Plášek 2011]); 16 (leg. Teichmannová, Z., 5.VI.2003, det. Teichmannová, Z., *Salix* sp., OP, [Teichmannová 2004]); 10 (leg. Plášek, V., 28.VII.2005, det. Plášek, V., *Acer pseudoplatanus*, OP, [Plášek 2005a, Plášek 2011]); 42 (leg. Plášek, V., 9.XII.2006, det. Plášek, V., *Salix caprea*, OP, [Plášek 2011])

***Ulotia crispa* (Hedw.) Brid. [LC]:**

- H:** 28 (leg. Duda, J., 16.X.1950, det. Duda, J., OP, [Vondráček 1994]); 28 (leg. Schenk, F., 1.VII.1933, det. Schenk, F., BRNM, [Vondráček 1994]); 28 (leg. Vlach, V., 1.VIII.1949, det. Vondráček, M., BRNM, [Vondráček 1994]); 29 (leg. Picbauer, R., 16.VII.1911, det. Vondráček, M., BRNM, [Vondráček 1994]); 40 (leg. Podpěra, J., 1.VII.1904, det. Vondráček, M., PR, [Vondráček 1994]); 48 (leg. Šmarda, J., 23.VI.1955, det. Vondráček, M., *Sorbus aucuparia*, BRNM, [Vondráček 1994]); 54 (leg. Pospíšil, V., 4.VII.1947, det. Pospíšil, V., *Sorbus aucuparia*, BRNM, [Vondráček 1994])

***Zygodon rupestris* Schimp. ex Lorentz [LR-nt]:**

- R1:** 43 (leg. Plášek, V., 9.XII.2006, det. Plášek, V., *Fagus sylvatica*, OP, [Plášek 2011])

Discussion

A total of 15 taxa have been found in the studied areas since 1896: *Nyholmiella obtusifolia*, *Orthotrichum affine*, *O. alpestre*, *O. anomalum*, *O. diaphanum*, *O. pallens*, *O. patens*, *O. pumilum*, *O. rupestre*, *O. speciosum*, *O. stramineum*, *O. striatum*, *Ulota bruchii*, *U. crispa* and *Zygodon rupestris*.

The greatest bryological activity can be observed mainly since 2000 due to the collections carried out by Číhal, Plášek and Teichmanová. Despite the fact that the areas are the nature reserves, the numbers of the bryophyte species from the Orthotrichaceae family are not very extraordinary compared to other localities of northern Moravia and Silesia. To a large extent this can be influenced by a composition of the species spectrum of the trees in these localities or also by the fact that most of them occur at a higher elevation. Still there are known rare or endangered bryophyte species coming from these areas: *Orthotrichum alpestre* (CR) - recorded by Podpěra in 1904 from Velká Kotlina (Plášek 2007, Podpěra 1905, Šmarda 1952) and after more than a hundred years discovered again, not far from the original locality by Plášek (Plášek 2007). Next two species are also recorded from Velká Kotlina in 1904, *Orthotrichum patens* (LR-nt) and *Orthotrichum rupestre* (VU) (Vondráček 1993), but their presence was not confirmed by the recent studies. Next species is *O. striatum* (LC-att) recorded by Schenk from Rejvíz in 1916 (Vondráček 1993) and rediscovered nearly ninety years later by Plášek in NNR Mionší (Plášek 2005a, Plášek 2011, Plášek & Cimalová 2008). Last species is *Zygodon rupestris* (LR-nt), found in 2006 by Plášek in NNR Salajka (Kučera 2006, Plášek 2011) and also found in Beskydy Mts before, near Nýdek village (Anonymus 1999).

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