

## High-altitude vegetation of the Western Carpathians – a syntaxonomical review

Ján KLIMENT<sup>1</sup>, Jozef ŠIBÍK<sup>2\*</sup>, Ivana ŠIBÍKOVÁ<sup>2</sup>, Ivan JAROLÍMEK<sup>2</sup>, Zuzana DÚBRAVCOVÁ<sup>3</sup>  
 & Jana UHLÍŘOVÁ<sup>4</sup>

<sup>1</sup>Botanical Garden of the Comenius University, SK-03815 Blatnica, Slovakia;  
 e-mail: kliment@rec.uniba.sk.

<sup>2</sup>Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 9, SK-84523 Bratislava, Slovakia;  
 e-mail: ivan.jarolimek@savba.sk, jozef.sibik@savba.sk, ivana.sibikova@savba.sk

<sup>3</sup>Department of Botany, Faculty of Sciences, Comenius University, Révová 9, SK-81102 Bratislava, Slovakia;  
 e-mail: dubravcova@fns.uniba.sk.

<sup>4</sup>Slovak National Museum-Natural History Museum, Vajanského nábrežie 2, P.O. Box 13, SK-81006 Bratislava 16, Slovakia;  
 e-mail: uhlirova@snm.sk.

**Abstract:** This paper presents a survey of high-altitude plant communities which occur in the Western Carpathians with an enumeration of the characteristic, transgressive and differential species of the individual alliances, orders and classes. It describes the tall-herb vegetation (*Mulgedio-Aconitetea*) and communities of the subalpine shrubs (*Betulo carpaticae-Alnetea viridis*), the montane and alpine calcareous swards (*Elyno-Seslerietea*), the wind-exposed cryophilous swards on ridge edges with low snow cover (*Carici rupestris-Kobresietea bellardii*), the chionophilous communities of snow beds and snow fields (*Salicetea herbaceae*), the arctic-boreal dwarf-shrub heathlands (*Loiseleurio-Vaccinietea*), the alpine acidophilous grasslands (*Caricetea curvulae*) and the high-mountain mat-grass swards of the alliance *Nardion strictae* (*Nardetea strictae*).

This study summarises the results of the syntaxonomical and nomenclatural revisions of various types of high-altitude vegetation in the Western Carpathians and the longstanding research in the field. The aim of this paper is to amass knowledge about the nomenclatural features, such as the synonyms, original diagnoses and nomenclatural types of the higher syntaxa in the Western Carpathians, that will be important and useful for a forthcoming vegetation survey of high-rank syntaxa of Europe (EuroChecklist). It reflects the current status of knowledge regarding the floristic composition and distribution of high-altitude (alpine) non-forest communities in Slovakia.

The fourth volume of *Plant Communities of Slovakia*, which discusses high-altitude vegetation, was recently published. This paper, however, contains some corrections and improvements to the concepts. It is presented in a compact form and in English, which makes it more accessible by international readership.

**Key words:** nomenclature; plant communities; syntaxonomy; vegetation survey

### Introduction

Alpine regions show strong gradients in abiotic conditions and contain highly specialised biota (Grabherr 1997). The specific conditions in high mountains have given rise to a diverse mosaic of vegetation types, with an abundance of rare, relic and endemic taxa. Rugged relief, heterogeneous bedrocks, and variable climatic and soil features all help to create an exceptional variety of habitats, including refugia that provide high-altitude plants with optimal conditions.

In the Western Carpathians, a detailed study of a group of vegetation units that are closely associated with high mountains and that occur mainly above the timberline began in the 1920s in the Tatry Mts (the highest mountains within the Carpathian moun-

tain range). In their pioneer studies, the Polish authors (Szafer et al. 1923, 1927; Pawłowski 1925, 1935; Pawłowski & Stecki 1927; Pawłowski et al. 1928, 1929) recorded a number of relevés from different alpine communities of the Tatry Mts. The Czech authors continued with this research (Domin 1929, 1930; Krajina 1933; Hadač 1956; Hadač et al. 1969; Šmarda et al. 1971; Unar et al. 1984, 1985), whereas many Slovak authors published valuable data later on, frequently as parts of manuscripts and theses (Dúbravcová et al. 1976, 1980, 1990; Šeffler et al. 1989; Dúbravcová 1996). Some vegetation research was also carried out in the Nízke Tatry Mts (Sillinger 1933; Miadok 1995), the Malá Fatra Mts and the Veľká Fatra Mts (Klika 1932; Grebenščikov et al. 1956; Bělohávková 1980; Kliment 1992), and in some other regions, e.g. Mt. Babia hora

\* Corresponding author

(Walas 1933). Numerous data have thus been scattered in partial and regional studies, diploma and dissertation theses, final reports, and other sources.

The study of the West Carpathian montane to sub-nival vegetation led to a complete overview of the high-altitude vegetation of Slovakia (Kliment & Valachovič 2007), forming part of the monographic series of the *Plant Communities of Slovakia*. In this publication it was impossible to present the whole synoptic table of higher syntaxa. In addition, further knowledge regarding the nomenclature was acquired after publication, and thus our study was required.

The overview of the high-altitude vegetation of the Western Carpathians (Kliment & Valachovič 2007) was preceded by the syntaxonomical revisions of the plant communities of the alliances *Petasition officinalis* (Kliment & Jarolímek 1995, 2002; Jarolímek et al. 2002), *Calamagrostion arundinaceae* (Kliment & Jarolímek 2003) and *Caricion firmae* (Šibík et al. 2004), orders *Calamagrostietalia villosae* and *Adenostyletalia alliariae* (Kliment et al. 2004) and classes *Elyno-Seslerietea* (Kliment et al. 2005a,b), *Carici rupestris-Kobresietea bellardii* (Petřík et al. 2005, 2006), *Loiseleurio-Vaccinietea* (Šibík et al. 2006, 2007a) and *Rosopendulinae-Pinetea mugo* (Šibík et al. 2005, 2010). In turn, this was preceded by parallel comparisons of the plant communities of several classes (Dúbravcová et al. 2005) in which previous knowledge was revised in the light of new methodological advances and new information about the diversity of the high-altitude vegetation in the surrounding mountain regions.

The aim of this paper has been to concentrate knowledge about the nomenclatural features, such as the synonyms, original diagnoses and nomenclatural types of the higher syntaxa occurring in the Western Carpathians, that will be important and useful for a forthcoming vegetation survey of high-rank syntaxa of Europe (EuroChecklist, cf. Mucina et al. 2009). This paper contains some corrections and improvements to the concepts published in Kliment & Valachovič (2007), and is presented in a compact form in English, which makes it more accessible by international readership.

## Material and methods

The data for the numerical analyses were obtained from the Slovak National Vegetation Database (Jarolímek & Šibík 2008; Šibíková et al. 2009) and from the private databases of the authors, stored in the Turboveg program (Hennekens & Schaminée 2001). All the relevés used have been collected according to the principles of the Zürich-Montpellier school (Braun-Blanquet 1964; Westhoff & van der Maarel 1978).

All the relevés were transformed into the nine-degree ordinal scale (van der Maarel 1979) in order to obtain data that could be compared by numerical classification. Taxa that were determined only at the genus level were excluded from the numerical analysis; some taxa were included in more broadly defined aggregates.

The numerical classification was performed with the NCLAS and HierClus programs from the SYN-TAX package (Podani 1993, 2001), whereas the arrangement of tables

and the unification of plant names were performed with the FYTOPACK program (Jarolímek & Schlosser 1997). The final synoptic table was defined on the basis of a numerical classification and was achieved in several steps. The extensive data sets comparing the vegetation data from several traditionally comprehended classes (*Elyno-Seslerietea* s. l. – including the stands on non-calcareous bedrock in the Belianske Tatry Mts and *Juncetea trifidi* sensu Mucina & Maglocký 1985) were analysed in the first step. The  $\beta$ -flexible method with coefficients for ratio scale data was used since the cover of individual species in the vegetation types has been of great importance. The results of these extensive analyses were published in several papers: Petřík et al. (2005, 2006) – the comparison of the plant communities of the classes *Carici-Kobresietea* and *Elyno-Seslerietea*; Dúbravcová et al. (2005) – *Caricetea curvulae*, *Loiseleurio-Vaccinietea*, *Carici-Kobresietea* and *Nardetea strictae*; Kliment et al. (2004, 2005a,b, partly unpublished) – *Elyno-Seslerietea*, *Mulgedio-Aconitetea*, partly *Festuco-Brometea* (stands with *Sesleria albicans*). As a next step, we analysed separately the inner variability of individual classes, most frequently at the alliance level. The presented synoptic table is hence the result of several subsequent numerical classifications. Vegetation units of the highest rank (classes) were analysed first, followed by the homogeneous units of lower rank (alliances). Outliers from the individual groups were removed from subsequent analysis.

The diagnostic taxa were chosen according to methods used in previous overviews of the plant communities of Slovakia (cf. Kliment & Valachovič 2007: 11, 17). The diagnostic taxa comprise characteristic taxa, differential taxa and constant taxa. The characteristic taxa represent the result of the comparison of floristic composition of all studied high-altitude plant communities (Table 1), with respect to previous opinions on their evaluation, as well as to the published data on the diagnostic taxa of another higher syntaxa (*Asplenietea trichomanis*, *Thlaspietea rotundifolii*, *Montio-Cardaminetea*; cf. Valachovič et al. 1995, 2001) and the long-term field experience of the authors of the fourth volume of *Plant Communities of Slovakia* (Kliment & Valachovič 2007). In special cases of syntaxonomically distant classes, the possibility of evaluation of one taxon as a characteristic of two syntaxa was allowed, e. g. for two distant alliances (or for the alliance and the class). The characteristic taxa are printed in bold in the synoptic table. The transgressive taxa (with the preference given to the syntaxon) are moreover printed with a rim. The differential taxa (shown in the synoptic table as underlined) differentiate the depicted syntaxon against other syntaxa of the same rank, within the first superior syntaxon [e. g. alliance within order]. The differential taxa of the orders are not, however, specified. Thus, one taxon can differentiate several alliances within the data set (Table 1) and be characteristic of a syntaxon, as well. Constant taxa are those that were present in more than 40 % of the relevés in the individual syntaxa (cf. Jarolímek and Šibík 2008). They are not highlighted in the synoptic table at all.

The descriptions of syntaxa are listed in descending order from class through the order to alliance. In some cases the association level follows the alliance level. The distribution of the relevés of the individual phytosociological classes of Slovakia is depicted with a map of Slovakia generated in DMAP software, version 7.2e (Morton 2005) – Figure 1. The order of the localities (orographical units) in the text (Dis-

tribution) has the West – East and North – South direction.

Syntaxonomical or nomenclatural notes (annotation), when necessary, complete the synopsis of the syntaxa. Important notes regarding the taxonomy of the constituent species and various opinions on the classification of a given syntaxon in the hierarchy are collected within these syntaxonomical notes.

The header of the synoptic table carries information on the number of relevés per given column and an average number of taxa in a community. In a given column, the constancy values of a taxon are expressed in percentage terms. The upper index accompanying the constancy values is indicative of the weighted average value of the cover/abundance of a taxon in a given column (in ordinal scale 1–9). The taxa in the table are grouped according to their diagnostic value. The sources of data (the number of relevés, the name of the author, the year of publication and the relevé number or the number of the table in the original source) for each particular column are identical to the sources of data published in Kliment & Valachovič (2007). The last column of Table 1, representing the alliance *Nardo-Agrostion tenuis*, was additionally incorporated only for comparison with the alliance *Nardion strictae* in order to highlight the differences between the most similar alliances of the class *Nardetea strictae*.

The nomenclature of the plants follows the checklist of Marhold & Hindák (1998); rare exceptions are added with the author's citation. The names of the subspecies in the synoptic table are abbreviated and marked by an asterisk (\*). The Arctic-alpine elements in the Table 1 were defined following the study by Šibíková et al. (2010); the endemic taxa are in accordance with the study by Kliment (1999).

The vegetation survey in our paper is organised as a structured text featuring the syntaxa in hierarchical order. The high-rank syntaxa (classes, orders, alliances) are followed by short English characteristics. The names of the syntaxa (following the *International Code of Phytosociological Nomenclature*, 3rd ed.: Weber et al. 2000) comprise synonyms, which are further subdivided into the categories of homotypical or nomenclature synonyms (Syn.) and syntaxonomic synonyms (Syntax. syn.). Both of these categories reflect the concept of a given syntaxon. Within information about the content of the syntaxon, the notes on the included communities of lower rank but of the same syntaxonomical meaning (Incl.) are available. Communities that were invalidly identified with an individual syntaxon are marked as pseudonyms (Pseud.). A special category represents the so-called 'phantom names' (*Phantomnamen*), the names assigned to some authors who did not use that name in the cited work (cf. Mucina 1993). We also report the original form of the name (OFN). The term 'Basionym' (Bas.) is used in the sense of Weber (2003: 402) and it specifies the original author's citation of a new name.

## Results and discussion

### *Syntaxonomy and nomenclature*

The syntaxonomy and nomenclature of the high-altitude plant communities have been solved as part of the vegetation survey of Slovakia (Kliment & Valachovič 2007). New syntaxonomy and nomenclature were recently uncovered, however, and are summarised as follows (the numbers adjacent to the syntaxa names are identical to those in the headers of Table 1):

### **1 *Mulgedio-Aconitetea* Hadač et Klika in Klika et Hadač 1944**

Tall-herb vegetation at high altitudes

Table 1, columns 1–8; Fig 1MU

**OFN:** *Mulgedio-Aconitea* Hadač-Klika 1944 (Klika & Hadač 1944: 283)

**Syn.:** *Betulo-Adenostyletea* Br.-Bl. et Tx. 1943 (Art. 8), *Betulo-Adenostyletea* Br.-Bl. in Br.-Bl. et al. 1947 (Art. 8), *Betulo-Adenostyletea* Br.-Bl. 1948 (Art. 3f), *Aconito-Cardaminetea* Hadač 1956 p. p. (Art. 25), *Stellario nemorum-Geranietea sylvatici* Niemann et al. 1973 (Art. 3b)

**Syntax. syn.:** *Galio-Urticetea* Passarge ex Kopecký 1969 p. p. (*Petasito-Chaerophylletalia*), *Nardo-Calamagrostietalia villosae* Jeník et al. 1980 p. p. (excl. *Nardion strictae*)

**Phantomname:** *Adenostyletea* Br.-Bl. et Tx. 1943 (Eggler 1952: 34)

**Nomenclatural type:** *Adenostyletalia* Br.-Bl. 1930, lectotypus (Jeník et al. 1980: 12)

**Annotation:** The name *Mulgedio-Aconitetea* Hadač et Klika in Klika 1948, which was accepted in several recent lists of syntaxa (e.g. Theurillat et al. 1994: 23, 1995: 223; Mucina 1997: 134; Malynovski & Kricsfalusy 2000: 141, 2002: 144; Kočí 2001: 295; Rivas-Martinez et al. 2001: 97; Kliment et al. 2007a: 24), turned out to be an earlier homonym. The original diagnosis of the name *Mulgedio-Aconitetea* was already validly published in the study by Klika & Hadač (1944: 283), where the authors (p. 257) noted the first valid publication of the name *Adenostyletalia* Br.-Bl. 1930 (Art. 2b, Note 1) by referring to the list of references in the study by Klika & Novák (1941). Hence we decided to use the older, widely-accepted name (cf. Kočí 2007: 91).

**Distribution:** Biele Karpaty Mts, Považský Inovec Mts, Javorníky Mts, Strážovské vrchy Mts, Kysucká vrchovina Mts, Oravské Beskydy Mts, Oravská vrchovina Mts, Lúčanská and Krivánska Malá Fatra Mts, Chočské vrchy Mts, Veľká Fatra Mts, Nízke Tatry Mts, Západné Tatry Mts, Vysoké Tatry Mts, Belianske Tatry Mts, Pieniny Mts, Spišská Magura Mts, Branisko Mts, Slovenský raj Mts, Kremnické vrchy Mts, Poľana Mts, Štiavnické vrchy Mts, Veporské vrchy Mts, Muránska planina Mts, Stolické vrchy Mts, Čergov Mts, Volovské vrchy Mts, Slovenský kras (inversion sites), Slanské vrchy Mts, Bukovské vrchy Mts

### **11 *Calamagrostietalia villosae* Pawłowski et al. 1928**

Tall-grass vegetation of high-altitude meadows

Table 1, columns 1–5

**OFN:** *Calamagrostidetalia villosae* (Pawłowski et al. 1928: 245)

**Syn.:** *Calamagrostietalia villosae* Pawłowski 1928 (Art. 8), *Calamagrostietalia arundinaceae* Eggler 1952 (Art. 8), *Calamagrostietalia arundinaceae* Rejmánek et Štursa in Sýkora et Štursa 1973 (Art. 8)

**Nomenclatural type:** *Calamagrostion villosae* Pawłowski et al. 1928, lectotypus (Art. 20; cf. Jeník et al. 1980: 9)













Table 1. (continued)

<sup>12</sup> *Kiaeria starkei* s. l. = *K. starkei* and *K. falcata* (cf. Dúbravcová 2007)

<sup>13</sup> nearly all suit the *Empetrum hermaphroditum* [*E. nigrum* subsp. *hermaphroditum* (Hagerup) Böcher]; due to the potential co-occurrence of *E. nigrum* and *E. hermaphroditum*, as well as of the hybrid species, we use the broadly defined taxa

<sup>14</sup> values marked with asterisk – *Sorbus aucuparia* subsp. *glabrata*

<sup>15</sup> incl. *Luzula multiflora*

reg. – diagnostic taxon from the regional point of view, in another area it should have different status or it does not occur

+ – occurrence with frequency lower than 0.5 %. [AA] – arctic-alpine taxon, [C] – Carpathian endemic, [Cs] – Carpathian subendemic, [CE] – East Carpathian endemic, [CW] – West Carpathian endemic, [CWs] – West Carpathian subendemic

**Annotation:** Hadač et al. (1969) previously indicated that there are two distinctly differentiated groups of plant communities recognisable within the alliance, differing in type of geological bedrock. The first group is formed by the communities of the alliances *Calamagrostion villosae* and *Trisetion fusci* (Table 1, columns 1, 2), and is differentiated primarily by the occurrence of *Agrostis pyrenaica*, *Carex* \**silicicola*, *Festuca picturata*, *Gentiana punctata*, *Luzula* \**obscura* and *Pulsatilla scherfelii*. The second group comprises the plant communities of the alliances *Calamagrostion arundinaceae*, *Calamagrostion variaae* and *Festucion carpaticae* (Table 1, columns 3–5) and is differentiated from the first group by the occurrence of many calciphilous and semi-calciphilous taxa, or species bound to sheltered, leeward sites: *Astrantia major*, *Bupleurum longifolium*, *Campanula elliptica*, *Carex sempervirens* subsp. *tatrorum* (Zapał.) Pawł., *Cirsium erisithales*, *Clinopodium vulgare*, *Crepis mollis*, *Cyanus mollis*, *Digitalis grandiflora*, *Helianthemum grandiflorum*, *Knautia maxima*, *Laserpitium latifolium*, *Linum extraaxillare*, *Origanum vulgare*, *Phleum hirsutum*, *Pimpinella* \**rhodochlamys*, *Pyrethrum clusii*, *Rubus saxatilis*, *Scabiosa lucida*, *Sesleria albicans*, *Tragopogon orientalis*, *Vicia oreophila*, etc.

#### 111 *Calamagrostion villosae* Pawłowski et al. 1928

Tall-grass vegetation on siliceous bedrock

Table 1, column 1

**OFN:** *Calamagrostidion villosae*-Verband (Pawłowski et al. 1928: 247)

**Syn.:** *Calamagrostion villosae* Pawłowski 1928 (Art. 8)

**Nomenclatural type:** *Calamagrostis villosa*-*Festuca picta*-Assoziation Pawłowski in Pawłowski et al. 1928 (Pawłowski et al. 1928: 248), lectotypus hoc loco

**Annotation:** In their original diagnosis, Pawłowski et al. (1928: 248, Table VIII) published the name *Calamagrostis villosa*-*Festuca picta*-Ass. with the name *Calamagrostidetum villosae tatricum* as a synonym. Hence, Kliment et al. (2004: 96), in order to correct the name of the association (Art. 43) and according to the dominating species of the community (cf. Pawłowski et al. 1928, Table VIII), as well as according to Art. 10b, inverted the order of the taxa names as follows: *Festuco picturatae*-*Calamagrostietum villosae* Pawłowski in Pawłowski et al. 1928 corr. Kliment et al. 2004. According to Art. 42, it is necessary to correct this citation as follows: *Festuco picturatae*-*Calamagrostietum villosae* Pawłowski in Pawłowski et al. 1928 corr.

#### Kliment et al. 2004 nom. invers. propos.

#### 112 *Trisetion fusci* Krajina 1933

Tall-grass vegetation on alluviums of mountain streams on siliceous bedrock

Table 1, column 2

**OFN:** Verband: *Trisetion fusci* (Krajina 1933: 929)

**Syn.:** *Deschampsion caespitosae* Borza 1934 (Art. 29c, 31), *Phleo alpini*-*Deschampsion caespitosae* (Borza 1934) Csürös et al. 1985 (Art. 29c)

**Syntax. syn.:** *Adenostylion alliariae* Br.-Bl. 1930 p. p. (*Aconitum firmum*-*Delphinium oxysepalum*-Ass.), *Aconitium firmiti* Krajina 1933

**Nomenclatural type:** *Trisetetum fusci* Krajina 1933 (Krajina 1933: 933), lectotypus (Art. 20)

**Annotation:** A recent syntaxonomical revision of the plant communities of the alliance *Trisetion fusci* in the Western Carpathians (Kliment et al. 2004) confirmed the older unpublished opinion of Šeffler (1984: 23). He claimed that the association *Trisetetum fusci* is a piece of the variability (syntax. syn.) of the association *Rhodiolo-Deschampsietum caespitosae* Krajina 1933. Hence, the association *Rhodiolo-Deschampsietum caespitosae* Krajina 1933 was chosen by Kliment et al. (2004: 99) as the lectotype of the name of the alliance. According to Art. 20 of the ICPN, however, the correct lectotype of the alliance is the association *Trisetetum fusci* Krajina 1933.

#### 113 *Calamagrostion arundinaceae* (Luquet 1926)

##### Oberdorfer 1957

Subthermophilous species-rich tall-grass vegetation on calcareous bedrock

Table 1, column 3

**OFN:** *Calamagrostidion* Luq. 26 (Oberdorfer 1957: 347)

**Syn.:** *Calamagrostion atlanticum* Luquet 1926 (Art. 34a), *Calamagrostion arundinaceae* Oberdorfer 1949 (Art. 8), *Calamagrostion arundinaceae* Jeník 1959 (Art. 8), *Calamagrostion arundinaceae* (Luquet 1926) Jeník 1961 (Art. 31)

**Phantomname:** *Calamagrostion arundinaceae* Oberdorfer 1950 (Karner & Mucina 1993: 489; Theurillat et al. 1995: 223)

**Nomenclatural type:** *Calamagrostietum arundinaceae* Luquet 1926, holotypus [Luquet 1926: 107 ut Association à *Calamagrostis arundinacea* (L.) Roth (Art. 41b)]

**Annotation 1:** Apart from the name *Calamagrostion arundinaceae* (Luquet 1926) Jeník 1961 (cf. Kliment

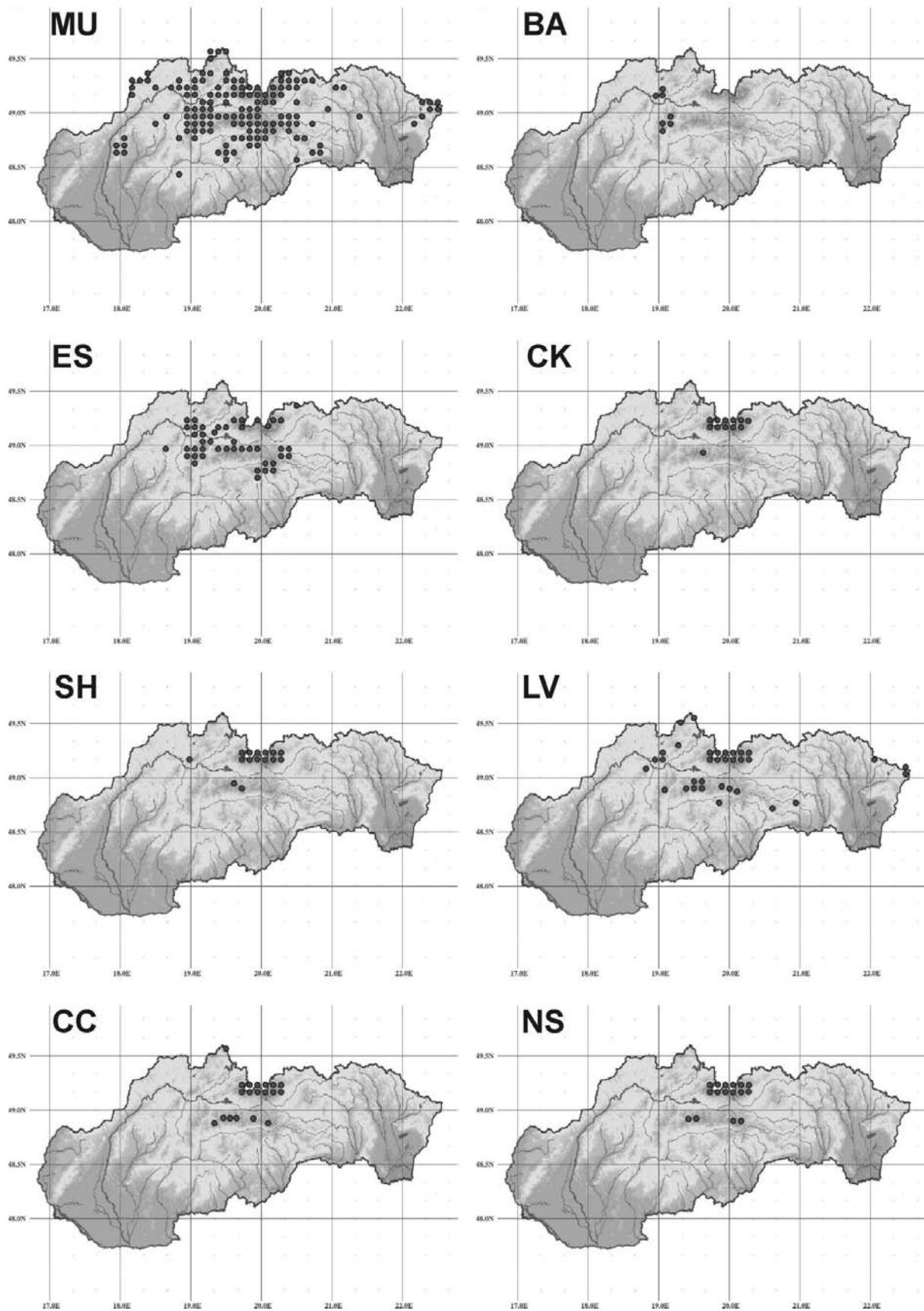


Fig. 1. The map of the distribution of high-altitude plant communities in the Western Carpathians.

Phytosociological classes are abbreviated as follows: MU – *Mulgedio-Aconitetea*, BA – *Betulo carpaticae-Alnetea viridis*, ES – *Elyno-Seslerietea*, CK – *Carici rupestris-Kobresietea bellardii*, SH – *Salicetea herbaceae*, LV – *Loiseleurio-Vaccinietea*, CC – *Caricetea curvulae*, NS – *Nardion strictae* (*Nardetea strictae*).

et al. 2007a: 51), we decided to use the older combination – *Calamagrostion arundinaceae* (Luquet 1926) Oberdorfer 1957 (cf. Kočí 2007: 106), where the species epithet is obvious from its only subordinated association *Sorbo-Calamagrostietum* (*arundinaceae*).

**Annotation 2:** Sillinger (1933: 262) described the tall-grass community with *Calamagrostis arundinacea* as ‘semi-xerophilous *Calamagrostidetum arundinaceae* or *Calamagrostis arundinacea-Digitalis ambigua*-association’. The dominant species is noticeable from both the name of the community and the cover values of the name-giving taxa (Art. 10b). In line with Art. 42, we have corrected the name of the association as follows: *Digitali ambiguae-Calamagrostietum arundinaceae* Sillinger 1933 nom. invers. propos.

**Annotation 3:** A repeated partial revision of these plant communities showed that in spite of several differential taxa (cf. Kliment et al. 2007a: 66), it is possible to include the regional association *Anemone narcissiflorae-Avenelletum flexuosae* (just like the association *Jaceo elatioris-Calamagrostietum villosae*) in the broadly defined association *Anemone narcissiflorae-Laserpitietum latifolii*. We have modified the basic characteristics of the association in the light of recent knowledge as follows:

**Anemone narcissiflorae-Laserpitietum latifolii**  
Grebensčikov et al. 1956

**Syntax syn.:** *Anemone narcissiflorae-Avenelletum flexuosae* Kmoníček ex Kliment 1994, *Jaceo elatioris-Calamagrostietum villosae* Kliment 1997

**Incl.:** siciation *Deschampsia flexuosa-Anemone narcissiflora* Kmoníček 1935 (Art. 3d), type *Deschampsia flexuosa-Anemone narcissiflora* Kmoníček 1936 (Art. 2b, 3d)

**Characteristic taxa:** *Hieracium prenanthoides* (transgr.), *Jacea pseudophrygia* (transgr.)

**Differential taxa:** *Anemone narcissiflora*, *Cyanus mollis*

#### 114 *Calamagrostion varia* Sillinger 1932

Calcareous meso-hygrophilous tall-grass vegetation on gravelly soils

Table 1, column 4

**OFN:** *Calamagrostidion varia* (Sillinger 1932: 19)

**Phantomname:** *Calamagrostion varia* Sillinger 1929 (Grabherr et al. 1993: 430; Theurillat et al. 1995: 218), *Calamagrostion varia* Sillinger ex Hadač 1962 (Mucina & Maglocký 1984: 34), *Calamagrostion varia* Sillinger ex Hadač 1963 (Mucina & Maglocký 1985: 187)

**Nomenclatural type:** *Calamagrostidetum varia* Sillinger 1932, lectotypus (Art. 20; cf. Kliment et al. 2004: 102) [nom. illeg. (Art. 31); correct name: *Geranio sylvatici-Calamagrostietum varia* (Sillinger 1932) Kliment et al. 2004 (see Kliment et al. 2004: 103, 2007a: 78)]

#### 115 *Festucion carpatica* Bělohávková et Fišerová 1989

Calcareous chionophilous hygrophilous tall-grass vegetation of the Carpathians

Table 1, column 5

**OFN:** *Festucion carpatica*, aliancia nova hoc loco (Bělohávková & Fišerová 1989: 12)

**Syntax. syn.:** *Calamagrostion varia* Sillinger 1932 p. p. (*Festucetum carpatica*)

**Nomenclatural type:** *Festucetum carpatica* Domin 1925, holotypus (Bělohávková & Fišerová 1989: 12)

#### 12 *Adenostyletalia alliarie* Br.-Bl. 1930

Tall-forb and fern-rich chionophilous communities of high-altitudes

Table 1, columns 6–7

**OFN:** *Adenostyletalia* (Braun-Blanquet 1930: 82)

**Syn.:** *Adenostyletalia* G. Br.-Bl. et J. Br.-Bl. 1931 (Art. 31)

**Syntax. syn.:** *Seslerietalia tatrae* Hadač ex Hadač et al. 1969 p. p. (*Delphinion elati*)

**Nomenclatural type:** *Adenostylion alliarie* Br.-Bl. 1930 (Braun-Blanquet 1930: 95 ut *Adenostylion*), lectotypus (Art. 20) [nom. illeg. (Art. 31); correct name: *Adenostylion alliarie* Br.-Bl. 1926 (see below)]

#### 121 *Adenostylion alliarie* Br.-Bl. 1926

Tall-forb and fern-rich chionophilous communities at high-altitudes

Table 1, columns 6–7

**OFN:** *Adenostylion* (Praeries à hautes herbes) (Braun-Blanquet 1926: 37)

**Syn.:** *Adenostylion* Luquet 1926 (Art. 33), *Adenostylion* Pawłowski 1928 p. p. (Art. 8), *Adenostylion alliarie* Pawłowski et al. 1928 p. p. (Art. 31), *Adenostylion alliarie* Br.-Bl. 1930 p. p. (Art. 31), *Adenostylion* G. Br.-Bl. et J. Br.-Bl. 1931 (Art. 31), *Adenostylion alliarie* Sillinger 1933 (Art. 31), *Adenostylion alliarie* Aichinger 1933 p. p. (Art. 31), *Alno-Adenostylion* Br.-Bl. 1948 (Art. 29c), *Dryopterido-Athyron distentifolii* Holub in Holub et al. 1967 (Art. 3b)

**Syntax. syn.:** *Dryopterido-Athyron distentifolii* (Holub ex Sýkora et Štursa 1973) Jeník et al. 1980

**Incl.:** *Eu-Adenostylion* Klika in Klika et Hadač 1944, *Eu-Adenostylenion alliarie* Sýkora et Štursa 1973, *Dryopterido-Athyrenion distentifolii* Holub ex Sýkora et Štursa 1973

**Nomenclatural type:** *Adenostylo alliarie-Cicerbitetum alpinae* Br.-Bl. 1926 (Braun-Blanquet 1926: 38 ut Association à *Adenostyles alliarie* et *Cicerbita alpina*), holotypus (Art. 18a)

**Annotation:** In recent studies and overviews, the fern communities of the Sudetes and the Western Carpathians have been delimited as the suballiance *Dryopterido-Athyrenion distentifolii* (Sýkora & Štursa 1973; Mucina & Maglocký 1984, 1985) or as a separate alliance *Dryopterido-Athyron distentifolii* (Jeník et al. 1980; Moravec et al. 1983a, b, 1995; Kočí 2001, 2007; Rodwell et al. 2002). The syntaxonomical revision of the relevés from the Slovak part of the Western Carpathians (Kliment et al. 2004, 2007a) showed that the associations *Ranunculo platanifolii-Adenostyletium alliarie* and *Adenostylo alliarie-Athyrietum alpestris* (suballiance *Adenostylenion alliarie*) form numerous transi-

tional phytocoenoses, and hence their evaluation within the separate alliances is unsubstantiated in this geographical area. The phytocoenoses of the association *Daphno mezerei-Dryopteridetum filicis-maris* are classified because of their floristic composition in the suballiance *Delphinienion elati* (cf. Kliment et al. 2007a; Jarolímek & Kliment 2008).

**1211 *Adenostylenion alliariae* Klika in Klika et Hadač 1944**

Tall-forb and fern-rich chionophilous communities on siliceous bedrock

Table 1, column 6

**OFN:** *Eu-Adenostylenion* (Kraj. 1933) Klika 1944 (Klika and Hadač 1944: 283)

**Nomenclatural type:** identical with the name of alliance (Art. 28)

**1212 *Delphinienion elati* (Hadač ex Hadač et al. 1969) Boşcaiu et Mihăilescu 1997**

Tall-forb and fern-rich chionophilous communities on calcareous bedrock

Table 1, column 7

**OFN:** *Delphinienion elati* (Hadač 1969) status novus (Boşcaiu & Mihăilescu 1997: 38)

**Bas.:** *Delphinienion elati* Hadač ex Hadač et al. 1969

**Syn.:** *Delphinienion elati* Hadač 1962 (Art. 8), *Delphinienion elati* (Hadač ex Hadač et al. 1969) Kliment et al. 2004 (Art. 31)

**Syntax. syn.:** *Adenostylenion* Br.-Bl. 1930 p. p. (*Adenostyletum alliariae*), *Calamagrostion varia* Sillinger 1932 p. p. min. (*Adenostyletum calcicolum*), *Adenostylenion alliariae* Sillinger 1933 p. p. (*Adenostyletum calcicolum*)  
**Nomenclatural type:** *Petasito kablikiani-Senecietum nemorensis* Hadač et al. 1969, lectotypus (Kliment et al. 2004: 109)

**13 *Petasito-Chaerophylletalia* Morariu ex Kopecký 1969**

Natural nitrophilous tall-herb vegetation on alluviums and banks of montane streams

Table 1, column 8

**OFN:** *Petasitetum-Chaerophylletalia* Morariu 67 (Kopecký 1969: 251)

**Syn.:** *Petasitetum-Chaerophylletalia* Morariu 1967 (Art. 8)

**Nomenclatural type:** *Petasition officinalis* Sillinger 1933 (Kopecký 1969: 251 ut *Petasition officinalis* Sillinger 33 em. Kopecký hoc loco), holotypus (Art. 18a)

**Annotation:** Morariu (1967: 242) described the order *Petasitetum-Chaerophylletalia* n. ord. on the basis of the only alliance *Telekiion* n. al. The description of the alliance is based on four associations (the original wording is used): *Petasitetum-Telekietum speciosae* n. as. (Art. 2b); *Chaerophylletum cicutariae-hirsuti* Soó 34c, 64; As. *Petasites hybridus-Aegopodium podagrariae* Borza et Boşcaiu 65 n. n. (Art. 2b) and *Carduetum personatae* n. as. (Art. 2b). The name *Chaerophylletum cicutariae* Soó 34c was based on an indirect reference in the study

by Soó (1964: 172, 306), and has remained problematic. It was determined, however, that Soó (1934: 108) only published the name of the association. In addition, he referred to an even older study (Soó 1927: 80) in the list of syntaxa (Soó 1964: 172), but he published there only the list of diagnostically important taxa of the associations *Equisetetum maximi* (*Chaerophylletum cicutariae*) (Art. 2b, 3a). The original diagnosis of the alliance *Telekiion speciosae* Morariu 1967 and thus of the order *Petasito-Chaerophylletalia* Morariu 1967, is therefore insufficient (Art. 8). The name of the order was validated by Kopecký (1969: 251) on the basis of the alliance *Petasition officinalis* Sillinger 1933, and on the phytosociological relevés (tables) of the associations *Petasitetum hybridi* Oberdorfer 1949 em. Kopecký and *Petasitetum officinalis-glabrati* Sillinger 1933.

**131 *Petasition officinalis* Sillinger 1933**

Tall-herb vegetation of raw alluvium soils on montane streamsides in Carpathians and Hercynic mountains

Table 1, column 8

**OFN:** *Petasition officinalis* (Sillinger 1933: 131)

**Syn.:** *Petasition officinalis* vel *albae* (Sillinger 1933) Klika 1955 (Art. 10a, 29c), *Petasition kablikiani* Hadač et Smola 1962 (Art. 8), *Telekiion speciosae* Morariu 1967 p. p. (Art. 8), *Chaerophyllo-Petasition hybridi* (Sillinger 1933) Kopecký 1968 (Art. 29c), *Petasito-Chaerophyllion* (Sillinger 1933) Niemann et al. 1973 (Art. 29c, 32d)

**Pseud.:** *Filipendulo-Petasition* sensu Špániková 1983 p. p. maj. non Br.-Bl. ex Duvigneaud 1949

**Nomenclatural type:** *Petasitetum officinalis-glabrati* Sillinger 1933 (Sillinger 1933: 131), lectotypus hoc loco

**Annotation 1:** Sillinger (1933: 131) described the association *Petasitetum officinalis-glabrati* from the middle parts of the mountain valleys of the Nízke Tatry Mts (760–920 m a. s. l.) as a plant community dominated by *Petasites hybridus*, with random occurrences of the species *Petasites kablikianus*. Kopecký (1969: 247) markedly changed the delimitation of this association when he included in it the phytocoenoses dominated by *Petasites kablikianus* (rarely also by *P. hybridus*) or the phytocoenoses co-dominated of both species. He included the stands dominated by *Petasites hybridus* (without the presence of *P. kablikianus*) in the subassociation *Petasitetum hybridi* Oberdorfer 1949 em. Kopecký 1969 *typicum* Kopecký 1969, and in the Sudeten-Carpathian geographical variant with *Chaerophyllum aromaticum*. Later, several Slovak and Czech authors adopted this conception. Afterwards, Kliment & Jarolímek (2002: 107) limited the concept of the association *Petasitetum officinalis-glabrati* to the stands with transitional floristic composition occurring in the area where both dominant species in the submontane belt of the Carpathian mountains can be found. The stands that were dominated by *Petasites kablikianus* were evaluated as *Agropyro caninae-Petasitetum kablikiani* Pawłowski et Walas 1949. In their next study (Jarolímek et al. 2002) the authors assigned the stands, dominated by *Petasites hybridus*, in

the association *Chrysosplenio alternifolii-Petasitetum hybridi* Hadač et Soldán 1989. Afterwards, the alluvial butterbur communities were evaluated in a similar manner in the fourth volume of *Plant Communities of Slovakia* (Kliment et al. 2007a).

The ongoing study of the alluvial butterbur stream-sides in the mountain valleys of the Western Carpathians shows that the stands with the co-occurrence of *Petasites hybridus* and *P. kablikianus* are difficult to distinguish by numerical analysis as a separate plant community. They most often occur in mildly wide parts of the valleys on streamsides with rolling relief (owing to alternation of gravelly layers and fine-grained silts). The transitional composition of the butterbur stands is noticeable also in marginal sites of the valleys, within the boundary zone of the vertical distribution of the community. It is conditioned by the characteristics of the habitat and the floristic composition of the neighbouring phytocoenoses. In the upper parts (up to the end) of the valleys, we recorded the *Petasites hybridus* phytocoenoses only with the occurrence of differential taxa of the association *Agropyro-Petasitetum kablikianum* and with the absence of own differential taxa. In the lower parts of the valleys the converse applied. These observations, together with the re-evaluation of the phytosociological relevés (Kliment et al., unpubl.), led us to conclude that the original relevés of the association *Petasitetum officinalis-glabrati* (Sillinger 1933: 134) can be evaluated as a variable of the broadly defined Carpathian plant community that is dominated by *Petasites hybridus*. The name, published by Sillinger, is the oldest validly published name for this community, and thus we have corrected the definition as follows:

***Petasitetum officinalis-glabrati* Sillinger 1933**

**OFN:** *Petasitetum officinalis-glabrati* (Sillinger 1933: 131)

**Syn.:** *Geranio phaei-Petasitetum* (Sillinger 1933) R. Tx. 1967 (Art. 29c), *Chaerophyllo-Petasitetum hybridi-kablikianum* (Sillinger 1933) Kopecký 1968 (Art. 29c, 30), *Petasitetum hybridi tatricum* Hadač et al. 1969 prov. (Art. 3b), *Petasitetum hybridi-kablikianum* sensu auct. carp. (e.g. Špániková 1983) p. p. (Art. 30)

**Syntax. syn.:** *Chrysosplenio alternifolii-Petasitetum hybridi* Hadač et Soldán 1989, *Lysimachio nummulariae-Petasitetum hybridi* Hadač et Soldán 1989 p. p.

**Incl.:** *Petasitetum hybridi typicum* Kopecký 1969, Sudeten-Carpathian variant with *Chaerophyllum aromaticum* p. p.; *Petasitetum officinalis-glabrati chaerophylletosum aromatici* Kopecký 1969; *Petasitetum officinalis-glabrati doronicetosum austriaci* Kopecký 1969 p. p. min.; *Petasitetum hybridi chaerophylletosum aromatici* Špániková 1983

**Non:** *Chaerophyllo hirsuti-Petasitetum officinalis* Kaiser 1926

**Pseud.:** *Petasitetum hybridi* sensu auct. carp. occid. (e.g. Fajmonová 1980; Špániková 1983) non Oberdorfer 1949

**Nomenclatural type:** Sillinger 1933: 134, rel. 1, lectotypus (Kliment & Jarolímek 2002: 107)

**Differential taxa:** *Angelica sylvestris*, *Anthriscus*

*sylvestris*, *Chaerophyllum aromaticum* (const.), *Galium aparine*, *Glechoma hederacea*, *Lysimachia nummularia*, *Petasites hybridus* (dom., const.), *Stachys sylvatica* (const.)

**Constant companions:** *Chaerophyllum hirsutum*, *Geranium phaeum*, *Stellaria nemorum*, *Urtica dioica*

**Annotation 2:** A later re-evaluation brought some changes into the synonymy and differentiation of the plant community with *Petasites kablikianus*. In line with Art. 10b and 42, we have corrected the author's citation [only the relevant synonyms are presented; for the whole synonymy see Kliment et al. (2007a: 110)] as follows:

***Agropyro caninae-Petasitetum kablikianum* Pawłowski et Walas 1949 nom. invers. propos.**

**OFN:** Association à *Petasites Kablikianus* et *Agropyrum caninum* = *Petasitetum Kablikianum* (= *glabrati*) Pawł. et Wal. (Pawł. 1936; Szaf., Pawł. et Kulcz. 1927) (Pawłowski & Walas 1949: 149)

**Syn.:** *Petasitetum hybridi-kablikianum* sensu auct. carp. (e.g. Špániková 1983) p. p. (Art. 30)

**Incl.:** *Petasitetum officinalis-glabrati doronicetosum austriaci* Kopecký 1969 p. p. maj.; *Petasitetum hybridi-kablikianum typicum* Špániková 1983 p. p.

**Pseud.:** *Petasitetum officinalis-glabrati* sensu auct. slov. et bohem. p. p. non Sillinger 1933

**Nomenclatural type:** Pawłowski & Walas 1949, Table XIII, rel. 6, lectotypus (Kliment & Jarolímek 2002: 103)

**Characteristic taxa:** *Petasites kablikianus* (transgr., dom., const.), *Orobancha flava* (transgr.)

**Differential taxa:** *Cortusa matthioli*, *Viola biflora*

**Constant companions:** *Chaerophyllum hirsutum*, *Stellaria nemorum*

## **2 *Betulo carpaticeae-Alnetea viridis* Rejmánek in Huml et al. 1979**

Subalpine communities of deciduous shrubs  
Table 1, column 9; Fig 1BA

**OFN:** *Betulo (carpaticeae)-Alnetea viridis* Rejmánek, cl. nova (Huml et al. 1979: 38)

**Syn.:** *Mugo-Alnetea viridis* Egger 1952 p. p. (Art. 8), *Betulo carpaticeae-Alnetea viridis* Rejmánek 1977 (Art. 8)

**Nomenclatural type:** *Alnetalia viridis* Rübél ex Rejmánek in Huml et al. 1979 (Huml et al. 1979: 38), holotypus (Art. 18a)

**Distribution:** Krivánska Malá Fatra Mts, Velká Fatra Mts

## **21 *Alnetalia viridis* Rübél ex Rejmánek in Huml et al. 1979**

Subalpine communities of small-leaved shrubs  
Table 1, column 9

**OFN:** *Alnetalia viridis* Rübél 1933 (Huml et al. 1979: 38)

**Syn.:** *Alnetalia viridis* Rübél 1933 (Art. 8), *Mugo-Alnetalia viridis* Egger 1952 p. p. (Art. 8)

**Nomenclatural type:** *Almion viridis* Rübél ex Rejmánek in Huml et al. 1979 (Huml et al. 1979: 38), holo-

typus (Art. 18a) [nom. illeg. (Art. 31); correct name: *Alnion viridis* Schnyder 1930 (Schnyder 1930: 175)]

### 211 *Salicion silesiacae* Rejmánek et al. 1971

Subalpine willow shrubs of the Western Carpathians and Hercynicum rich in tall herbs

Table 1, column 9

**OFN:** *Salicion silesiacae* foederatio nova (Rejmánek et al. 1971: 36)

**Nomenclatural type:** *Salici silesiacae-Betuletum carpaticae* Rejmánek et al. 1971, lectotypus (Jeník et al. 1980: 17)

### 3 *Elyno-Seslerietea* Br.-Bl. 1948

Montane and alpine calcareous swards

Table 1, columns 10–13; Fig 1ES

**OFN:** Classe *Elyno-Seslerietea* (Braun-Blanquet 1948: 147)

**Syn.:** *Elyno-Seslerietea* Br.-Bl. in Br.-Bl. et al. 1947 (Art. 8), *Seslerietea varia* Oberdorfer 1978 (Art. 29c), *Seslerietea albicantis* Oberdorfer 1978 corr. Oberdorfer 1990 (Art. 29c, 30)

**Syntax. syn.:** *Seslerio-Arabadetea alpinae* Klika in Klika et Hadač 1944 p. p. (*Seslerietalia calcariae*), *Festuco-Seslerietea* Barbero et Bonin 1969 p. p. (*Festucion scopariae*)

**Phantomname:** *Seslerietea albicantis* Br.-Bl. 1948 em. Oberdorfer 1978 (Oberdorfer 1983: 41; Coldea 1997: 207), *Elyno-Seslerietea albicantis* Br.-Bl. 1948 corr. Oberdorfer 1983 em. Ohba 1974 (Theurillat et al. 1994: 23, 1995: 216)

**Nomenclatural type:** *Seslerietalia caeruleae* Br.-Bl. 1948 [Braun-Blanquet 1948: 149 ut “*coeruleae*” (Art. 41a)], holotypus (Art. 18a)

**Annotation:** After the description of the class *Carici rupestris-Kobresietea* Ohba 1974, Oberdorfer (1978: 194) described the class *Seslerietea varia*. This class, similarly to the class *Elyno-Seslerietea*, was described on the basis of the only order *Seslerietalia caeruleae*, therefore the *Seslerietea varia* Oberdorfer 1978 represents the superfluous name for *Elyno-Seslerietea* Br.-Bl. 1948 (Art. 29c). Although the alliance *Elynion medioeuropaeum* Br.-Bl. 1948 [correct name: *Oxytropido-Elynion* Br.-Bl. (1948) 1949; see below] was also part of the original diagnosis of the class *Elyno-Seslerietea* (within the order *Seslerietalia caeruleae*), the order *Oxytropido-Elynietalia* Oberdorfer ex Albrecht 1969 was described later. Therefore, according to Art. 35, which concerns the rejection of the double syntaxa names, it is not possible to assign the name *Elyno-Seslerietea* Br.-Bl. 1948 as a synonym (cf. Grabherr et al. 1993: 403; Rivas-Martinez et al. 2001: 100).

**Distribution:** Lúčanská and Krivánska Malá Fatra Mts, Chočské vrchy Mts, Veľká Fatra Mts, Nízke Tatry Mts, Západné Tatry Mts, Vysoké Tatry Mts, Belianske Tatry Mts, Pieniny Mts, Slovenský raj Mts, Muránska planina Mts

### 31 *Seslerietalia caeruleae* Br.-Bl. in Br.-Bl. et Jenny 1926

Montane and alpine calcareous swards

Table 1, columns 10–13

**OFN:** *Seslerietalia caeruleae* (Braun-Blanquet and Jenny 1926: 225)

**Syn.:** *Seslerietalia caeruleae* G. Br.-Bl. in Br.-Bl. 1931 (Art. 31), *Seslerietalia calcariae* Br.-Bl. in Br.-Bl. et Jenny 1926 corr. Klika in Klika et Hadač 1944 (Art. 30), *Seslerietalia caeruleae* Br.-Bl. in Br.-Bl. et al. 1947 (Art. 8), *Seslerietalia varia* Br.-Bl. in Br.-Bl. et Jenny 1926 corr. Egger 1952 (Art. 30), *Seslerietalia albicantis* Br.-Bl. in Br.-Bl. et Jenny 1926 corr. Oberdorfer 1983 (Art. 30), *Seslerietalia tatrae* Hadač 1962 p. p. (Art. 2b, 8)

**Syntax. syn.:** *Caricetalia firmae* Wendelberger 1962, *Seslerietalia tatrae* Hadač ex Hadač et al. 1969 p. p. (*Seslerion tatrae*)

**Phantomname:** *Seslerietalia albicantis* Br.-Bl. 1926 (Coldea 1997: 207; Malynovski & Kricsfalusy 2000: 84, 2002: 85), *Seslerietalia varia* Br.-Bl. 1926 (Oberdorfer et al. 1967: 38; Albrecht 1969: 15; Ohba 1974: 382)

**Nomenclatural type:** *Seslerion caeruleae* Br.-Bl. in Br.-Bl. et Jenny 1926 [Braun-Blanquet & Jenny 1926: 225 ut “*coeruleae*” (Art. 41a)], holotypus (Art. 18a)

**Annotation:** The corrections of the syntaxa names based on the name *Sesleria caerulea* (L.) Ard. are unfounded, according to Art. 43. The name *S. caerulea*, in the sense of the lectotypification (Rauschert 1969: 412, Foggi et al. 2001: 1103), does not relate to the marsh taxon *S. uliginosa*, but the species of calcareous sites (syn.: *S. albicans*, *S. calcarea*, *S. varia*) (cf. Weber et al. 2000: 756).

### 311 *Astero alpini-Seslerion calcariae* Hadač ex Hadač et al. 1969 nom. invers. propos.

Montane and alpine more or less open communities on shallow soils on sunny slopes with short snow cover in the Western Carpathians

Table 1, columns 10–11

**OFN:** *Seslerio-Asterion alpini*, Hadač 1962, 51 (Hadač et al. 1969: 64)

**Syn.:** *Seslerieto-Asterion alpini* Hadač 1962 (Art. 8), *Astereto-Seslerion calcariae* Hadač et Smola 1962 (Art. 8), *Astero serpentimontani-Seslerion* Hadač 1962 corr. Mucina 1981 (Art. 43)

**Pseud.:** *Seslerion caeruleae* auct. carpat. occid. p. p. non Br.-Bl. in Br.-Bl. et Jenny 1926

**Phantomname:** *Seslerio tatrae-Asterion alpini* Hadač 1962 (Coldea 1997: 207)

**Nomenclatural type:** *Astereto-Seslerietum calcariae* Hadač et al. 1969, lectotypus (Art. 20, cf. Kliment et al. 2005a: 125) [Art. 41b; correct form of the name: *Astero alpini-Seslerietum calcariae* Hadač et al. 1969]

### 3111 *Astero alpini-Seslerienion calcariae* Kliment et al. 2005

Subalpine-alpine open communities on shallow soils on steep sunny slopes

Table 1, column 10

**Nomenclatural type:** identical with the name of alliance (Art. 28)

**3112 *Pulsatillo slavicae*-*Caricetum humilis* Uhlířová suball. nov. hoc loco**

Montane-subalpine more or less open communities on shallow soils on sunny slopes

Table 1, column 11

**Syn.:** *Pulsatillo slavicae*-*Caricetum humilis* Uhlířová in Kliment et al. 2005 (Art. 5)

**Nomenclatural type:** *Caricetum humilis carpaticum* Sillinger 1933 (Sillinger 1933: 177), lectotypus [nom. illeg. (Art. 34a); correct name: *Pulsatillo slavicae*-*Caricetum humilis* (Sillinger 1933) Mucina ex Uhlířová et Bernátová 2004 (see Kliment et al. 2007b: 176)]

**Annotation 1:** Uhlířová (in Kliment et al. 2005a: 127–128) published the description of a new suballiance, but since the category of the nomenclatural type was not used *expressis verbis* in this study, this rendered the description invalid (Art. 5).

**Annotation 2:** In the study by Kliment et al. (2007b), some of the nomenclatural types were not set in the associations. To complete the study, we set them as follows:

***Festuco tatrae*-*Caricetum humilis* Uhlířová et Petřík 2006**

**Nomenclatural type:** Uhlířová & Petřík 2006, Table 2, rel. 3, holotypus

***Seslerio calcariae*-*Festucetum tatrae* Sillinger 1933**

**Nomenclatural type:** Sillinger 1933, Table between p. 188–189, rel. 16, lectotypus hoc loco

**312 *Seslerion tatrae* Pawłowski 1935 corr. Klika 1955**

Calcareous alpine swards of the Western Carpathians on deeper soils with prolonged snow cover

Table 1, column 12

**OFN:** *Seslerion (Bielzii) tatrae* Pawł. 1935 (Klika 1955: 306)

**Syn.:** *Seslerion bielzii* Pawłowski 1935 (Art. 43), *Seslerion tatrae* Pawłowski 1956 (Art. 8), *Seslerion tatrae* Hadač et Smola 1962 (Art. 8), *Seslerion tatrae* Pawłowski em. Hadač 1962 (Art. 8)

**Phantom name:** *Seslerion tatrae* Hadač 1962 (Mucina & Maglocký 1984: 32, 1985: 198)

**Non:** *Festuco saxatilis*-*Seslerion bielzii* (Pawłowski et Walas 1949) Coldea 1984

**Nomenclatural type:** *Versicoloretum tatricum* Pawłowski 1935 (Pawłowski 1935: 132), lectotypus hoc loco [nom. illeg. (Art. 34a); correct name: *Seslerio tatrae*-*Festucetum versicoloris* Pawłowski et Stecki 1927 corr. Kliment et al. 2005 nom. invers. proposit. (see Annotation 2)]

**Annotation 1:** Kliment et al. (2005a: 129) chose the association *Seslerietum bielzii* Domin 1929 as a lectotype of the name of the alliance; but this association was not in the original diagnosis of the alliance *Seslerion bielzii*.

**Annotation 2:** According to the order of the taxa names in the original diagnosis of the association *Festuca varia*-*Sesleria bielzii* (Pawłowski & Stecki

1927: 96 ut *Festuca varia*-*Sesleria Bielzii*-Assoziation oder das *Varietum tatricum*), it is necessary to correct the name *Seslerio tatrae*-*Festucetum versicoloris* Pawłowski et Stecki 1927 corr. Kliment et al. 2005 (cf. Kliment et al. 2005a: 131) as follows: ***Seslerio tatrae*-*Festucetum versicoloris* Pawłowski et Stecki 1927 corr. Kliment et al. 2005 nom. invers. proposit. (Art. 42).**

**Annotation 3:** Kliment et al. (2005a: 130) published the correction of the name *Seslerietum bielzii* Domin 1929 to *Seslerietum tatrae* Domin 1929 corr. Kliment et al. 2005 (Art. 43); and thereby it created the earlier homonym of the validly published name *Seslerietum tatrae* Šmarda 1956 (Art. 40b). To correct the name of the association, several new combinations of the subassociation names published in that study were needed:

***Seslerietum tatrae* Šmarda 1956**

**Nomenclatural type:** Šmarda 1956: 20, holotypus (Art. 18a)

***Seslerietum tatrae luzuletosum rubellae* (Kliment et al. 2005) comb. nov. hoc loco**

**Bas.:** *Seslerietum tatrae* Domin 1929 corr. Kliment et al. 2005 *luzuletosum rubellae*

**Nomenclatural type:** Domin 1929: 9, holotypus (Kliment et al. 2005a: 131)

***Seslerietum tatrae biscutelletosum laevigatae* (Kliment et al. 2005) comb. nov. hoc loco**

**Bas.:** *Seslerietum tatrae* Domin 1929 corr. Kliment et al. 2005 *biscutelletosum laevigatae*

**Nomenclatural type:** Unar et al. 1984, Table 19, rel. 3, holotypus (Kliment et al. 2005a: 131)

**313 *Caricion firmae* Gams 1936**

Alpine cushion-like open sedge and tussocky swards on hard limestone on northern windswept slopes and ridges with low snow cover

Table 1, column 13

**OFN:** *Caricion firmae* (Gams 1936: 57)

**Syn.:** *Seslerion bielzii* Pawłowski 1935 p. p. (Art. 43), *Caricion firmae* Hadač 1962 (Art. 8), *Caricion firmae* Wendelberger 1962 (Art. 29c, 31)

**Syntax. syn.:** *Seslerion caeruleae* Br.-Bl. in Br.-Bl. et Jenny 1926 p. p. min. (*Caricetum firmae*), *Seslerion caeruleae* Aichinger 1933 p. p. min. (*Caricetum firmae*)

**Incl.:** *Caricion firmae* (Gams 1936) Theurillat in Theurillat et al. 1995

**Pseud.:** *Seslerion caeruleae* sensu auct. carpat. occid. p. p. non Br.-Bl. in Br.-Bl. et Jenny 1926

**Nomenclatural type:** *Caricetum firmae* Br.-Bl. in Br.-Bl. et Jenny 1926 (Gams 1936: 57), holotypus (Art. 18a) [nom. illeg. (Art. 31); correct name: *Caricetum firmae* Rübel 1911 (see Grabherr et al. 1993: 406)]

**4 *Carici rupestris*-*Kobresietea bellardii* Ohba 1974**

Wind-exposed, cryophile swards and carpets on edges with low snow cover

Table 1, columns 14–15; Fig 1CK

**OFN:** *Carici rupestris*-*Kobresietea bellardii* nom. nov. (Ohba 1974: 379)

**Syn.:** *Elyno-Seslerietea* Br.-Bl. in Br.-Bl. et al. 1947 p. p. (Art. 8), *Kobresio-Elynetea* Oberdorfer 1957 (Art. 3b)

**Syntax. syn.:** *Juncetea trifidi* Hadač in Klika et Hadač 1944 p. p. min. (*Festucion versicoloris*), *Elyno-Seslerietea* Br.-Bl. 1948 p. p. min. (*Elynon medioeuropaeum*)

**Nomenclatural type:** *Kobresio-Dryadetalia* Br.-Bl. ex Ohba 1974 (Ohba 1974: 384), lectotypus hoc loco [syn.: *Elyno-Dryadetalia* Br.-Bl. 1948 (Art. 8)]

**Annotation 1:** The previous typification of the name of the class (Dierssen 1992: 214) was illegitimate because the author used the invalid name *Oxytropido-Elynetalia* Oberdorfer 1957 (Art. 17; cf. Theurillat & Moravec 1995: 364) as the nomenclatural type.

**Annotation 2:** Two diagnostic taxa, *Carex rupestris* and *Festuca \*versicolor*, were assigned subjectively on the basis of a wider knowledge of coenology and ecology of both taxa. The first, the arctic-alpine species *Carex rupestris*, was evaluated as a diagnostic after new knowledge was obtained about the sociology of this species in the Western Carpathians (cf. Šibík et al. 2007b). The second, the Carpathian subendemic *Festuca \*versicolor*, represents a relic species of the old autochthonous flora of the Carpathians (Hendrych 1981; Kliment 1999). Owing to a relatively wide ecological valence, this species can be found in the plant communities of rocky fissures [the class *Asplenietea trichomanis* (Br.-Bl. in Meyer et Br.-Bl. 1934) Oberd. 1977] and in the communities of the classes *Elyno-Seslerietea* and *Carici rupestris-Kobresietea*. Owing to the presence of a fine and dense rooting system, this species thrives in windward habitats. It is one of the few plants that can survive in habitats with periglacial climate together with solifluction and ice blasts that reach the advanced stages of cryoplanation. This species usually dominates stands with at least a thin layer of fine-grained soil; on stands with a deeper soil profile it cannot compete with other species (Bělohávková 1980). Therefore, we decided to evaluate this taxon as a regional characteristic species (reg. char.) for the order *Oxytropido-Elynetalia* (hence it occurs in a smaller part of the distributional area of the alliance) because in its habitat preferences and ecology it resembles the alpine species *Festuca pumila* Vill., which is characterised similarly by Ohba (1974). Although *Festuca \*versicolor* occurs very often in the plant communities of other classes, it occupies extreme habitats there, too. Thus, we suppose that the stands of the class *Carici rupestris-Kobresietea* are ecologically optimal for this species. Jarolímeček et al. (2008) also evaluated this species as a diagnostic taxon for the class *Carici rupestris-Kobresietea*, as well as for the alliance *Oxytropido-Elynon*.

**Distribution:** Nízke Tatry Mts, Západné Tatry Mts, Vysoké Tatry Mts, Belianske Tatry Mts

#### 41 *Oxytropido-Elynetalia* Oberdorfer ex Albrecht 1969

Species-rich alpine tundra of high mountains in central Europe and the Balkans  
Table 1, columns 14–15

**OFN:** *Oxytropis-Elynetalia* Oberdorfer 1957 (Albrecht 1969: 27)

**Syn.:** *Elynetalia* Oberdorfer 1957 (Art. 3b), *Oxytropido-Elynetalia* Oberdorfer (1957) 1962 (Art. 3b), *Oxytropido-Kobresietalia* Oberdorfer ex Albrecht 1969 (in Grabherr 1993a: 374) (Art. 30)

**Syntax. syn.:** *Seslerietalia caeruleae* Br.-Bl. 1948 p. p. (*Elynon medioeuropaeum*), *Festucetalia versicoloris* Jeník in Moravec et al. 1995

**Phantomname:** *Oxytropido-Kobresietalia* Oberdorfer 1957 (Ohba 1974: 382)

**Nomenclatural type:** *Oxytropido-Elynon* Br.-Bl. (1948) 1949 (Albrecht 1969: 27 ut *Oxytropido-Elynon* Br.-Bl. 1948), holotypus (Art. 18a)

**Annotation:** Oberdorfer (1957: 305) published the name *Elynetalia*, although conditionally (Art. 3b). He published the name *Oxytropido-Elynetalia* later, but it was invalid in every publication. In the first study (Oberdorfer 1962: 33), he published it as *Oxytropido-Elynetalia* (Oberdorfer 57) prov. (Art. 3b). In the second study (Oberdorfer et al. 1967: 39) it was published as *Oxytropido-Elynetalia* Oberdorfer 57, but without reference to the original diagnosis of the alliance *Oxytropido-Elynon* and the original name of the alliance (Art. 2b); and in the last study (Oberdorfer 1970: 33) without reference to the original diagnosis of the alliance *Oxytropido-Elynon*. Despite the fact that the authors' citation was incorrect in the name of the alliance in the study by Albrecht 1969 (but see Oberdorfer et al. 1967: 39), we still consider the citation 'Oberdorfer ex Albrecht 1969' according to Art. 6 and Recomm. 46D to be legitimate.

#### 411 *Oxytropido-Elynon* Br.-Bl. (1948) 1949

Alpine xero-cryophilous wind-exposed swards and carpets on calcium-rich soils

Table 1, column 14

**OFN:** Verband *Oxytropo-Elynon* Br.-Bl. 1948 (Braun-Blanquet 1949b: 24)

**Bas.:** *Elynon medioeuropaeum* Br.-Bl. 1948 (Art. 34a)

**Syn.:** *Elynon* Gams 1936 (Art. 8), *Oxytropo-Elynon* Br.-Bl. in Br.-Bl. et al. 1947 (Art. 8)

**Syntax. syn.:** *Seslerion caeruleae* Br.-Bl. in Br.-Bl. et Jenny 1926 p. p. min. (*Elynetum*)

**Non:** *Elynon bellardii* (*boreoatlanticum*) Nordhagen 1936 (Art. 8)

**Phantomname:** *Oxytropido-Elynon* Oberdorfer 1957 (Ohba 1974: 382), *Oxytropido-Kobresion* Oberdorfer 1957 (Ohba l. c.)

**Nomenclatural type:** Ass. *Elyno-Oxytropidetum foucaudi* Br.-Bl. 1948 [Braun-Blanquet 1948: 164 ut Ass. *Elyneto-Oxytropidetum foucaudi* (Ass. à *Elyna myosuroides* et *Oxytropis foucaudi*)], holotypus (Art. 18a)

**Annotation:** Braun-Blanquet (1948: 163) described a new alliance *Elynon medioeuropaeum* and included it in the order *Seslerietalia caeruleae*. The name was illegitimate, however, because he used a geographical epithet to name the Central European phytocoenoses in order to distinguish them from the North



European phytocoenoses (Art. 34a). One year later (Braun-Blanquet 1949b: 24), he corrected the name to *Oxytropo-Elymion* Br.-Bl. 1948, and instead of publishing the original name, he referred to it as follows: ‘Die nähere Begründung dieses Vorgehens ist in meiner Vegetations-Monographie der Ostpyrenäen (1948) erläutert’. Therefore we have corrected the authors’ citation in the name of the alliance stated in the study by Šibík et al. (2007b: 222) as mentioned above (cf. Rivas-Martinez et al. 2001: 100).

#### 412 *Festucion versicoloris* Krajina 1933

Alpine xero-cryophilous tussocky, cushion-like and dwarf-shrub vegetation on siliceous-neutral soils on mylonites

Table 1, column 15

**OFN:** Verband: *Festucion versicoloris* (Krajina 1933: 53)

**Nomenclatural type:** *Festucetum versicoloris graniticum* Krajina 1933 (Krajina 1933: 69), lectotypus hoc loco [nom. illeg. (Art. 34a); correct name: *Agrosti alpinae-Festucetum versicoloris* Pawłowski in Pawłowski et al. 1928 nom. invers. propos. (see Dúbravcová & Šibík 2006: 227; Šibík et al. 2007b: 237)]

#### 5 *Salicetea herbaceae* Br.-Bl. 1948

Vegetation of long-lasting snow beds and snow fields and slopes irrigated by melt waters

Table 1, columns 16–18; Fig 1SH

**OFN:** *Salicetea herbaceae* (Braun-Blanquet 1948: 71)

**Syn.:** *Salicetea herbaceae* Br.-Bl. et al. 1947 (Art. 8)

**Syntax. syn.:** *Juncetea trifidi* Hadač in Klika et Hadač 1944 p. p. (*Festucion pictae*, *Salicetalia herbaceae*)

**Nomenclatural type:** *Salicetalia herbaceae* Br.-Bl. 1948 (Braun-Blanquet 1948: 73), lectotypus (Art. 20) [nom. illeg. (Art. 31); correct name: *Salicetalia herbaceae* Br.-Bl. in Br.-Bl. et Jenny 1926 (see below)]

**Distribution:** Krivánska Malá Fatra Mts, Nízke Tatry Mts, Západné Tatry Mts, Vysoké Tatry Mts, Belianske Tatry Mts

#### 51 *Salicetalia herbaceae* Br.-Bl. in Br.-Bl. et Jenny 1926

Vegetation of long-lasting snow beds on siliceous bedrock

Table 1, columns 16–17

**OFN:** *Salicetalia herbaceae* (Braun-Blanquet & Jenny 1926: 213)

**Syn.:** *Salicetalia herbaceae* G. Br.-Bl. et J. Br.-Bl. 1931 (Art. 31)

**Nomenclatural type:** *Salicion herbaceae* Br.-Bl. in Br.-Bl. et Jenny 1926 (Braun-Blanquet & Jenny 1926: 213), holotypus (Art. 18a)

#### 511 *Salicion herbaceae* Br.-Bl. in Br.-Bl. et Jenny 1926

Dwarf-willow and moss dominated communities of snow beds on acid soils and rocks

Table 1, column 16

**OFN:** *Salicion herbaceae*-Verband (Braun-Blanquet & Jenny 1926: 213)

**Syn.:** *Salicion herbaceae* Pawłowski 1928 (Art. 8), *Salicion herbaceae* Br.-Bl. 1930 (Art. 31), *Salicion herbaceae* G. Br.-Bl. et J. Br.-Bl. 1931 (Art. 31), *Salicion herbaceae* Sillinger 1933 (Art. 31), *Salicion herbaceae* Aichinger 1933 (Art. 31)

**Nomenclatural type:** *Salicetum herbaceae* Br.-Bl. in Br.-Bl. et Jenny 1926 (Braun-Blanquet & Jenny 1926: 220), lectotypus (Art. 20; cf. Englisch 1993: 385) [nom. illeg. (Art. 31); correct name: *Salicetum herbaceae* Rübel 1911 (see Englisch l. c.)]

#### 512 *Festucion picturatae* Krajina 1933 corr. Dúbravcová 2007

Chionophilous communities of fixed screes on siliceous bedrock

Table 1, column 17

**Syn.:** *Festucion pictae* Krajina 1933 (Art. 43)

**Nomenclatural type:** *Festucetum pictae* Krajina 1933 (Krajina 1933: 835), lectotypus (Art. 20)

**Annotation:** Malynovski & Kricsfalusy (2000: 67) corrected the name *Festucetum pictae* Krajina 1933 (Art. 43) to *Festucetum picturatae* Krajina 1933 corr. Malynovski et Kricsfalusy 2000. Thereby they created the earlier homonym of the name *Festucetum picturatae* Schittengruber 1961 corr. Theurillat 1989 (Art. 40b). According to Art. 43, paragraph 3, it is necessary to create a *nomen novum* for the association *Festucetum pictae* Krajina 1933 (Art. 39). For the name-giving taxon, we have chosen one of the three most diagnostically important taxa of the association that were determined in its original diagnosis (Krajina 1933, Table 13):

***Gentiano punctatae-Festucetum picturatae* (Krajina 1933) Dúbravcová nom. nov. et nom. corr. hoc loco**

**Bas.:** *Festucetum pictae* Krajina 1933 (Krajina 1933: 835)

**Non:** *Festucetum pictae* Domin 1929

**Nomenclatural type:** Krajina 1933, Table 13, rel. 3, lectotypus (Unar et al. 1985: 18)

Thus, it was necessary to create new combinations of previously described subassociations, which were classified under the different association name (Art. 26):

***Gentiano punctatae-Festucetum picturatae hieracietosum alpini* (Dúbravcová 2007) Dúbravcová comb. nov. hoc loco**

**Bas.:** *Festucetum picturatae hieracietosum alpini* Dúbravcová 2007 (Dúbravcová 2007: 272)

**Nomenclatural type:** Dúbravcová 2007: 272, holotypus

***Gentiano punctatae-Festucetum picturatae typicum* (Dúbravcová 2007) Dúbravcová comb. nov. hoc loco**

**Bas.:** *Festucetum picturatae typicum* Dúbravcová 2007 (Dúbravcová 2007: 272)

**Nomenclatural type:** identical with the name of association

**52 *Arabidetalia caeruleae* Br.-Bl. 1948**

Alpine basiphilous vegetation of snow fields on stabilised screes with long-lasting snow cover

Table 1, column 18

**OFN:** *Arabidetalia caeruleae* (Braun-Blanquet 1948: 92)

**Syn.:** *Arabidetalia caeruleae* Rübél 1933 (Art. 8), *Arabidetalia caeruleae* Rübél ex Br.-Bl. 1949 (Art. 31)

**Syntax. syn.:** *Salicetalia retusae* Lakušić 1970

**Phantomname:** *Arabidetalia caeruleae* Rübél ex Br.-Bl. 1948 (Englisch et al. 1993: 307; Dúbravcová 2007: 273)

**Nomenclatural type:** *Arabidion caeruleae* Br.-Bl. 1948 [Braun-Blanquet 1948: 92 ut “*coeruleae*” (Art. 41a)], lectotypus (Art. 20)

**Annotation 1:** Braun-Blanquet (1949a: 291) validated the name of the order *Arabidetalia caeruleae* Rübél 1933 in issue 4–5 of the first volume of the journal *Vegetatio*. This issue, however, was published 1 August 1949, so the name *Arabidetalia caeruleae* Br.-Bl. 1948 has priority. The incorrect date of the validation of the name of the alliance is presumably reflective of the incorrect date of the whole volume of the journal (see References).

**Annotation 2:** Theurillat et al. (1995: 206) published the name *Arabidetalia caeruleae* Rübél ex Nordhagen 1936 as a valid name of the order. That name is invalid (Art. 2b), however, because Nordhagen (1936: 44) in his article published the name *Arabidetalia caeruleae* Rübél (without the year) and he adduced two studies by Rübél in the references.

**521 *Arabidion caeruleae* Br.-Bl. in Br.-Bl. et Jenny 1926**

Basiphilous vegetation of snow fields on stabilised screes with long-lasting snow cover (rocky snow patches)

Table 1, column 18

**OFN:** *Arabidion caeruleae*-Verband [Braun-Blanquet & Jenny 1926: 198 ut “*coeruleae*” (Art. 41a)]

**Syn.:** *Arabidion caeruleae* Pawłowski 1928 (Art. 8), *Arabidion caeruleae* Br.-Bl. 1930 (Art. 31), *Arabidion caeruleae* G. Br.-Bl. et J. Br.-Bl. 1931 (Art. 31)

**Nomenclatural type:** *Arabidetum caeruleae* Br.-Bl. in Br.-Bl. et Jenny 1926 [Braun-Blanquet & Jenny 1926: 199 ut “*coeruleae*” (Art. 41a)], lectotypus (Art. 20) [nom. illeg. (Art. 31); correct name: *Arabidetum caeruleae* Br.-Bl. 1918 (see Englisch et al. 1993: 309)]

**6 *Loiseleurio-Vaccinietea* Egger ex Schubert 1960**

Arctic-boreal and (sub)alpine dwarf-shrub heathlands

Table 1, columns 19–20; Fig 1LV

**OFN:** *Loiseleurio-Vaccinietea* (Egger 52 emend.) (Schubert 1960: 194)

**Syn.:** *Loiseleurio-Vaccinietea* Egger 1952 (Art. 8)

**Syntax. syn.:** *Vaccinio-Piceetea* Br.-Bl. in Br.-Bl. et al. 1939 p. p. (*Loiseleurio-Vaccinion*), *Juncetea trifidi* Hadač in Klika et Hadač 1944 p. p. (*Rhodoreto-Vaccinietalia*), *Loiseleurio-Cetrarietea* Suzuki-Tokio et Umezu in Suzuki-Tokio 1964, *Calluno-Vaccinietea myr-*

*tilli* de Foucalt 1990 p. p. (*Empetretalia hermaphroditi*)

**Nomenclatural type:** *Empetretalia hermaphroditi* Schubert 1960 [Schubert 1960: 194 ut *Empetretalia hermaphrodita* (ord. nov.)], holotypus (Art. 18a)

**Distribution:** Lúčanská and Krivánska Malá Fatra Mts, Oravské Beskydy Mts, Oravská Magura Mts, Chočské vrchy Mts, Velká Fatra Mts, Nízke Tatry Mts, Západné Tatry Mts, Vysoké Tatry Mts, Belianske Tatry Mts, Muránska planina Mts, Volovské vrchy Mts, Bukovské vrchy Mts

**61 *Rhododendro-Vaccinietalia* Br.-Bl. in Br.-Bl. et Jenny 1926**

Arctic-boreal and (sub)alpine ericoid dwarf-shrub heathlands

Table 1, columns 19–20

**OFN:** *Rhodoreto-Vaccinietalia* (Braun-Blanquet and Jenny 1926: 286)

**Syn.:** *Rhodoretalia* G. Br.-Bl. et J. Br.-Bl. 1931 (Art. 29c, 41b), *Loiseleurio-Vaccinietalia* Egger 1952 (Art. 8)

**Syntax. syn.:** *Empetretalia hermaphroditi* Schubert 1960, *Cladonio-Vaccinietalia* Kielland-Lund 1967 p. p. (*Loiseleurio-Vaccinion*, *Rhododendro-Vaccinion*)

**Nomenclatural type:** *Loiseleurio-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny 1926 (Braun-Blanquet & Jenny 1926: 287 ut *Loiseleurieto-Vaccinion*-Verband), holotypus (Art. 18a)

**Annotation:** The alliance *Rhododendro-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny 1926 was described invalidly (Art. 2b; cf. Grabherr 1993b: 456), therefore the alliance *Loiseleurio-Vaccinion* remained as the only proper choice of the type. A valid description of the alliance *Rhododendro-Vaccinion* was published by Schnyder (1930: 171) and afterwards by G. Braun-Blanquet & J. Braun-Blanquet (1931: 61).

**611 *Loiseleurio procumbentis-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny 1926**

Chionophobic cryophilous dwarf-shrub heathlands on wideswept slopes and edges

Table 1, column 19

**OFN:** *Loiseleurieto-Vaccinion*-Verband [Braun-Blanquet & Jenny 1926: 287 (Art. 41b)]

**Syn.:** *Loiseleurio-Vaccinion* G. Br.-Bl. et J. Br.-Bl. 1931 (Art. 31), *Loiseleurio-Vaccinion* Aichinger 1933 (Art. 31), *Loiseleurio-Vaccinion uliginosi* Krajina 1933 p. p. maj. (Art. 43)

**Incl.:** *Cetrario-Loiseleurion* Br.-Bl. et Sissingh in Br.-Bl. et al. 1939

**Phantomname:** *Loiseleurio-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny ex Krajina 1933 (Mucina & Maglocký 1985: 192)

**Non:** *Loiseleurio-Vaccinion uliginosi* Nordhagen 1936 [nom. inval. (Art. 8); correct name: *Loiseleurio-Diapension* (Nordhagen in Br.-Bl. et al. 1939) Daniëls 1982; see Braun-Blanquet et al. 1939: 89; Dierssen 1992: 218, 1996: 779]

**Nomenclatural type:** *Empetro-Vaccinietum uliginosi* Br.-Bl. in Br.-Bl. et Jenny 1926 [Braun-Blanquet

& Jenny 1926: 291 ut *Empetretum-Vaccinietum* (*Empetrum-Vaccinium uliginosum*-Heide)], lectotypus hoc loco [nom. illeg. (Art. 43); correct name: *Empetretum-Vaccinietum gaultherioidis* Br.-Bl. in Br.-Bl. et Jenny 1926 corr. Grabherr 1993 (see Grabherr 1993b: 454)]

**Annotation 1:** Šibík et al. (2007c: 291) did not use *expressis verbis* the category of the nomenclatural type to typify the name of the alliance (Art. 5); therefore, the typification in this study is invalid.

**Annotation 2:** Šibík et al. (2007a: 103, 2007c: 296) classified the phytocoenoses, dominated by *Calluna vulgaris* from the subalpine to lower alpine belt of the Tatra Mts, as the association *Junco trifidi-Callunetum vulgaris* (Krajina 1933) Hadač ex Šibík et al. 2007. Phytocoenoses from the Krkonoše Mts, similar to those occurring in the Tatra Mts, were previously described by Zlatník (1925: 40) as *Callunetum-Deschampsietum*. After considering the species composition and the synecology of the community, we identify the West Carpathian phytocoenoses with those from the Sudetes (Krkonoše Mts, Jeseníky Mts). Therefore, we suggest using the name published by Kočí & Chytrý (2007: 67):

**Avenello flexuosae-Callunetum vulgaris** Zlatník 1925 nom. invers. propos. et nom. mut. propos.

**Syn.:** *Callunetum vulgaris tatricum* Krajina 1933 (Art. 34a), *Junco trifidi-Callunetum* (Krajina 1933) Hadač in Mucina et Maglocký 1985 (Art. 2b), *Junco trifidi-Callunetum* (Krajina 1933) Hadač 1987 (Art. 2b), *Junco trifidi-Callunetum vulgaris* (Krajina 1933) Hadač ex Šibík et al. 2006 (Art. 3i)

**Syntax. syn.:** *Junco trifidi-Callunetum vulgaris* (Krajina 1933) Hadač ex Šibík et al. 2007

**Annotation 3:** Hadač (1972: 357) published the name *Loiseleurio-Arctostaphyilion* Kalliola 1939 as the valid name for the alliance *Loiseleurio-Vaccinion* Nordhagen 1936 non Br.-Bl. in Br.-Bl. et al. 1926. Kalliola (1939: 174), however, described the alliance *Loiseleurieto-Vaccinion* on the basis of the sociations, and hence invalidly (Principle II, Art. 3d).

### 612 *Vaccinion myrtilli* Krajina 1933

Subalpine acidophilous mesophilous dwarf-shrub heathlands in the Western Carpathians and Hercynic mountains

Table 1, column 20

**OFN:** *Vaccinion myrtilli* (Krajina 1933: 162)

**Syntax. syn.:** *Melampyro-Vaccinion* Jeník et al. 1980

**Pseud.:** *Rhodoretum-Vaccinion* sensu Klika & Hadač 1944 p. p. non Schnyder 1930

**Non:** *Genisto pilosae-Vaccinion* Br.-Bl. 1926

**Phantomname:** *Rhodoretum-Vaccinion myrtilli* (Br.-Bl. 1926) Krajina 1933 (Klika 1948: 307, 1955: 308; Unar et al. 1985: 26)

**Nomenclatural type:** *Vaccinietum myrtilli tatricum* Szafer et al. 1927, lectotypus (Šibík et al. 2007a: 104) [nom. illeg. (Art. 34a); correct name: *Avenastro versicoloris-Vaccinietum myrtilli* Krajina 1933 nom. invers. propos. (see Šibík et al. 2007a: 103, 2007c: 299)]

**Annotation 1:** Šibík et al. (2006: 43, 2007c: 297) emended the content of the alliance *Vaccinion myr-*

*tilli* that was described by Krajina (1933). The alliance was restricted only to the subalpine acido-mesophilous dwarf-shrub heathlands of the Western Carpathians and the Sudetes. From the original diagnosis of the alliance, they excluded the (sub)associations *Myrtilleto-Calamagrostidetum villosae carpaticum* Krajina 1933, *Vaccinietum myrtilli tatricum pinetosum mughi* Krajina 1933 and *Vaccinietum myrtilli tatricum piceetosum abietis* Krajina 1933 that represent the elements of other higher syntaxa.

**Annotation 2:** Chytrý & Härtel (2007: 311) took the name *Vaccinion myrtilli* Krajina 1933 as a partial synonym of the alliance *Genisto pilosae-Vaccinion* Br.-Bl. 1926, in which they classified the subalpine heathlands with *Vaccinium myrtillus* from the high Sudeten mountains. As was reported by Šibík et al. (2006: 44, 2007c: 298), the classification of these species-poor communities (association *Festuco supinae-Vaccinietum myrtilli* Šmarda 1950 that could be mistaken for *Avenastro versicoloris-Vaccinietum myrtilli* Krajina 1933 nom. invers. propos.) is complicated. They represent the transitional stands between the plant communities of the alliances *Genisto-Vaccinion* and *Vaccinion myrtilli*. The latter alliance is analogous with the alpine alliance *Rhododendro-Vaccinion* Schnyder 1930 (syn.: *Rhododendro-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny 1926, Art. 2b). The alliance *Rhododendro-Vaccinion* is differentiated from the plant communities of the *Genisto-Vaccinion* (widespread in low mountain ranges of Western Europe) by the occurrence of mountain and boreal taxa, such as *Calamagrostis villosa*, *Empetrum nigrum* s. l., *Homogyne alpina*, *Huperzia selago*, *Melampyrum sylvaticum* etc., and also by the absence of many characteristic species with subatlantic distribution typical of Western Europe and disappearing eastward (cf. Schaminée et al. 1993).

### 7 *Caricetea curvulae* Br.-Bl. 1948 nom. cons. propos.

Alpine siliceous swards

Table 1, column 21; Fig 1CC

**OFN:** *Caricetea curvulae* (Braun-Blanquet 1948: 185)

**Syn.:** *Caricetea curvulae* Br.-Bl. in Br.-Bl. et al. 1947 (Art. 8)

**Syntax. syn.:** *Juncetea trifidi* Hadač in Klika et Hadač 1944 p. p. min. (*Juncion trifidi*)

**Phantomname:** *Caricetea curvulae* Br.-Bl. 1926 (Lakušić 1970: 355), *Juncetea trifidi* Hadač 1946 em. Br.-Bl. 1948 (Theurillat et al. 1994: 23, 1995: 218)

**Nomenclatural type:** *Caricetalia curvulae* Br.-Bl. in Br.-Bl. et Jenny 1926 (Braun-Blanquet 1948: 186), holotypus (Art. 18a)

**Annotation:** Theurillat et al. (1995: 218) proposed to protect the name *Caricetea curvulae* Br.-Bl. 1948 (Art. 52). Therefore, we corrected the name of the class from the previous form in the study by Dúbravcová & Jarolímek (2007: 321) into the correct form.

**Distribution:** Nízke Tatry Mts, Západné Tatry Mts, Vysoké Tatry Mts, Belianske Tatry Mts

**71 *Caricetalia curvulae* Br.-Bl. in Br.-Bl. et Jenny 1926**

Alpine siliceous swards on impoverished humic soils  
Table 1, column 21

**OFN:** *Caricetalia curvulae* (Braun-Blanquet & Jenny 1926: 262)

**Syn.:** *Caricetalia curvulae* G. Br.-Bl. et J. Br.-Bl. 1931 (Art. 31), *Caricetalia curvulae* Br.-Bl. in Br.-Bl. et al. 1947 (Art. 8)

**Nomenclatural type:** *Caricion curvulae* Br.-Bl. in Br.-Bl. et Jenny 1926 (Braun-Blanquet & Jenny 1926: 263 ut *Caricion curvulae*-Verband), lectotypus (Art. 20)

**711 *Juncion trifidi* Krajina 1933**

Rush-swards in the Eastern Alps and the Western Carpathians

Table 1, column 21

**OFN:** *Juncion trifidi* (*Trifidion*) (Krajina 1933: 2)

**Syn.:** *Juncion trifidi* Pawłowski 1928 (Art. 8)

**Pseud.:** *Caricion curvulae* sensu auct. carpat. occid. (e.g. Pawłowski et al. 1928 p. p. maj.; Braun-Blanquet 1930; Pawłowski 1935) non Br.-Bl. in Br.-Bl. et Jenny 1926

**Nomenclatural type:** *Juncetum trifidi* Szafer et al. 1923 em. Krajina 1933 [Krajina 1933: 20 ut *Juncetum trifidi* (*Trifidetum*) Szafer, Pawłowski, Kulczyński 33, 1923 (excl. *Agrostidetum rupestris* et *Oreochloetum*)], lectotypus (Art. 20)

**8 *Nardetea strictae* Rivas Goday et Borja Carbonell 1961**

Montane and alpine mat-grass meadows and pastures  
Table 1, columns 22–23; Fig 1NS

**OFN:** *Nardetea* (Oberdorfer, Prsg. 1949) (Rivas Goday & Borja Carbonell 1961: 218)

**Syntax. syn.:** *Juncetea trifidi* Hadač in Klika et Hadač 1944 p. p. min. (*Nardion strictae*), *Caricetea curvulae* Br.-Bl. 1948 p. p. (*Nardion*), *Nardo-Callunetea* Preising 1949 p. p. (*Nardetalia strictae*), *Nardo-Calamagrostietea villosae* Jenik et al. 1980 p. p. min. (*Nardion strictae*)

**Non:** *Calluno-Ulicetea* Br.-Bl. et Tx. ex Klika in Klika et Hadač 1944

**Nomenclatural type:** *Nardetalia strictae* Oberdorfer ex Preising 1949 [Rivas Goday & Borja Carbonell 1961: 218 ut *Nardetalia* (Oberdorfer 1949) Prsg. 1949], holotypus (Art. 18a)

**81 *Nardetalia strictae* Oberdorfer ex Preising 1949**

Montane and alpine mat-grass meadows and pastures  
Table 1, columns 22–23

**OFN:** *Nardetalia* (Oberdorfer 1949 n. n.) Prsg. 1949 (Preising 1949: 23)

**Syn.:** *Nardetalia* Oberdorfer 1949 (Art. 3b, 8)

**Nomenclatural type:** *Nardo-Galium saxatilis* Preising 1949 (Preising 1949: 20), holotypus (Art. 18a) [nom. illeg. (Art. 29c); correct name: *Violion caninae* Schwickerath 1944 (cf. Krahulec 1983: 207)]

**Annotation:** Preising (1949: 23) described the order *Nardetalia* on the basis of three alliances: *Nardion boreale* Prsg. 1949 (prov.) (Art. 3b), *Nardo-Trifolium alpini* Prsg. 1949 (*Nardion* Br.-Bl. 1926 p. p.) (Art. 8) and *Nardo-Galium saxatilis* Prsg. 1949 (*Violion caninae* Schwickerath 1944 p. p.). Of these, only the name of the alliance *Nardo-Galium saxatilis* was published validly (with the reference of the original diagnosis of the alliance *Violion caninae*, stated as synonym). Therefore, this name became the only proper choice of the type (cf. Krahulec 1983: 208).

**811 *Nardion strictae* Br.-Bl. 1926**

Alpine and subalpine dense low-stem mat-grass swards  
Table 1, column 22

**OFN:** *Nardion* (Pacages alpestres à *Nardus stricta*) (Braun-Blanquet 1926: 31)

**Syn.:** *Nardion strictae* Br.-Bl. in Br.-Bl. et Jenny 1926 (Art. 8), *Nardion strictae* Luquet 1926 (Art. 33), *Nardion strictae* Pawłowski 1928 (Art. 8), *Nardion strictae* Wallisch in Pawłowski et al. 1928 (Art. 31), *Nardion strictae* Sillinger 1933 (Art. 31), *Nardion strictae* Rübél 1933 (Art. 8), *Eu-Nardion* Oberdorfer 1949 (Art. 3h, 8), *Nardo-Trifolium alpini* Preising 1949 (Art. 8), *Hygronardion* Hadač et al. 1969 (Art. 3b)

**Phantomname:** Verband *Eu-Nardion* Br.-Bl. 1926 (Oberdorfer 1957: 308, 1962: 34)

**Nomenclatural type:** *Plantagini alpinae-Nardetum* Br.-Bl. 1926 (Braun-Blanquet 1926: 32 ut Association à *Nardus* et *Plantago alpina*), holotypus (Art. 18a; cf. Krahulec 1983: 208)

**Annotation:** From the higher syntaxa of the class *Nardetea strictae*, only the primary low-stem floriferous mat-grass swards of the alliance *Nardion strictae* (Kliment 2007b) were compiled in the fourth volume of *Plant Communities of Slovakia*. Pastures affected by humans that are included in the alliances *Nardo-Agrostion tenuis* Sillinger 1933 and *Violion caninae* Schwickerath 1944 are discussed in a separate study (Ujházy & Kliment 2007). Therefore, these are not dealt with directly in this article. In order to depict the diagnostic species of the class *Nardetea strictae*, order *Nardetalia strictae* and alliance *Nardion strictae*, we have attached a column to the synoptic table that represents the alliance *Nardo-Agrostion tenuis* from the area of the Western Carpathians (Table 1, column 23).

**Distribution:** Nízke Tatry Mts, Západné Tatry Mts, Vysoké Tatry Mts, Belianske Tatry Mts

**Acknowledgements**

The authors are grateful to František Krahulec (Prague), Milan Chytrý (Brno) and Jean-Paul Theurillat (Champex-Lac) for valuable comments on the nomenclature of selected syntaxa, as well as for providing publications difficult to obtain elsewhere. We also thank anonymous reviewers for their thorough reviews and comments on an earlier version of the manuscript. For English proofreading we are indebted to American Journal Experts (www.journalexperts.com) and Proof-Reading-Service.com, Hertfordshire, UK. This work

was supported by the grant agency VEGA, grant No. 2/0121/09.

## References

- Aichinger A. 1933. Vegetationskunde der Karawanken. Pflanzensoziologie **2**: 1–329.
- Albrecht J. 1969. Soziologische und ökologische Untersuchungen alpiner Rasengesellschaften, insbesondere an Standorten auf Kalk-Silikat-Gesteinen. Diss. Bot. **5**: 1–91.
- Barbero M. & Bonin G. 1969. Signification biogéographique et phytosociologique des pelouses écorchées des massifs méditerranéens nord-occidentaux, des Apennins et des Balkans septentrionaux (*Festuco-Seslerietea*). Bull. Soc. Bot. France **116**: 227–243.
- Bělohávková R. 1980. Rostlinná spoločenstva alpského stupně Kriváňské Malé Fatry. Mscr., Administration of Malá Fatra National park, Varín.
- Bělohávková R. & Fišerová D. 1989. *Festucion carpaticae* alianza nova – a new alliance of tall grasslands in the high Carpathian Mountains. Folia Geobot. Phytotax. **24**: 1–24.
- Borza A. 1934. Studii fitosociologice in Munții Retezatului. Bul. Grăd. Bot. Cluj. **14**: 1–84.
- Boşcaiu N. & Mihăilescu S. 1997. Reconsideration of syntaxonomical position for *Delphinion elati* alliance in the Romanian vegetation. Proc. Inst. Biol. Rom. Acad., Annual Sci. Session, Bucharest, pp. 37–40.
- Braun-Blanquet J. 1926. Le “climax complexe” des landes alpines (*Genisteto-Vaccinion* du Cantal), pp. 29–48. In: Braun-Blanquet J. (ed.), Études phytosociologiques en Auvergne, Clermont-Ferrand.
- Braun-Blanquet J. 1930. Zentralalpen und Tatra, eine pflanzensoziologische Parallele. Veröff. Geobot. Inst. Rübel **6**: 81–123.
- Braun-Blanquet J. 1948. La végétation alpine des Pyrénées Orientales. Consejo superior de investigaciones científicas, Barcelona, 306 pp.
- Braun-Blanquet J. 1949a. Übersicht der Pflanzengesellschaften Rätians III. Vegetatio **1** (1948) **4–5**: 285–316.
- Braun-Blanquet J. 1949b. Übersicht der Pflanzengesellschaften Rätians (IV). Vegetatio **2/1**: 20–37.
- Braun-Blanquet J. 1964. Pflanzensoziologie. Grundzüge der Vegetationskunde. 3. Aufl. Springer, Wien, 865 pp.
- Braun-Blanquet G. & Braun-Blanquet J. 1931. Recherches phytogéographiques sur le Massiv du Gross Glockner (Hohe Tauern). Rev. Géogr. Alp. **19**: 1–65.
- Braun-Blanquet J. & Jenny H. 1926. Vegetations-Entwicklung und Bodenbildung in der alpinen Stufe der Zentralalpen. Denkschr. Schweiz. Naturforsch. Ges. **63**: 183–349.
- Braun-Blanquet J. & Tüxen R. 1943. Übersicht der höheren Vegetationseinheiten Mitteleuropas. S.I.G.M.A. Comm. No. **84**: 1–11.
- Braun-Blanquet J., Sissingh G. & Vlieger J. 1939. Prodromus der Pflanzengesellschaften. Fasc. 6. Klasse der *Vaccinio-Piceetea* (Nadelholz- und Vaccinienheiden-Verbände der eurosibirisch-nordamerikanischen Region). Comité International du Prodrome Phytosociologique, Montpellier, 123 pp.
- Braun-Blanquet J., Emberger L. & Molinier R. 1947. Instructions pour l'établissement de la Carte des Groupements Végétaux. Causse Graille Castelnau, Montpellier, 45 pp.
- Coldea Gh. 1984. L' étude des pâturages basiphytes sous-alpins des Monts Rodnei (Les Carpathes Orientales). Contr. Bot. **1984**: 137–154.
- Coldea Gh. 1997. Classe *Seslerietea albicantis* Br.-Bl. 1948 em. Oberd. 1978, pp. 207–222. In: Coldea Gh. (ed.), Sanda V., Popescu A. & Stefan N., Les associations végétales de Roumanie. 1. Les associations herbacées naturelles, Presses Universitaires de Cluj, Cluj.
- Csűrös Št., Gergely I. & Csűrös M. 1985. Studii fitocenologice asupra pajıştilor de *Deschampsia caespitosa* (L.) P. Beauv. din R. S. România. Contr. Bot. **1985**: 141–159.
- Dierssen K. 1992. Zur Synsystematik nordeuropäischer Vegetationstypen. 1. Alpine Vegetation und floristisch verwandte Vegetationseinheiten tieferer Lagen sowie der Arktis. Ber. Reinhold-Tüxen Ges. **4**: 191–226.
- Dierssen K. 1996. Vegetation Nordeuropas. Eugen Ulmer, Stuttgart, 838 pp.
- Domin K. 1925. *Festucetum carpaticae* v Bielských Tatrách. Rozpr. České Akad. Věd **34/19**: 1–25.
- Domin K. 1929. Příspěvek k poznání vegetačních poměrů a květeny Malého Havranu v Bělských Tatrách. Spisy Přír. Fak. Karlovy Univ. **1929/101**: 3–18.
- Domin K. 1930. Zur Soziologie der chionophytischen Pflanzengesellschaften des Tatragebirges. Veröff. Geobot. Inst. Rübel **6**: 167–190.
- Dúbravcová Z. 1996. Spoločenstvá triedy *Juncetea trifidi* v Západných Karpatoch. CSc. thesis, mscr., Faculty of Sciences UK, Bratislava.
- Dúbravcová Z. 2007. *Salicetea herbaceae* Br.-Bl. 1948, pp. 253–281. In: Kliment J. & Valachovič M. (eds), Rastlinné spoločenstvá Slovenska. 4. Vysokohorská vegetácia, Veda, Bratislava.
- Dúbravcová Z. & Jarolímek I. 2007. *Caricetea curvulae* Br.-Bl. 1948, pp. 319–339. In: Kliment J. & Valachovič M. (eds), Rastlinné spoločenstvá Slovenska. 4. Vysokohorská vegetácia, Veda, Bratislava.
- Dúbravcová Z. & Šibík J. (2006): K variabilite spoločenstiev zväzu *Festucion versicoloris* (*Carici rupestris-Kobresietea bellardii*). Bull. Slov. Bot. Spoločn. **28**: 223–238.
- Dúbravcová Z., Foltínová J., Pačlová L. & Turečková J. 1976. Vegetácia subalpínskeho a alpínskeho stupňa Západných Tatier. Final report, mscr., Faculty of Sciences UK, Bratislava.
- Dúbravcová Z., Lisická E. & Pačlová L. 1980. Vegetácia vápencových a dolomitových obvodov Západných Tatier. Partial report, mscr., Faculty of Sciences UK, Bratislava.
- Dúbravcová Z., Bernátová D., Dzubinová L., Kliment J., Lisická E., Medovič J., Petrik A. & Bernát J. 1990. Nelesné rastlinné spoločenstvá Západných Karpát a hodnotenie negatívnych vplyvov na nelesnú vegetáciu Tatier. Final report, mscr., Faculty of Sciences UK, Bratislava.
- Dúbravcová Z., Jarolímek I., Kliment J., Petrik A., Šibík J. & Valachovič M. 2005. Alpine heaths in the Western Carpathians – a new approach to the classification. Ann. Bot., S. N. **5**: 153–160.
- Duvigneaud P. 1949. Classification phytosociologique des tourbières de l'Europe. Bull. Soc. Roy. Bot. Belgique **81**: 58–129.
- Eggler J. 1952. Übersicht der höheren Vegetationseinheiten der Ostalpen. Mitt. Naturwiss. Vereines Steiermark **81–82**: 28–41.
- Englisch T. 1993. *Salicetea herbaceae*, pp. 382–401. In: Grabherr G. & Mucina L. (eds), Die Pflanzengesellschaften Österreichs. Teil 2. Natürliche waldfreie Vegetation, Gustav Fischer, Jena.
- Englisch T., Valachovič M., Mucina L., Grabherr G. & Ellmauer T. 1993. *Thlaspietea rotundifolii*, pp. 276–342. In: Grabherr G. & Mucina L. (eds), Die Pflanzengesellschaften Österreichs. Teil 2. Natürliche waldfreie Vegetation, Gustav Fischer, Jena.
- Fajmonová E. 1980. Príspevok k poznaniu nitrofilných lemových spoločenstiev v Javorníkoch. Preslia **52**: 333–345.
- Foggi B., Nardi E. & Rossi G. 2001. Nomenclatural notes and typification in *Sesleria* Scop. (Poaceae). Taxon **50**: 1101–1106.
- Foucault de B. 1990. Essai sur une ordination synsystematique des landes continentales a boreo-alpines. Doc. Phytosociol., N. S. **12**: 151–174.
- Gams H. 1936. Beiträge zur pflanzengeographische Karte Österreichs. I. Die Vegetation des Grossglocknergebietes. Abh. Zool.-Bot. Ges. Wien **16**: 1–79.
- Grabherr G. 1993a. *Carici rupestris-Kobresietea bellardii*, pp. 373–381. In: Grabherr G. & Mucina L. (eds), Die Pflanzengesellschaften Österreichs. Teil 2. Natürliche waldfreie Vegetation, Gustav Fischer, Jena.
- Grabherr G. 1993b. *Loiseleurio-Vaccinietea*, pp. 447–467. In: Grabherr G. & Mucina L. (eds), Die Pflanzengesellschaften Österreichs. Teil 2. Natürliche waldfreie Vegetation, Gustav Fischer, Jena.
- Grabherr G. 1997. The high-mountain ecosystems of the Alps, pp. 97–121. In: Wielgolaski F.E. (ed.), Ecosystems of the world. 3. Polar and alpine tundra, Elsevier, Amsterdam.

- Grabherr G., Greimler J. & Mucina L. 1993. *Seslerietea albican-tis*, pp. 402–446. In: Grabherr G. & Mucina L. (eds), Die Pflanzengesellschaften Österreichs. Teil 2. Natürliche waldfreie Vegetation, Gustav Fischer, Jena.
- Grabensčíkov O., Brilllová-Suchá D., Kolláriková K., Ružička M., Schidlá E., Šmarda J. & Zahradníková-Rošetzká K. 1956. Hole južnej časti Veľkej Fatry. Vydavateľstvo SAV, Bratislava, 256 pp.
- Hadač E. 1946. The Plant-Communities of Sassen Quarter, Vest-spitzbergen. Stud. Bot. Českoslov. **7/2–4**: 127–164.
- Hadač E. 1956. Rostlinná společenstva Temnomrečínové doliny ve Vysokých Tatrách. Biol. Práce **2/1**: 1–78.
- Hadač E. 1962. Übersicht der höheren Vegetationseinheiten des Tatragebirges. Vegetatio **11**: 46–54.
- Hadač E. 1972. Fell-field and heath communities of Reykjanes Peninsula, SW Iceland (Plant communities of Reykjanes Peninsula, Part 5). Folia Geobot. Phytotax. **7**: 349–380.
- Hadač E. 1987. Plant ecological notes from the Belianske Tatry Mts. Biol. Práce **33/3**: 5–95.
- Hadač E. & Smola J. 1962. Struktura sněhové pokrývky některých nelesních společenstev Doliny Siedmich prameňov v Belanských Tatrách. Biológia **17**: 98–113.
- Hadač E. & Soldán Z. 1989. Rostlinná společenstva prameniší a horských potoků v Bukovských vrších na severovýchodním Slovensku. Preslia **61**: 343–353.
- Hadač E., Březina P., Ježek V., Kubička J., Hadačová V., Vondráček M. et al. 1969. Die Pflanzengesellschaften des Tales "Dolina Siedmich prameňov" in der Belauer Tatra. Vegetácia ČSSR, Ser. B. **2**: 5–343.
- Hendrych R. 1981. Bemerkungen zum Endemismus in der Flora der Tschechoslowakei. Preslia **53**: 97–120.
- Hennekens S. M. & Schaminée J. H. J. 2001. TURBOVEG, a comprehensive data base management system for vegetation data. J. Veg. Sci. **12**: 589–591.
- Holub J., Hejny S., Moravec J. & Neuhäusl R. 1967. Übersicht der höheren Vegetationseinheiten der Tschechoslowakei. Rozpr. Českoslov. Akad. Věd **77**: 3–75.
- Huml O., Lepš J., Prach K. & Rejmánek M. 1979. Zur Kenntnis der Quellfluren, alpinen Hochstaudenfluren und Gebüsch des Fägäraş-Gebirges in die Südkarpaten. Preslia **51**: 35–45.
- Chytrý M. & Härtel H. 2007. *Genisto pilosae-Vaccinion* Br.-Bl. 1926, pp. 311–319. In: Chytrý M. (ed.), Vegetace České republiky. 1. Travinná a keříčková vegetace, Academia, Praha.
- Jarolímek I. & Kliment J. 2008. *Daphno mezerei-Dryopteridetum filicis-mariss* v Krivánskej Malej Fatre. Bull. Slov. Bot. Spoločn. **30**: 239–246.
- Jarolímek I. & Schlosser G. 1997. FYTOPACK – a system of programs to process phytocoenological tables. Biologia **52**: 53–59.
- Jarolímek I., Kliment J. & Valachovič M. 2002. The syntaxonomical revision of the riparian plant communities dominated by *Petasites hybridus* in Slovakia. Biologia **57**: 471–492.
- Jarolímek I., Šibík J. (eds) 2008. Diagnostic, constant and dominant species of the higher vegetation units of Slovakia. Veda, Bratislava, 332 pp.
- Jarolímek I., Šibík J., Hegedúsová K., Janišová M., Kliment J., Kučera P., Májerková J., Micháľková D., Sadloňová J., Šibíková I., Škodová I., Uhlířová J., Ujházy K., Ujházyová M., Valachovič M. & Zaliberová M. 2008. A list of vegetation units of Slovakia, pp. 295–329. In: Jarolímek I. & Šibík J. (eds), Diagnostic, constant and dominant species of the higher vegetation units of Slovakia, Veda, Bratislava.
- Jeník J. 1959. Kurzgefasste Übersicht der Theorie der anemographischen Systeme. Preslia **31**: 337–357.
- Jeník J. 1961. Alpínská vegetace Krkonoš, Králického Sněžníku a Hrubého Jeseníku. Nakladatelství ČSAV, Praha, 409 pp.
- Jeník J., Bureš L. & Burešová Z. 1980. Syntaxonomic study of vegetation in Velká Kotlina cirque, the Sudeten Mountains. Folia Geobot. Phytotax. **15**: 1–28.
- Kaiser E. 1926. Die Pflanzenwelt des Hennebergisch-Fränkischen Muschelkalkgebietes. Rep. Spec. Nov. Reg. Veg., Beih. **44**: 1–280.
- Kalliola R. 1939. Pflanzensoziologische Untersuchungen in der alpinen Stufe Finnisch-Lapplands. Ann. Bot. Soc. Zool. Bot. Fenn. Vanamo **13/2**: 1–321.
- Karner P. & Mucina L. 1993. *Mulgedio-Aconitetea*, pp. 469–505. In: Grabherr G. & Mucina L. (eds), Die Pflanzengesellschaften Österreichs. Teil 2. Natürliche waldfreie Vegetation, Gustav Fischer, Jena.
- Kielland-Lund J. 1967. Zur Systematik der Kieferfelder Fennoskandiens. Mitt. Florist. Soziol. Arbeitsgem. **11/12**: 127–141.
- Klika J. 1932. Der *Seslerion coeruleae*-Verband in den Westkarpaten. Beih. Bot. Centralbl. **49B**: 133–175.
- Klika J. 1948. Rastlinná sociologie. Melantrich, Praha, 380 pp.
- Klika J. 1955. Nauka o rostlinných společenstvech. Nakladatelství ČSAV, Praha, 361 pp.
- Klika J. & Hadač E. 1944. Rostlinná společenstva střední Evropy. Příroda (Brno) **36**: 249–259, 281–295. [sep. p. 1–26]
- Klika J., Novák V. (eds), Gösl V., Gregor A., Hiltzer A., Káš V., Klečka A., Laník J., Maňan B., Mikyška R., Pelíšek J., Prát S., Spirhanzl J., Svoboda P. & Zlatník A. 1941. Praktikum rostlinné sociologie, půdoznalství, klimatologie a ekologie. Melantrich, Praha, 385 pp.
- Kliment J. 1992. Hölne spoločenstvá Veľkej Fatry a skupiny Zvolena. CSc. thesis, mscr., Institute of Botany SAS, Bratislava.
- Kliment J. 1994. *Anemone narcissiflorae-Auenelletum flexuosae* Kmoníček 1935 emend. Kliment – "zabudnuté" spoločenstvo zväzu *Calamagrostion arundinaceae*. Bull. Slov. Bot. Spoločn. **16**: 63–70.
- Kliment J. 1997. Dve nové asociácie zväzu *Calamagrostion villosae*. Bull. Slov. Bot. Spoločn. **19**: 136–148.
- Kliment J. 1999. Komentovaný prehľad vyšších rastlín flóry Slovenska, uvádzaných v literatúre ako endemické taxóny. Bull. Slov. Bot. Spoločn., Suppl. **4**: 1–434.
- Kliment J. 2007a. *Betulo carpaticae-Alnetea viridis* Rejmánek in Huml et al. 1979, pp. 133–145. In: Kliment J. & Valachovič M. (eds), Rastlinné spoločenstvá Slovenska. 4. Vysokohorská vegetácia, Veda, Bratislava.
- Kliment J. 2007b. *Nardetea strictae* Rivas Goday et Borja Carbonell 1961, pp. 343–353. In: Kliment J. & Valachovič M. (eds), Rastlinné spoločenstvá Slovenska. 4. Vysokohorská vegetácia, Veda, Bratislava.
- Kliment J. & Jarolímek I. 1995. The *Rumex alpinus* communities in Slovakia. Biologia **50**: 349–365.
- Kliment J. & Jarolímek I. 2002. Syntaxonomical revision of the *Petasites kablikianus* communities (*Petasition officinalis*) in the West Carpathians. Biologia **57**: 101–118.
- Kliment J. & Jarolímek I. 2003. Syntaxonomical revision of the plant communities dominated by *Calamagrostis arundinacea* (*Calamagrostion arundinaceae*) in Slovakia. Thaiszia-J. Bot. **13**: 135–158.
- Kliment J. & Valachovič M. (eds) 2007. Rastlinné spoločenstvá Slovenska. 4. Vysokohorská vegetácia. Veda, Bratislava, 388 pp.
- Kliment J., Jarolímek I., Šibík J. & Valachovič M. 2004. Syntaxonomy and nomenclature of the communities of the orders *Calamagrostietalia villosae* and *Adenostyletalia alliariae* in Slovakia. Thaiszia-J. Bot. **14**: 93–157.
- Kliment J., Bělohávková R., Bernátová D., Jarolímek I., Petřík A., Šibík J., Uhlířová J. & Valachovič M. 2005a. Syntaxonomy and nomenclature of the communities of the alliances *Astero alpini-Seslerion calcariae* and *Seslerion tatrae* in Slovakia. Hacquetia **4**: 121–149.
- Kliment J., Bernátová D., Jarolímek I. & Uhlířová J. 2005b. Floristic composition and syntaxonomy of the plant communities with *Carex sempervirens* subsp. *tatorum* in the West Carpathians. Biologia **60**: 37–56.
- Kliment J., Jarolímek I. & Šibík J. 2007a. *Mulgedio-Aconitetea* Hadač et Klika in Klika 1948, pp. 23–129. In: Kliment J. & Valachovič M. (eds), Rastlinné spoločenstvá Slovenska. 4. Vysokohorská vegetácia, Veda, Bratislava.
- Kliment J., Bernátová D., Jarolímek I., Šibík J. & Uhlířová J. 2007b. *Elyno-Seslerietea* Br.-Bl. 1948, pp. 149–208. In: Kliment J. & Valachovič M. (eds), Rastlinné spoločenstvá Slovenska. 4. Vysokohorská vegetácia. Veda, Bratislava.

- Kmoníček V. 1935. *Deschampsietum flexuosae* ve Velké Fatře. Věda Přír. **16**: 40–43.
- Kmoníček V. 1936. Louky a pastviny středního Slovenska. Sborn. Českoslov. Akad. Zeměd. **11**: 436–445.
- Kočí M. 2001. Subalpine tall-forb vegetation (*Mulgedio-Aconitetea*) in the Czech Republic – syntaxonomical revision. Preslia **73**: 289–331.
- Kočí M. 2007. Subalpínská vysokobylinná a křovinná vegetace (*Mulgedio-Aconitetea*), pp. 91–131. In: Chytrý, M. (ed.), Vegetace České republiky 1. Travinná a keříčková vegetace, Academia, Praha.
- Kočí M. & Chytrý M. 2007. Alpínská vřesoviště (*Loiseleurio-Vaccinietea*), pp. 65–75. In: Chytrý M. (ed.), Vegetace České republiky 1. Travinná a keříčková vegetace, Academia, Praha.
- Kopecký K. 1968. Zur Polemik über die phytozöologische Erfassung der Flussröhrichtgesellschaften Mitteleuropas. Preslia **40**: 397–407.
- Kopecký K. 1969. Zur Syntaxonomie der natürlichen Saumgesellschaften und zur Gliederung der Klasse *Galio-Urticetea*. Folia Geobot. Phytotax. **4**: 235–259.
- Krahulec F. 1983. Zur Nomenklatur der höheren Einheiten der mitteleuropäischen Pflanzengesellschaften der Ordnung *Nardetalia* s. l.: Berichtigungen und Typisierungen. Folia Geobot. Phytotax. **18**: 207–210.
- Krajina V. 1933. Die Pflanzengesellschaften des Mlynic-Tales in den Vysoké Tatry (Hohe Tatra). Beih. Bot. Centralbl., **50B**: 774–957, **51B**: 1–224.
- Lakušić R. 1970. Die Vegetation der südöstlichen Dinariden. Vegetatio **21**: 321–373.
- Luquet A. 1926. Essai sur la géographie botanique de l' Auvergne. Les Presses Univ. de France, Paris, 263 pp.
- Maarel van der E. 1979. Transformation of cover-abundance values in phytosociology and its effect on community similarity. Vegetatio **39**: 97–114.
- Malynovski K. A. & Kricsfalusy V. V. 2000. Vegetation of the Ukraine. 1. High mountain vegetation. Phytosociocentre, Kyiv, 232 pp.
- Malynovski K. A. & Kricsfalusy V. V. 2002. Plant communities of the Ukrainian Carpathian highlands. Uzghorod, 244 pp.
- Marhold K. & Hindák F. (eds) 1998. Zoznam nižších a vyšších rastlín Slovenska. Veda, Bratislava, 687 pp.
- Maynard Smith J. & Price G. R. 1973. The logic of animal conflicts. Nature **246**: 15–18.
- Miadok D. 1995. Vegetácia ŠPR Ďumbier. Univerzita Komenského, Bratislava, 70 pp.
- Morariu I. 1967. Clasificarea vegetației nitrofile din România. Contr. Bot. **1967**: 233–246.
- Moravec J., Balátová-Tuláčková E., Hadač E., Hejny S., Jeník J., Kolbek J., Kopecký K., Neuhäusl R., Rybníček K. & Vicherek V. 1983a. Přehled vyšších vegetačních jednotek České socialistické republiky. Preslia **55**: 97–122.
- Moravec J., Balátová-Tuláčková E., Hadač E., Hejny S., Jeník J., Kolbek J., Kopecký K., Krahulec F., Kropáč Z., Neuhäusl R., Rybníček K. & Vicherek V. 1983b. Rostlinná společenstva České socialistické republiky a jejich ohrožení. Severočeskou Přír., Příl. **1983/1**: 1–110.
- Moravec J., Balátová-Tuláčková E., Blažková D., Hadač E., Hejny S., Husák Š., Jeník J., Kolbek J., Krahulec F., Kropáč Z., Neuhäusl R., Rybníček K., Řehořek V. & Vicherek V. 1995. Rostlinná společenstva České socialistické republiky a jejich ohrožení. Ed. 2. Severočeskou Přír., Příl. **1995/1**: 1–206.
- Morton A. 2005. DMAP for Windows. Software for Distribution Mapping. Version 7.2. <http://www.dmap.co.uk/>
- Mucina L. 1981. Poznámky ku flóře severovýchodní části Velké Fatry. Zprávy Českoslov. Bot. Společn. **16**: 29–44.
- Mucina L. 1993. Nomenklatorische und syntaxonomische Definitionen, Konzepte und Methoden, pp. 19–28. In: Mucina L., Grabherr G. & Elmauer T. (eds), Die Pflanzengesellschaften Österreichs. Teil. 1. Anthropogene Vegetation, Gustav Fischer, Jena.
- Mucina L. 1997. Conspectus of classes European vegetation. Folia Geobot. Phytotax. **32**: 117–172.
- Mucina L. & Maglocký Š. 1984. A list of higher syntaxonomical units of Slovakia. Tuexenia **4**: 31–38.
- Mucina L. & Maglocký Š. (eds) 1985. A list of vegetation units of Slovakia. Doc. Phytosociol., N. S. **9**: 175–220.
- Mucina L. & the Team of the Euro-Checklist 2009. Vegetation survey of high-rank syntaxa of Europe (EuroChecklist): A brief story of a long journey. 18<sup>th</sup> International Workshop of European Vegetation Survey, Roma, pp. 101.
- Niemann E., Heinrich W. & Hilbig W. 1973. Mädesüss-Uferfluren und verwandte Staudengesellschaften im hercynischen Raum. Wiss. Zeitschr. Univ. Jena, Math.-Natur. **22**: 591–635.
- Nordhagen R. 1936. Versuch einer neuen Einteilung der subalpinen-alpinen Vegetation Norwegens. Bergens Mus. Årb., Ser. Natur. **7**: 3–88.
- Oberdorfer E. 1949a. Pflanzensoziologische Exkursionsflora für Südwestdeutschland und die angrenzenden Gebiete. Eugen Ulmer, Stuttgart, 412 pp.
- Oberdorfer E. 1949b. Die Pflanzengesellschaften der Wutachschlucht. Beitr. Naturk. Forsch. Südwestdeutschl. **8** (1943/49): 22–60.
- Oberdorfer E. 1950. Beitrag zur Vegetationskunde des Allgäu. Beitr. Naturk. Forsch. Südwestdeutschl. **9**: 29–98.
- Oberdorfer E. 1957. Süddeutschen Pflanzengesellschaften. Pflanzensoziologie **10**: 1–564.
- Oberdorfer E. 1962. Pflanzensoziologische Exkursionsflora für Süddeutschland und die angrenzenden Gebiete. Ed. 2. Eugen Ulmer, Stuttgart, 987 pp.
- Oberdorfer E. 1970. Pflanzensoziologische Exkursionsflora für Süddeutschland und die angrenzenden Gebiete. Ed. 3. Eugen Ulmer, Stuttgart, 987 pp.
- Oberdorfer E. 1978. Klasse: *Seslerietea varia* clas. nov., pp. 194–203. In: Oberdorfer E. (ed.), Korneck D. & Müller Th., Süddeutsche Pflanzengesellschaften. 2. Ed. 2, Gustav Fischer, Jena.
- Oberdorfer E. 1983. Pflanzensoziologische Exkursionsflora. Ed. 5. Eugen Ulmer, Stuttgart, 1051 pp.
- Oberdorfer E. 1990. Pflanzensoziologische Exkursionsflora. Ed. 6. Eugen Ulmer, Stuttgart, 1050 pp.
- Oberdorfer E., Görs S., Korneck D., Lohmeyer W., Müller Th., Philippi G. & Seibert P. 1967. Systematische Übersicht der westdeutschen Phanerogamen- und Gefäßkryptogamengesellschaften. Schriftenreihe Vegetationsk. **2**: 7–62.
- Ohba T. 1974. Vergleichende Studien über die alpine Vegetation Japans. Phytocoenologia **1**: 339–401.
- Pawlowski B. 1925. Über die subnivale Vegetationsstufe im Tatragebirge. Bull. Int. Acad. Polon. Sci., Cl. Sci. Math., Ser. B., pp. 769–775.
- Pawlowski B. 1928. Guide de l' excursion botanique dans les monts Tatras pp. 1–61 In: Guide des excursions en Pologne, Kraków.
- Pawlowski B. 1935. Über die Klimaxassoziationen in der alpinen Stufe der Tatra. Bull. Int. Acad. Polon. Sci., Cl. Sci. Math., Ser. B, pp. 115–146.
- Pawlowski B. 1956. Flora Tatr. I. Rośliny naczyniowe. Polska Akademia Nauk, Warszawa, 669 pp.
- Pawlowski B. & Stecki K. 1927. Die Pflanzenassoziationen des Tatra-Gebirges. IV. Teil: Die Pflanzenassoziationen des Miętusia-Tales und des Hauptmassivs der Czerwone Wierchy. Bull. Int. Acad. Polon. Sci., Cl. Sci. Math., Ser. B, Suppl. **2**: 79–121.
- Pawlowski B. & Walas J. 1949. Les associations des plantes vasculaires des Monts de Czywczyn. Bull. Int. Acad. Polon. Sci., Cl. Sci. Math., Ser. B **1948**: 117–181.
- Pawlowski B., Sokolowski M. & Wallisch K. 1928. Die Pflanzenassoziationen des Tatra-Gebirges. VII. Teil. Die Pflanzenassoziationen und die Flora des Morskie Oko-Tales. Bull. Int. Acad. Polon. Sci., Cl. Sci. Math., Ser. B, Suppl. **2**: 205–272.
- Pawlowski B., Sokolowski M. & Wallisch K. 1929. Zespoły roślin w Tatrach. Część VII. Zespoły roślinne i flora doliny Morskiego Oka. Rozpr. Wydz. Mat.-Przyr. Polsk. Akad. Umiejetn., dział A/B, **67**: 171–312.
- Petrik A., Šibík J. & Valachovič M. 2005. The class *Carici rupestris-Kobresietea bellardii* Ohba 1974 also in the Western Carpathians. Hacquetia **4**: 33–51.
- Petrik A., Dúbravcová Z., Jarolímek I., Kliment J., Šibík J. & Valachovič M. 2006. Syntaxonomy and ecology of plant

- communities of the *Carici rupestris-Kobresietea bellardii* in the Western Carpathians. *Biologia* **61**: 393–412.
- Podani J. 1993. SYN-TAX-pc. Computers Programs for Multivariate Data Analysis in Ecology and Systematics. Ver. 5.0. Scientia Publ., Budapest, 104 pp.
- Podani J. 2001. SYN-TAX 2000. Computers Program for Data Analysis in Ecology and Systematics for Windows 95, 98 and NT. User's manual. Scientia Publ., Budapest, 53 pp.
- Preising E. 1949. *Nardo-Callunetea*. Zur Systematik der Zwergstrauch-Heiden und Magertriften Europas mit Ausnahme des Mediterran-Gebietes, der Arktis und der Hochgebirge. Mitt. Florist. Soziol. Arb.-Gem., N. F. **1**: 82–94. [12–25]
- Rauschert S. 1969. Zur Nomenklatur der Farn- und Blütenpflanzen Deutschlands (II). *Feddes Repert.* **79**: 409–421.
- Rejmánek M. 1977. The concept of structure in phytosociology with references to classification of plant communities. *Vegetatio* **35**: 55–61.
- Rejmánek M., Sýkora T. & Štursa J. 1971. Fytocenologické poznámky k vegetaci Hrubého Jeseníku (*Salici silesiacae-Betuletum carpaticae* ass. nova). *Campanula* **2**: 31–39.
- Rivas Goday S. & Carbonell J. 1961. Estudio de vegetación y florula, del Macizo de Gúdar y Jabalambre. *Anal. Inst. Bot. Cavanilles* **19**: 1–550.
- Rivas-Martínez S., Fernández-González F., Loidi J., Lousã M. & Penas A. 2001. Syntaxonomical checklist of vascular plant communities of Spain and Portugal to association level. *Itinera Geobotanica* **14**: 5–341.
- Rodwell J. S., Schaminée J. H. J., Mucina L., Pignatti S., Dring J. & Moos D. 2002. The Diversity of European Vegetation. An overview of phytosociological alliances and their relationships to EUNIS habitats. Report EC-LNV nr. 2002/54, Wageningen, 168 pp.
- Rübel E. 1933. Versuch einer Übersicht über die Pflanzengesellschaften der Schweiz. *Ber. Geobot. Inst. Rübel* **1932**: 19–30.
- Schaminée J. H. J., Hennekens S. M. & Thébaud G. 1993. A syntaxonomical study of subalpine heathland communities in West European low mountain ranges. *J. Veg. Sci* **4**: 125–134.
- Schnyder A. 1930. Floristische und Vegetationsstudien im Alviergebiet II. *Mitt. Bot. Mus. Univ. Zürich* **75**: 97–188.
- Schubert R. 1960. Die zwergstrauchreichen azidiphilen Pflanzengesellschaften Mitteldeutschlands. *Pflanzensoziologie* **11**: 1–235.
- Sillinger P. 1932. *Festucetum carpaticae* v Nízkých Tatrách ve srovnání s analogickou asociací v jiných částech oblasti západokarpatské. *Rozpr. České Akad. Věd, Tř. 2, Vědy Mat.-Přír.* **41 (1931)/16**: 1–21.
- Sillinger P. 1933. Monografická studie o vegetaci Nízkých Tater. *Orbis*, Praha, 339 pp.
- Soó R. 1927. Geobotanische Monographie von Kolozsvar (Klausenburg) I. *Tisza Társ. Honism. Biz. Kiadv.* **15–16**: 1–152.
- Soó R. 1934. Vasmegeye szociológiai és florisztikai növényföldrajz-áhos (Zur soziologischen und floristischen Pflanzengeographie des Komitats Vas in Westungarns). *Vasi Szemle* **1**: 105–134.
- Soó R. 1964. A Magyar flóra és vegetáció rendszertani-növényföldrajzi kézikönyve I. Akadémiai kiadó, Budapest, 590 pp.
- Suzuki T. 1964. Übersicht auf die alpinen und subalpinen Pflanzengesellschaften im inneren Kurobe-Gebiet. *Synthetic Science Research Organization of the Toyama University, Toyama*.
- Sýkora T. & Štursa J. 1973. Vysokostébelné nivy s dominancí kapradin v sudetských karech – *Daphno (mezerei)-Dryopteridetum filix-mas* ass. nova. *Preslia* **45**: 338–357.
- Szafer W., Pawłowski B. & Kulczyński S. 1923. Die Pflanzenassoziationen des Tatra-Gebirges. I. Teil: Die Pflanzenassoziationen des Chochołowska-Tales. *Bull. Int. Acad. Polon. Sci., Cl. Sci. Math., Ser. B, suppl.*, pp. 1–66.
- Szafer W., Pawłowski B. & Kulczyński S. 1927. Die Pflanzenassoziationen des Tatra-Gebirges. III. Teil: Die Pflanzenassoziationen des Kościeliska-Tales. *Bull. Int. Acad. Polon. Sci., Cl. Sci. Math., Ser. B, Suppl.* **2 (1926)**: 13–78.
- Šeffler J. 1984. Spoločenstvá nív a horských lúk vo Vysokých Tatrách I. Thesis, mscr., Faculty of Sciences UK, Bratislava.
- Šeffler J., Šefflerová E. & Dúbravcová Z. 1989. Numerical syntaxonomy of the tall-forb and tall-grass communities in the Tatra Mountains. *Vegetatio* **81**: 181–187.
- Šibík J., Petrik A. & Kliment J. 2004. Syntaxonomical revision of plant communities with *Carex firma* and *Dryas octopetala* in the Western Carpathians. *Polish Bot. J.* **49**: 181–202.
- Šibík J., Valachovič M. & Kliment J. 2005. Plant communities with *Pinus mugo* (alliance *Pinion mugo*) in the subalpine belt of the Western Carpathians – a numerical approach. *Acta Soc. Bot. Polon.* **74**: 329–343.
- Šibík J., Kliment J., Jarolímek I., Dúbravcová Z., Bělohlávková R. & Pačlová L. 2006. Syntaxonomy and nomenclature of the alpine heaths (the class *Loiseleurio-Vaccinietea*) in the Western Carpathians. *Hacquetia* **5**: 37–71.
- Šibík J., Kliment J., Jarolímek I., Dúbravcová Z., Bělohlávková R. & Pačlová L. 2007a. To the validation of some syntaxa of the *Loiseleurio-Vaccinietea* from the Western Carpathians published in *Hacquetia* 2006, 5/1: 37–71. *Hacquetia* **6**: 103–104.
- Šibík J., Petrik A., Valachovič M. & Dúbravcová Z. 2007b. *Carici rupestris-Kobresietea bellardii* Ohba 1974, pp. 211–249. In: Kliment J. & Valachovič M. (eds), *Rastlinné spoločenstvá Slovenska 4. Vysokohorská vegetácia*, Veda, Bratislava.
- Šibík J., Kliment J., Jarolímek I. & Dúbravcová Z. 2007c. *Loiseleurio-Vaccinietea* Eggler ex Schubert 1960, pp. 285–317. In: Kliment J. & Valachovič M. (eds), *Rastlinné spoločenstvá Slovenska 4. Vysokohorská vegetácia*, Veda, Bratislava.
- Šibík J., Šibíková I. & Kliment J. 2010. The subalpine *Pinus mugo*-communities of the Carpathians with a European perspective. *Phytocoenologia* **40**: in press.
- Šibíková I., Šibík J., Jarolímek I. & Kliment J. 2009. Current knowledge and phytosociological data on the high-altitude vegetation in the Western Carpathians – a review. *Biologia* **64**: 215–224.
- Šibíková I., Šibík J., Hájek M. & Kliment J. 2010. The occurrence of arctic-alpine elements within high-altitude plant communities of Western Carpathians in relation to environmental factors, life forms and phytogeography. *Phytocoenologia* **40**: in press.
- Šmarda J. 1950. Květena Hrubého Jeseníku (Část sociologická). *Čas. Morav. Mus.* **35**: 78–156.
- Šmarda J. 1956. Vegetační kryt erodí obnažených a tundrových půd v Tatrách. *Biol. Práce* **2/8**: 5–50.
- Šmarda J. et al. 1971. K ekologii rostlinných společenstev Doliny Sedmi pramenů v Belanských Tatrách. *Práce a Štúd. Českoslov. Ochr. Přír., Ser.* **3/4**: 1–204.
- Špániková A. 1983. Rastlinné spoločenstvá radu *Molinietalia* W. Koch na Slovensku. *Acta Bot. Slov., Ser. A.* **7**: 9–135.
- Theurillat J.-P. & Moravec J. 1995. Index of names of syntaxa typified in 1992. *Folia Geobot. Phytotax.* **30**: 363–369.
- Theurillat J.-P., Aeschmann D., Küpfer P. & Spichiger R. 1994. Habitats et régions naturelles des Alpes. *Colloq. Phytosoc.* **22 (1993)**: 15–30.
- Theurillat J.-P., Aeschmann D., Küpfer P. & Spichiger R. 1995. The higher vegetation units of the Alps. *Colloq. Phytosoc.* **23 (1994)**: 189–239.
- Tüxen R. 1967. Ausdauernde nitrophile Saumgesellschaften Mitteleuropas. *Contr. Bot.* **1967**: 431–453.
- Uhlířová J. & Bernátová D. 2004. A new syntaxonomical view on the association *Pulsatillo slavicae-Caricetum humilis*. *Annot. Zool. Bot. No.* **227**: 3–12.
- Uhlířová J. & Petrik A. 2006. *Festuco tatrae-Caricetum humilis* – a new plant community from the Slovenský raj Mts. *Annot. Zool. Bot. No.* **228**: 3–17.
- Ujházy K. & Kliment J. 2007. NSA *Nardo strictae-Agrostion tenuis* Sillinger 1933, pp. 203–223. In: Janišová M. (ed.), *Travninobylinná vegetácia Slovenska – elektronický expertný systém na identifikáciu syntaxónov*, Botanický ústav SAV, Bratislava.
- Unar J., Unarová M. & Šmarda J. 1984. Vegetační poměry Tomanovy doliny a Žlebu spod Diery v Západních Tatrách. 1. Fytocenologické tabulky. *Folia Fac. Sci. Nat. Univ. Purkyaniana Brun., Ser. Biol.* **25/10**: 5–101.
- Unar J., Unarová M. & Šmarda J. 1985. Vegetační poměry Tomanovy doliny a Žlebu spod Diery v Západních Tatrách.



2. Charakteristika přírodních poměrů a rostlinných společenstev. *Folia Fac. Sci. Nat. Univ. Purkynianae Brun.*, Ser. Biol. **26/14**: 5–78.
- Valachovič M. (ed.), Ořaheľová H., Stanová V. & Maglocký Š. 1995. *Rastlinné spoločenstvá Slovenska. 1. Pionierska vegetácia*. Veda, Bratislava, 435 pp.
- Valachovič M. (ed.), Háberová I., Hájek M., Hrivnák R., Jarolímek I., Ořaheľová H., Šoltés R. & Zaliberová M. 2001. *Rastlinné spoločenstvá Slovenska. 3. Vegetácia mokradi*. Veda, Bratislava, 435 pp.
- Walas J. 1933. *Rošlinnosť Babiej Góry (Vegetation des Babia Góra-Gebietes in den Karpaten)*. *Monogr. Nauk* **2**: 1–68.
- Weber H. E. 2003. *Anleitung zur Revision und gültigen Veröffentlichung syntaxonomischer Namen bis zur Rangstufe der Assoziation*. *Tuexenia* **23**: 401–417.
- Weber H. E., Moravec J. & Theurillat J.-P. 2000. *International code of the phytosociological nomenclature*. 3<sup>rd</sup> edition. *J. Veg. Sci.* **11**: 739–768.
- Wendelberger G. 1962. *Die Pflanzengesellschaften des Dachstein-Plateaus*. *Mitt. Naturwiss. Ver. Steiermark* **92**: 120–178.
- Westhoff V. & Maarel van der E. 1978. The Braun-Blanquet approach, pp. 289–399. In: Whittaker, R. H. (ed.), *Classification of plant communities*, W. Junk, The Hague.
- Zlatník A. 1925. *Les associations de la végétation des Krkonoše et le pH*. *Věstn. Král. České společn. Nauk, Tř. Mat.-Přir.* **1925/10**: 1–67.

Received November 3, 2009

Accepted March 24, 2010