

## Nomenclatural revision of dry grassland syntaxa of the Central Balkan

### Nomenklatorische Revision der Trockenrasen-Syntaxa des zentralen Balkans

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#### Abstract

An extensive survey of the relevant literature of dry grassland communities described for the territory of Serbia allowed us to check the validity and legitimacy of the nomenclature of this vegetation. Nomenclature rules of the International Code of Phytosociological Nomenclature were strictly followed. The syntaxonomic affiliation of communities to higher syntaxa was assessed according to existing syntaxonomic schemes for Serbia and the position determined by the original source. Higher syntaxa followed the synsystem of the so-called “EuroVegChecklist”. We have highlighted problems and some disagreement with the existing classification of dry grassland communities in Europe. A total of 134 dry grassland communities have so far been registered for Serbia. This list of syntaxa may serve for further research of grassland vegetation and its appropriate positioning within a syntaxonomical scheme of Europe.

**Keywords:** phytocoenology, *Festuco-Brometea*, *Halacsyetalia sendtneri*, International Code of Phytosociological Nomenclature

**Erweiterte deutsche Zusammenfassung am Ende des Manuskripts**

### 1. Introduction

It is well accepted that dry grasslands harbour a significant diversity of plant and animal species (VRAHNAKIS et al. 2013). It was recently shown that if habitats with a smaller area are considered, the diversity of grassland communities significantly outperforms the diversity of tropical rain forests (DENGLER et al. 2012, WILSON et al. 2012, DENGLER et al. 2014). Most European dry grassland communities are semi-natural habitats, which have developed over centuries of traditional land use such as mowing, grazing or temporary abandonment of arable fields (POSCHLOD & WALLISDEVRIES 2002, ELLENBERG & LEUSCHNER 2010, VELEV & VASSILEV 2014). However, as a result of economic and land-use changes, dry grasslands

have become threatened in almost every part of Europe. As a consequence dry grasslands are now among the most endangered European habitats (VEEN et al. 2009), while in Serbia they are still in favourable conservation status. Accordingly, most of Europe's dry grassland types are now listed as priority habitats under the Habitats Directive of the EU (EUROPEAN COMMISSION 2007), e.g., 6120 (Xeric and calcareous grasslands), 6210 (Semi-natural dry grasslands and scrubland facies on calcareous substrates), 6260 (Pannonic sand steppes) and 6240 (Sub-pannonic steppic grasslands).

The region of Serbia, as central part of the Balkan Peninsula, represents one of the centres of floristic diversity in Europe, with 39 % of European species thriving on its territory (RADOVIĆ & KOZOMARA 2011). According to HOBHOM & BRUCHMANN (2009), there are more than 6000 endemic species in Europe, whereby grasslands contain almost twice as many endemics as forests. In a review of Balkan endemics in Serbia, TOMOVIĆ (2007) pointed out that grasslands of the class *Festuco-Brometea* contain 67 % of Balkan endemic species distributed in Serbia. It should be noted that out of 46 local endemics ("stenoendemics") determined for Serbia (TOMOVIĆ 2007), 29 appear within grassland vegetation, and among them, more than a half is associated to communities of the *Festuco-Brometea*, which is characterised by the highest number of critically endangered taxa as well (DAJIĆ STEVANOVIĆ et al. 2010). In many European countries, *Festuco-Brometea* plant communities are receiving a great deal of attention in relation to conservation management (HEGEDUŠOVÁ & SENKO 2011).

Supranational or even continent-wide classifications of dry grasslands are still rare (VRAHNAKIS et al. 2013). ROYER's (1991) classification of the class *Festuco-Brometea* throughout its Eurasian range, based on modern classification methods, should be highlighted. More recently DENGLER (2003) and DENGLER & LÖBEL (2006) published continent-wide reviews of the classes *Festuco-Brometea*, *Koelerio-Corynephoretea* and *Trifolio-Geranietea sanguinei* based on a numerical classification. In addition REDŽIĆ (1999) published a review of *Festuco-Brometea* in the Balkans, ILLYÉS et al. (2007) of *Brachypodietalia pinnati* (*Festuco-Brometea*) in Central Europe and DUBRAVKOVÁ et al. (2010) of *Festuco-Brometea* communities in the Western Carpathians and the Northern Pannonian Basin.

Phytocoenological studies of the vegetation of Serbia have a long tradition, but the rules of the International Code of Phytosociological Nomenclature (WEBER et al. 2000, hereinafter ICPN) have not been strictly followed, and many syntaxa have been invalidly published (AČIĆ et al. 2013a). Recent developments in vegetation research (databases, large-scale analyses etc., DENGLER et al. 2011) highlight the importance of harmonisation of syntaxonomical schemes that are transboundary and validated according to international rules.

According to traditional syntaxonomical schemes, dry grasslands in Serbia were classified within the classes *Festuco-Brometea* and *Festucetea vaginatae* (KOJIĆ et al. 2004). In a previous classification according to KOJIĆ et al. (1998), the Balkan orders *Astragalo-Potentilletalia* and *Halacsyetalia sendtneri* belonged to the separate class *Festucetea vaginatae*. MUCINA (1997) proposed the unification of all syntaxa into a single class *Festuco-Brometea*, but a recent proposal by MUCINA et al. (in review) divided these syntaxa into the two classes *Koelerio-Corynephoretea* and *Festuco-Brometea*.

In our analysis we have selected all associations of dry grasslands traditionally classified into *Festuco-Brometea* according to MUCINA (1997), but we have followed the syntaxonomical system of alliances recently proposed by MUCINA et al. (in review), although we do not entirely agree with it.

The geographical position of the Central Balkan is very complex from a phytogeographical point of view. Serbia is part of the Balkan Peninsula and Pannonia, and since this is a transitional region between Mediterranean and Central European zones, the delimitation of higher syntaxa is not always clear (ŠILC et al. 2014).

The aim of this study was to check the validity and legitimacy of the existing nomenclature according to the ICPN and to correct and typify syntaxa of dry grasslands traditionally assigned to the classes *Festuco-Brometea* and *Festucetea vaginatae*. The syntaxonomical content remains to be studied by numerical classification methods in the future. The present list of syntaxa is a first step towards a consistent syntaxonomical system from this region.

## 2. Methods

The starting point for creating a list of dry grassland communities in the Central Balkan was the vegetation database of grassland vegetation of Serbia (GIVD ID EU-RS-02, AČIĆ et al. 2012). The study area Central Balkan comprised territory of the Republic of Serbia (with its province Vojvodina in the North, belonging to the Pannonian plain) and territory of Kosovo. An extensive survey of the relevant literature allowed us to check the validity and legitimacy of the nomenclature of dry grassland associations. The nomenclature rules of the ICPN were strictly followed. The affiliation of plant communities to their alliances and higher syntaxa followed the original source and MUCINA et al. (in review), respectively.

The nomenclature of plant taxa follows Flora Europaea (FLORA EUROPAEA DATABASE), except for the species *Bothriochloa ischaemum* (L.) Keng., *Bromus fibrosus* Hack., *Echium rubrum* Forssk., *Koeleria pyramidata* subsp. *montana* (Hausm.) Domin, *Nepeta rtanjensis* Diklić & Milojević, *Potentilla arenaria* Borkh. ex G. Gaertn., *Potentilla tommasiniana* F. W. Schultz, *Sedum serpentini* Janch., *Stachys recta* subsp. *baldaccii* (K. Malý) Hayek, *Veronica austriaca* subsp. *jacquinii* (Baumg.) Eb. Fisch and *Cytisus procumbens* Bojer ex Baker var. *petrovicii* (Adamović) Diklić.

Syntaxa were designated by their orthographically correct form according to ICPN Art. 41. Synonyms of the accepted name include a reference to the article and paragraph of the Code according to which the name must be rejected. The original name is provided in brackets with an indication of the relevant article of ICPN according to which it is invalid. Whenever necessary to avoid a homonymy, the initials of the first author are added. The dates of effective publication of syntaxa were taken from the papers in which they were validly published, regardless of possible different indications reported by the authors in the papers. Doctoral or master theses that are not available in libraries were not considered to be effective publications [Article 1]. In those cases we give a short description of the habitat of the association and a relevé as holotype.

Lectotypes were defined for the determination of the correct names for syntaxa not yet typified. The accepted names of associations that contained only the genus name(s) in the original diagnosis were supplemented with species epithets in accordance with Recommendation 10c of the Code.

When the name of a syntaxon is published by an author without a sufficient original diagnosis, that syntaxon is not valid according to Article 2b of the Code and is considered to be *nomen nudum*.

According to Article 42 of the Code, *nomina inversa* are the names of syntaxa in which, as compared with the original diagnosis, the order of the names of taxa has been changed so that the dominant taxon or the taxon of the higher layer is in second place.

A 'phantom name' is a name that has not been used by the person(s) named in the author citation in the stated source. The 'cited' source may even be non-existent. MUCINA (1993) introduced the apt term 'phantom name' for such cases. Phantom names are attributions by later authors and do not have any nomenclatural significance.

Abbreviations: Art. = article of ICPN; ass. nov. = associatio nova; nom. illeg. = nomen illegitimum, nom. ined. = nomen ineditum; nom. inval. = nomen invalidum; nom. nud. = nomen nudum; nom. superf. = nomen superfluum; Orig. = original form of the valid syntaxon name; rel. = relevé; Tab. = phytocoenological table in the publication.

### 3. Results

We present the list of corrected and typified grassland communities of dry grasslands occurring in Serbia. The list comprises all associations (and some phytocoenoses) classified within *Festuco-Brometea* or *Festucetea vaginatae*.

#### 1. *Festuco-Brometea* Br.-Bl. et Tx. ex Klika et Hadač 1944

##### 1.1 *Brachypodietalia pinnati* Korneck 1974 (*Brometalia erecti* Br.-Bl. 1936)

###### 1.1.1 *Bromion erecti* Koch 1926

###### *Brometum erecti* Scherer 1925

Syn. *Brometum erecti* Pavlović 1955 [Art. 31]

Note: The association *Brometum erecti* was described for Serbia in PAVLOVIĆ (1955a) and MIŠIĆ et al. (1978) and mentioned in AMIĐIĆ (2003), but without a phytocoenological table.

###### *Lamio garganici-Brometum erecti* Jovanović-Dunjić 1955

Orig. (JOVANOVIĆ-DUNJIĆ 1955): *Lamieto-Brometum erecti* [art. 41a]

Typus: JOVANOVIĆ-DUNJIĆ 1955, Tab. 8, rel. 2 – lectotypus hoc loco

###### *Carici montanae-Brometum erecti* Kojić in Gajić et al. ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Cariceto-Brometum erecti* Kojić in Gajić et al. 1992 nom. inval. [Art. 5, 41 b]

Typus: GAJIĆ et al. 1992, Tab. 22, rel. 5 – holotypus hoc loco

###### *Melico ciliatae-Brometum fibrosi* Petković et Tatić ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Melico-Brometum fibrosi* Petković 1981 nom. ined. [Art. 1], *Melico-Brometum fibrosi* Petković et Tatić 1985 nom. inval. [Art. 5]

Note: The association was described in the doctoral thesis of PETKOVIĆ (1981) and then printed in a paper (PETKOVIĆ & TATIĆ 1985), but without a phytocoenological table. We have selected a representative relevé from the table in the PhD thesis and described the habitat of this association.

The association *Melico ciliatae-Brometum fibrosi* is dry pasture developed on limestone.

Holotypus: *Ajuga genevensis* +, *Asperula cynanchica* +, *A. purpurea* 1, *Asplenium ruta-muraria* +, *A. trichomanis* +, *Brachypodium pinnatum* +, *Bromus fibrosus* 1, *B. squarrosus* 1, *Carlina vulgaris* +, *Convolvulus arvensis* +, *Erigeron acer* +, *Euphorbia cyparisiass* +, *Euphorbia falcata* +, *Galium album* +, *Helianthemum nummularium* +, *Herniaria incana* +, *Hypericum perforatum* +, *Inula oculus-christi* +, *Lactuca quercina* +, *L. viminea* +, *Melica ciliata* 1, *Plantago lanceolata* +, *Polygala comosa* +, *P. supina* +, *Sedum acre* +, *Stipa pulcherrima* +, *Taraxacum erythrospermum* +, *Teucrium chamaedrys* 1, *Thymus glabrescens* 3, *Valerianella eriocarpa* +, *Vicia hirsuta* +, *V. lathyroides* +.

Locality: Southwestern Serbia, Tutin, Veliki Gradac, relevé area 50 m<sup>2</sup>, altitude 1022 m, aspect S, slope 60°, limestone.

###### *Bromo-Plantaginetum mediae* Horvat 1931

Note: The association *Bromo-Plantaginetum mediae* was described for Serbia in PETKOVIĆ (1985), REXHEPI (1978) and GAJIĆ et al. (1992).

### 1.1.2 *Chrysopogono grylli-Danthonion alpinae* Kojić 1957 *nomen mutatum propositum*

Syn.: *Chrysopogono-Danthonion calycinae* Kojić 1957 [Art. 45]

The syntaxonomic position of this alliance is controversial. The alliance *Chrysopogono-Danthonion calycinae* was published for the first time by KOJIĆ (1957) and classified within the order *Festucetalia valesiaca*. However, in a later syntaxonomic revision of the vegetation of Serbia (KOJIĆ et al. 1998, 2004), the alliance was classified within the order *Brometalia erecti* Br.-Bl. 1936. Different authors have used different concepts: TZONEV et al. (2009) place this alliance in the acidophilous order *Koelerio-Phleetalia phleoidis* Korneck 1974, BERGMEIER et al. (2009) in the Balkan order *Astragalo-Potentilletalia* Micevski 1971 and, recently, PEDASHENKO et al. (2013) preliminarily assigned it to *Brachypodietalia pin-nati* (formerly *Brometalia erecti*). Further research on the syntaxonomic position and distribution of the alliance *Chrysopogono-Danthonion calycinae* is required.

### *Rhinantho rumelici-Agrostietum capillaris* (Pavlović 1955) Ačić et al. *nom. nov. hoc loco*

Syn.: *Agrostidetum vulgare* Pavlović 1955 [Art. 31], *Trifolieto-Agrostidetum vulgare* Jovanović-Dunjić 1955 prov. nom. inval. [Art. 3b]

Typus: PAVLOVIĆ 1955a (O pašnjačkoj i livadskoj vegetaciji centralnog dela Kopaonika. – Bulletin du Muséum d'histoire naturelle du pays serbe B 7: 59–65), Table on page 60, rel. 6 – lectotypus hoc loco

Note: This association is a younger homonym, and the nomen novum was determined in accordance with Article 39a. The association was also studied by DANON (1960), TATIĆ (1969), MIŠIĆ et al. (1978), KOJIĆ et al. (1992) and OBRATOV (1992).

### *Asperulo hungarorum-Agrostietum capillaris* Jovanović-Dunjić 1956 *nomen mutatum propositum*

Orig. (JOVANOVIĆ-DUNJIĆ 1956): *Asperuleto-Agrostidetum vulgare* [Art. 41 b, 45]

Syn.: *Trifolieto-Agrostidetum vulgare* R. Jovanović 1955 prov. nom. inval. [Art. 3b]

Typus: JOVANOVIĆ-DUNJIĆ 1956, Tab. 8, rel. 6 – lectotypus hoc loco

Note: This association was mentioned for Serbia by AČIĆ et al. (2013b).

### *Cynosuro cristati-Agrostietum capillaris* M. Vučković ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Cynosuro cristati-Agrostietum capillaris* M. Vučković 1988 nom. ined. [Art. 1], *Cynosuro cristati-Agrostietum capillaris* M. Vučković 1991 nom. inval. [Art. 5]

Typus: M. VUČKOVIĆ 1991, Tab. 6, rel. 1 – holotypus hoc loco

Note: The association was described in the doctoral thesis of VUČKOVIĆ (1988) and then printed in a monograph (VUČKOVIĆ 1991), but without indication of a nomenclatural type.

### *Festuco pseudovinae-Agrostietum capillaris* Danon et Blaženčić in Mišić et al. ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Festuco-Agrostidetum vulgare* Danon et Blaženčić 1978 prov. [Art. 3b]

Typus: MIŠIĆ et al. 1978, Tab. 47, rel. 3 – holotypus hoc loco

### *Diantho cruenti-Armerietum rumelicae* N. Ranđelović ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Diantho-Armerietum rumelicae* Ranđelović 1978 nom. ined. [Art. 1], *Diantho-Armerietum rumelicae* Ranđelović 1979 nom. inval. [Art. 5]

Typus: RANĐELOVIĆ, N. 1979, Tab. 3, rel. 6 – holotypus hoc loco

Note: The association was first published in a doctoral thesis (RANĐELOVIĆ 1978) and then invalidly in RANĐELOVIĆ (1979). RANĐELOVIĆ (1978) classified this association into *Chrys-*

*opogono-Danthonion calycinae*. V. RANĐELOVIĆ (2002), and RANĐELOVIĆ & ZLATKOVIĆ (2010) later invalidly described a new order *Armerietalia rumelicae* [Art. 2b, 8] and classified this association into it. This order is a synonym of the order *Astragalo-Potentilletalia* Micevski 1971. According to our analysis (Aćić et al. unpubl.), this association belongs to the alliance *Chrysopogono-Danthonion calycinae*, where it was classified originally.

***Agrostio capillaris-Asphodeletum albae*** R. Jovanović in Mišić et al. 1978

Orig.: (MIŠIĆ et al. 1978): *Agrostio-Asphodeletum albae* R. Jovanović

Typus: MIŠIĆ et al. 1978, Table on page 50, rel. 4 – lectotypus hoc loco

Note: In the foreword to a monograph (MIŠIĆ et al. 1978) it was mentioned that grassland vegetation had been elaborated by Rajna Jovanović-Dunjić.

***Scorzonero hispanicae-Asphodeletum albae*** Petković et al. ex Aćić et al. *ass. nov. hoc loco*

Syn.: *Scorzonero-Asphodeletum albae* Petković et al. 1990 nom. inval. [Art. 5]

Typus: PETKOVIĆ et al. 1990, Table on page 40, rel. 3 – holotypus hoc loco

***Agrostio capillaris-Chrysopogonetum grylli*** Kojić 1959

Orig.: (KOJIĆ 1959): *Agrostideto-Chrysopogonetum grylli* [Art. 41 b]

Syn.: *Chrysopogonetum grylli* Kojić et Ivanović 1954 [Art. 31], *Chrysopogonetum grylli* Kojić 1955 [Art. 31], *Chrysopogonetum grylli* Gajić 1955 [Art. 31]

Typus: KOJIĆ 1959, Tab. 1, rel. 4 – lectotypus hoc loco

Note: PEDASHENKO et al. (2013) stated Table 9 and relevé 6 in KOJIĆ (1959) as the nomenclatural type, which was incorrect because only two phytocoenological tables were published in this paper, and this association was described in Table 1. This association was also studied by GAJIĆ (1961), TATIĆ (1969), DIKLIĆ & NIKOLIĆ (1972) and REXHEPI (1978).

***Alyso markgrafi-Chrysopogonetum grylli*** A. Marković ex Aćić et al. *ass. nov. hoc loco*

Syn.: *Alyso-Chrysopogonetum grylli* Marković 2007 nom. inval. [Art. 5]

Typus: MARKOVIĆ 2007, Tab. 1, rel. 4 – holotypus hoc loco

***Brizo mediae-Chrysopogonetum grylli*** A. Marković ex Aćić et al. *ass. nov. hoc loco*

Syn.: *Brizo-Chrysopogonetum grylli* Marković 2007 nom. inval. [Art. 5]

Typus: MARKOVIĆ 2007, Tab. 3, rel. 3 – holotypus hoc loco

***Trifolio-Trisetetum flavescens*** N. Randelović 1975

Syn.: *Festuco-Chrysopogonetum grylli* Randelović 1978 nom. superf. [Art. 1, 29c] *Festuco-Chrysopogonetum grylli* Randelović 1979 nom. inval. [Art. 5]

Typus: RANĐELOVIĆ, N. 1975, Table on page 170, rel. 13 – holotypus hoc loco

Note: RANĐELOVIĆ (1975) first published the association *Trifolio-Trisetetum flavescens* and then renamed it to *Festuco-Chrysopogonetum grylli* in a doctoral thesis (RANĐELOVIĆ 1978) in order to highlight the assignment of this association to the class *Festuco-Brometea*. According to Art. 29c, this later name is superfluous. He subsequently described the association *Festuco-Chrysopogonetum grylli* in a paper (RANĐELOVIĆ 1979), but without indication of a nomenclatural type.

It is not possible to add an epitheton to the first genus since RANĐELOVIĆ (1975) refers to different *Trifolium* taxa (*T. ochroleucon*, *T. strictum* and *T. striatum*). This association was also mentioned for Serbia by JOVANOVIĆ, V. (1979), RUŽIĆ (1981a) and RANĐELOVIĆ & STAMENKOVIĆ (1983).

***Teucrio chamaedrydis-Chrysopogonetum grylli* Jovanović-Dunjić 1954**

Orig. (JOVANOVIĆ-DUNJIĆ 1954): *Teucrieto-Chrysopogonetum grylli* [Art. 41 b]

Typus: JOVANOVIĆ-DUNJIĆ 1954, Table on page 68, rel. 2 – lectotypus hoc loco

Note: This association was mentioned for Serbia by JOVANOVIĆ-DUNJIĆ (1955).

***Thymo serpylli-Chrysopogonetum grylli* A. Marković ex Ačić et al. *ass. nov. hoc loco loco***

Syn.: *Thymo-Chrysopogonetum grylli* Marković 2007 nom. inval. [Art. 5]

Typus: MARKOVIĆ 2007, Tab. 2, rel. 5 – holotypus hoc loco

***Trifolio montanae-Chrysopogonetum grylli* Veljović 1967**

Orig. (VELJOVIĆ 1967): *Trifolio-Chrysopogonetum grylli*

Typus: VELJOVIĆ 1967, Tab. 7, rel. 14 – lectotypus hoc loco

***Danthonietum alpinae* Cincović et Kojić 1962 *nomen mutatum propositum***

Orig. (CINCOVIĆ & KOJIĆ 1962): *Danthonietum calycinae* [Art. 45]

Syn.: Phytocenosis with *Danthonia calycina* Cincović et Kojić 1955 [Art. 3c]

Typus: CINCOVIĆ & KOJIĆ 1962, Tab. 1, rel. 9 – lectotypus hoc loco

Note: This association was also studied by DIKLIĆ & NIKOLIĆ (1962), DIKLIĆ & NIKOLIĆ (1972), MIJATOVIĆ (1972), PETKOVIĆ (1985), MRFAT-VUKELIĆ (1991), KOJIĆ et al. (1992) and AČIĆ et al. (2013b).

***Agrostio capillaris-Danthonietum alpinae* Ružić ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Agrosteto-Danthonietum calycinae* Ružić 1981 nom. inval. [Art. 5]

Typus: RUŽIĆ 1981b, Tab. 1, rel. 3 – holotypus hoc loco

Note: The association was described in the doctoral thesis of RUŽIĆ (1981a) and then printed in a paper (RUŽIĆ 1981b), but without indication of a nomenclatural type.

***Bothriochloo ischaemi-Danthonietum alpinae* Danon et Blaženčić in Mišić et al. ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Andropogono-Danthonietum calycinae* Danon et Blaženčić 1978 prov. nom. inval. [Art. 3b]

Typus: MIŠIĆ et al. 1978, Tab. 45, rel. 3 – holotypus hoc loco

***Helleboro serbicae-Danthonietum alpinae* Obratov et al. ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Helleboro serbicae-Danthonietum calycinae* Obratov et al. 1994 nom. inval. [Art. 5]

Typus: OBRATOV et al. 1994, Tab. 1, rel. 5 – holotypus hoc loco

***Inulo hirtae-Danthonietum alpinae* Stanković-Tomić 1975 *nomen mutatum propositum***

Orig. (STANKOVIĆ-TOMIĆ 1975): *Inulo-Danthonietum calycinae* [Art. 45]

Typus: STANKOVIĆ-TOMIĆ 1975, Table on page 15, rel. 9 – lectotypus hoc loco

Note: This association was also mentioned by RANĐELOVIĆ et al. (1979) and RANĐELOVIĆ & RUŽIĆ (1986).

***Koelerio-Danthonietum alpinae*** Pavlović 1974 *nomen mutatum propositum*

Orig. (PAVLOVIĆ 1974): *Koelero-Danthonietum calycinae* [Art. 41b, 45]

Syn.: *Danthonietum calycinae* Pavlović 1955 prov. nom. inval. [Art. 3b]

Typus: PAVLOVIĆ 1974, Tab. 2, rel. 9 – lectotypus hoc loco

Note: PAVLOVIĆ (1955b) published the name only provisionally and validated it in 1974. It is not possible to add an epitheton to the first genus since PAVLOVIĆ (1974) refers to different *Koeleria* taxa (*K. eryostachia* and *K. pyramidata* subsp. *montana*).

***Sanguisorbo minoris-Festucetum valesiacaе*** Danon 1960 *nomen mutatum propositum*

Orig. (DANON 1960): *Poterieto-Festucetum valesiacaе* [Art. 41a, b, 45]

Typus: DANON 1960, Tab. 2, rel. 5 – lectotypus hoc loco

Note: This association was also mentioned by DANON (1960), DANON & RADMIĆ (1962) and DIKLIĆ & NIKOLIĆ (1964).

***Trifolio incarnati-Festucetum valesiacaе*** Diklić et Nikolić 1972

Orig. (DIKLIĆ & NIKOLIĆ 1972): *Trifoliato-Festucetum valesiacaе* [Art. 41a, b]

Typus: DIKLIĆ & NIKOLIĆ 1972, Tab. 2, rel. 8 – lectotypus hoc loco

***Agrosti-Genistetum carinalis*** N. Randelović et V. Milosavljević in Milosavljević et al. 2008 *nomen nudum* [Art. 2b, 5]

Note: The name of the syntaxon is not validly published since no phytocoenological table or relevé was published (MILOSAVLJEVIĆ et al. 2008).

***Thymo sibthorpii-Knautietum macedonicae*** Rexhepi ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Thymo-Knautietum macedonicae* Rexhepi 1978 nom. ined. [Art. 1]

Note: The name was described in REXHEPI'S doctoral thesis (1978). We have selected a representative relevé from the table in the PhD thesis and described the habitat of this association.

The association *Thymo sibthorpii-Knautietum macedonicae* is Balkan semi-dry grassland developed on limestone bedrock.

Holotypus: *Achillea nobilis* +, *Ajuga genevensis* +, *Anthoxanthum odoratum* 1, *Anthyllis vulneraria* +, *Asperula cynanchica* +, *Coronilla varia* +, *Danthonia alpina* +, *Dasyphyrum villosum* 1, *Euphorbia cyparissias* +, *Festuca rupicola* 1, *Filipendula vulgaris* 1, *Galium verum* +, *Hieracium praealtum* subsp. *bauhini* +, *Hypochaeris radicata* +, *Knautia macedonica* 4, *Koeleria macrantha* +, *Leontodon hispidus* +, *Leucanthemum vulgare* +, *Lolium perenne* +, *Lotus corniculatus* +, *Medicago lupulina* +, *M. rigidula* +, *Moenchia mantica* +, *Muscari comosum* +, *Onobrychis arenaria* 1, *Orchis morio* +, *Plantago media* +, *Polygala comosa* +, *Potentilla pedata* +, *Primula veris* subsp. *columnae* +, *Ranunculus bulbosus* 1, *Rhinanthus minor* +, *R. rumelicus* +, *Sanguisorba minor* 1, *Scabiosa columbaria* +, *Scorzonera laciniata* +, *Thymus sibthorpii* 1, *Trifolium alpestre* 1, *T. incarnatum* subsp. *molineri* 1, *T. ochroleucon* 1, *T. pratense* 1, *T. repens* +, *T. angustifolium* +, *Trisetum flavescens* 2, *Valerianella coronata* +, *Vicia cracca* 1, *V. lathyroides* 1.

Locality: Kosovo, Prilepnice (Hodžin kamen), altitude 950 m, aspect N, slope 20°.

***Koelerietum montanae*** Pavlović 1951

Typus: PAVLOVIĆ 1951, Tab. 8, rel. 5 – lectotypus hoc loco

Note: This association was also studied by CINCOVIĆ & KOJIĆ (1955), MIŠIĆ et al. (1978) and KOJIĆ et al. (1992).



***Polygalo majoris-Pedicularietum heterodontae*** Randelović et al. ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Polygalo-Pedicularietum heterodontae* Randelović et al. 1979 nom. inval. [Art. 5]

Typus: RANĐELOVIĆ N. et al. 1979, Tab. 4, rel. 9 – holotypus hoc loco

***Potentillo zlatiborensis-Festucetum rupicolae*** Pavlović 1951 *nomen inversum propositum*

Orig. (PAVLOVIĆ 1951): Festuceto sulcatae-Potentilletum zlatiborensis [Art. 10b, 42]

Typus: PAVLOVIĆ 1951, Tab. 7, rel. 4 – lectotypus hoc loco

Note: VASIĆ & DIKLIĆ (2001) evaluated *Potentilla hirta* var. *zlatiborensis* Novák as a Serbian endemic taxon on serpentine bedrock. When the name of an association is formed from the names of two taxa of which one is dominant, the name of that taxon appears in second place. Names that do not follow this rule are legitimate, but must be inverted according to Art. 42. The species *F. rupicola* has a higher cover value than reported for this association.

***Salvio nemorosae-Scorzoneretum villosae*** Hundozi 1987

Syn.: *Salvio-Scorzoneretum villosae* Hundozi 1980 nom. ined. [Art. 1]

Note: The association was first published in a PhD thesis (HUNDOZI 1980) and then published in HUNDOZI (1987).

***Centaureo splendentis-Trifolietum velenovskyi*** Rexhepi ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Centaureo-Trifolietum velenovskyi* Rexhepi 1978 nom. ined. [Art. 1]

Note: The name was described in the doctoral thesis of REXHEPI (1978). We have selected a representative relevé from the table in the PhD thesis and described the habitat of this association.

The association *Centaureo splendentis-Trifolietum velenovskyi* is dry steppic grassland developed on silicate bedrock.

Holotypus: *Anthoxanthum odoratum* 2, *Avenula pratensis* 2, *Briza media* 1, *Campanula patula* 2, *Centaurea alba* subsp. *splendens* 1, *Cerastium caespitosum* +, *Cynosurus cristatus* 1, *Cynosurus echinatus* +, *Danthonia alpina* +, *Dianthus armeria* +, *D. cruentus* +, *D. deltoides* +, *Erigeron acris* +, *Euphrasia stricta* 2, *Filipendula vulgaris* 1, *Galium verum* +, *Gentiana utriculosa* +, *Gentianella bulgarica* 1, *Geranium sanguineum* +, *Gladiolus palustris* 2, *Hieracium praealtum* subsp. *bauhinii* 1, *Helianthemum nummularium* 2, *Hypochaeris radicata* +, *Lathyrus latifolius* 1, *Leontodon crispus* subsp. *crispus* +, *Leucanthemum vulgare* +, *Linum catharticum* +, *Lotus corniculatus* 1, *Narcissus poeticus* subsp. *radiiflorus* 1, *Plantago lanceolata* 1, *Polygala comosa* 1, *P. vulgaris* 1, *Ranunculus bulbosus* 2, *R. oreophilus* 2, *Rhinanthus minor* 1, *R. rumelicus* +, *Rumex acetosa* +, *R. acetosella* 1, *Sanguisorba minor* 1, *S. officinalis* 1, *Stachys germanica* +, *Thymus pulegioides* 2, *Tragopogon orientalis* +, *Trifolium montanum* 1, *T. pratense* 1, *T. repens* 1, *T. velenovskyi* 2, *Viola tricolor* 1.

Locality: Kosovo, Mt. Šara-Brezovica, silicate, altitude 1100 m, aspect SW, slope 60°.

***Danthonio alpinae-Trifolietum velenovskyi*** N. Randelović ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Danthonio-Trifolietum velenovskyi* N. Randelović 1978 nom. ined. [Art. 1], *Danthonio-Trifolietum velenovskyi* N. Randelović 1979 nom. inval. [Art. 5]

Typus: RANĐELOVIĆ, N. 1979, Tab. 2, rel. 5 – holotypus hoc loco

Note: The association was described in the doctoral thesis of RANĐELOVIĆ (1978) and then printed in a paper (RANĐELOVIĆ 1979) but without indication of a nomenclatural type. This association was also mentioned for Serbia by JOVANOVIĆ V. (1979) and RANĐELOVIĆ & STAMENKOVIĆ (1983).

***Onobrychido arenariae-Trifolietum pannonicum*** Randelović et al. ex Aćić et al. *ass. nov. hoc loco*

Syn.: *Onobrychi-Trifolietum pannonicum* Randelović et al. 1979 nom. inval. [Art. 5]

Typus: RANĐELOVIĆ et al. 1979, Tab. 5, rel. 10 – holotypus hoc loco

***Geranio sanguinei-Caricetum halleranae*** Jovanović-Dunjić et al. 1986 *nomen nudum*

Syn.: *Geranio sanguinei-Caricetum halleranae* Jovanović-Dunjić et al. 1986 [Art. 2b, 5]

Note: The association was described by JOVANOVIĆ-DUNJIĆ et al. (1986), but only with a synoptic table, so the name has not been published with a sufficient original diagnosis. Since there is still no relevé available, the association remains *nomen nudum*.

***Sieglingio decumbens-Festucetum rubrae*** Jovanović-Dunjić et al. 1986 *nomen nudum* [Art. 2b, 5]

Note: This association was described by JOVANOVIĆ-DUNJIĆ et al. (1986) with only a synoptic table. Since there is still no relevé available, the association remains *nomen nudum*.

## 1.2 *Festucetalia valesiaca* Soó 1947

### 1.2.1 *Festucion sulcatae* Soó 1930

According to DÚBRAVKOVÁ et al. (2010) and MUCINA et al. (in review), there is only one alliance of subcontinental steppic grasslands, *Festucion sulcatae*. The floristic compositions of the alliances *Festucion rupicolae* and *Festucion valesiaca* in Serbia show considerable differences so that these alliances should be considered two separate syntaxa (Aćić et al. unpubl.). BORHIDI et al. (2012) changed their rank to the level of suballiance, and we support this classification.

***Crambo tatariae-Artemisietum campestris*** Stevanović ex Aćić et al. *ass. nov. hoc loco*

Syn.: *Crambo-Artemisietum campestris* Stevanović 1984 nom. ined. [Art. 1, 5]

Note: This association was published in a doctoral thesis (STEVANOVIĆ 1984), so we selected a representative relevé together with the description of its habitat.

The association *Crambo tatariae-Artemisietum campestris* is Pannonian steppe grassland.

Holotypus: *Adonis vernalis* +, *Artemisia campestris* 2, *Asperula cynanchica* +, *Aster linosyris* 1, *Astragalus onobrychis* +, *Bothriochloa ischaemum* +, *Brachypodium pinnatum* 1, *Bromus squarrosus* +, *Centaurea biebersteinii* subsp. *biebersteinii* +, *C. scabiosa* +, *Cephalaria transsylvanica* +, *Chamaecytisus austriacus* +, *C. heuffellii* 1, *Crambe tataria* 1, *Elymus hispidus* +, *Eryngium campestre* +, *Euphorbia nicaeensis* 1, *Festuca pseudovina* +, *Galium volhynicum* +, *Hieracium praealtum* subsp. *bauhini* +, *Inula ensifolia* +, *I. germanica* +, *Isatis tinctoria* 1, *Koeleria macrantha* +, *Linaria genistifolia* +, *Linum austriacum* +, *Lotus corniculatus* +, *Medicago sativa* subsp. *falcata* +, *Nonea pulla* +, *Petrorhagia saxifraga* +, *Peucedanum alsaticum* +, *Phleum phleoides* +, *Potentilla cinerea* +, *P. recta* +, *Salvia nemorosa* +, *Silene vulgaris* +, *Stachys recta* +, *Taraxacum serotinum* +, *Thymus pannonicus* 1, *Trinia ramosissima* +, *Vinca herbacea* +.

Locality: Vojvodina, Fruška gora, near the road Slankamen-Koševac, altitude 200 m, relevé area 20 m<sup>2</sup>, total cover 100 %, aspect SE.

***Agrostio capillaris-Andropogonetum ischeami*** Veljović 1967

Orig. (VELJOVIĆ 1967): *Agrostido-Andropogonetum ischeami* [Art. 41a]

Typus: VELJOVIĆ 1967, Tab. 8, rel. 4 – lectotypus hoc loco

***Xeranthemo cylindracei-Andropogonetum ischaemi*** Borisavljević et al. 1955

Orig. (BORISAVLJEVIĆ et al. 1955): *Xeranthemeto-Ischaemetum* [Art. 41 b]

Typus: BORISAVLJEVIĆ et al. 1955, Table 3, rel. 1 – lectotypus hoc loco

Note: In the original description of the association, the authors used the abbreviated name version *Ischaemetum* instead of *Andropogonetum*.

***Euphorbio myrsinitae-Andropogonetum ischaemi*** Jovanović-Dunjić 1955

Orig. (JOVANOVIĆ-DUNJIĆ 1955): *Myrsiniteto-Ischaemetum* [Art. 41 b]

Typus: JOVANOVIĆ-DUNJIĆ 1955, Tab. 2, rel. 2 – lectotypus hoc loco

Note: In the original description of the association, the authors wrote the abbreviated name versions *Myrsiniteto* instead of *Euphorbio* and *Ischaemetum* instead of *Andropogonetum*.

***Dorycnio herbacei-Bothriochloetum ischaemi*** A. Marković ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Dorycnio-Andropogonetum ischaemi* Marković 2007 nom. inval. [Art. 5]

Typus: MARKOVIĆ 2007, Tab. 8, rel. 6 – holotypus hoc loco

***Euphorbio pannonicae-Andropogonetum ischaemi*** Bogojević 1968 *nomen inversum propositum*

Orig. (BOGOJEVIĆ 1968): *Andropogoneto-Euphorbietum pannonicae* [Art. 10b, 42]

Typus: BOGOJEVIĆ 1968, Tab. 1, rel. 16 – lectotypus hoc loco

Note: The species *Andropogon ischaemum* has a higher cover value than reported for this association so that the name of the syntaxa must be inverted according to Art. 42.

***Festuco pseudovinae-Bothriochloetum ischaemi*** R. Vučković ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Festuco-Andropogonetum ischaemi* R. Vučković 1985 nom. inval. [Art. 5]

Typus: VUČKOVIĆ R. 1985b, Tab. 2, rel. 18 – holotypus hoc loco

Note: The association was described in the doctoral thesis of VUČKOVIĆ (1985a) and then printed in a paper (VUČKOVIĆ 1985b), but without indication of a nomenclatural type.

***Potentillo arenariae-Bothriochloetum ischaemi*** Butorac ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Potentillo arenariae-Andropogonetum ischaemi* Butorac 1989 nom. ined. [Art. 1], *Potentillo arenariae-Andropogonetum ischaemi* Butorac 1992 nom. inval. [Art. 5]

Typus: BUTORAC 1992, Tab. 13, rel. 16 – holotypus hoc loco

Note: The association was described in the doctoral thesis of BUTORAC (1989) and then printed in a monograph (BUTORAC 1992), but without indication of a nomenclatural type.

***Inulo salicinae-Calamagrostietum epigeji*** M. Vučković ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Inulo salicinae-Calamagrostietum epigeio* M. Vučković 1988 nom. ined. [Art. 1], *Inulo salicinae-Calamagrostietum epigeio* M. Vučković 1991 nom. inval. [Art. 5]

Typus: VUČKOVIĆ M. 1991, Tab. 5, rel. 7 – holotypus hoc loco

Note: The association was described in the doctoral thesis of VUČKOVIĆ (1988) and then printed in a monograph (VUČKOVIĆ 1991), but without indication of a nomenclatural type.

***Adonido vernalis-Chrysopogonetum grylli*** (Stjepanović-Veseličić 1953) Ačić et al. *nom. nov. hoc loco*

Syn.: *Chrysopogonetum pannonicum* Stjepanović-Veseličić 1953 nom. illeg. [Art. 34a]

Typus: STJEPANOVIĆ-VESELIČIĆ 1953 (Vegetacija Deliblatske peščare: 54–65), Tab. 4, rel. 12 – lectotypus hoc loco

Note: The name is illegitimate and must be rejected because it contains an epithet that indicates a geographical property. We selected the species *Adonis vernalis* as the characteristic species of the association and formed the new name according to Art. 39a.

***Bromo squarrosi-Chrysopogonetum grylli* Kojić 1959**

Orig. (KOJIĆ 1959): *Brometo-Chrysopogonetum grylli* [Art. 41b]

Syn.: *Chrysopogonetum grylli* Gajić 1952 [Art. 31]

Typus: KOJIĆ 1959, Tab. 2, rel. 1 – lectotypus hoc loco

***Centaureo sadlerianae-Chrysopogonetum grylli* Parabućski et Stojanović ex Ačić et al. ass. nov. hoc loco**

Syn.: *Centaureo (sadlerianae)-Chrysopogonetum grylli* Parabućski et Stojanović 1985 nom. inval. [Art.5]

Typus: PARABUĆSKI & STOJANOVIĆ 1985, Tab. 1, rel. 10 – holotypus hoc loco

***Chamaecytiso austriaci-Chrysopogonetum grylli* Butorac ex Ačić et al. ass. nov. hoc loco**

Syn.: *Chamaecytiso austriacae-Chrysopogonetum grylli* Butorac 1989 nom. ined. [Art. 1], *Chamaecytiso austriacae-Chrysopogonetum grylli* Butorac 1992 nom. inval. [Art. 5]

Typus: BUTORAC 1992, Tab. 11, rel. 10 – holotypus hoc loco

Note: The association was described in the doctoral thesis of BUTORAC (1989) and then printed in a monograph (BUTORAC 1992), but without indication of a nomenclatural type.

***Inulo ensifoliae-Chrysopogonetum grylli* Stevanović ex Ačić et al. ass. nov. hoc loco**

Syn.: *Inulo-Chrysopogonetum grylli* Stevanović 1984 nom. ined. [Art. 1, 5]

Note: This association was published in a doctoral thesis (STEVANOVIĆ 1984), so we selected a representative relevé together with the description of its habitat.

The association *Inulo ensifoliae-Chrysopogonetum grylli* is Pannonian steppe grassland developed on limestone.

Holotypus: *Achillea collina* +, *Allium scorodoprasum* subsp. *rotundum* +, *Anemone sylvestris* 1, *Asparagus officinalis* +, *Asperula cynanchica* +, *Aster linosyris* +, *Bothriochloa ischaemum* 1, *Brachypodium pinnatum* +, *Carex caryophyllea* +, *C. humilis* 1, *Centaurea biebersteinii* subsp. *biebersteinii* +, *Chamaecytisus austriacus* +, *C. heuffellii* +, *Chrysopogon gryllus* 3, *Cynoglossum officinale* +, *Dianthus giganteiformis* subsp. *pontederiae* +, *Dorycnium pentaphyllum* subsp. *herbaceum* +, *Eryngium campestre* +, *Euphorbia cyparissias* +, *E. nicaeensis* subsp. *glareosa* +, *E. seguieriana* +, *Festuca rupicola* 1, *Filipendula vulgaris* +, *Fragaria viridis* +, *Gymnadenia conopsea* +, *Helianthemum nummularium* +, *Hieracium pilosella* +, *Hypochaeris maculata* +, *Inula ensifolia* 1, *Jurinea mollis* +, *Knautia arvensis* +, *Koeleria macrantha* +, *Lembotropis nigricans* 1, *Linum flavum* 1, *L. hirsutum* subsp. *glabrescens* +, *Lotus corniculatus* +, *Nonea pulla* +, *Onobrychis arenaria* 1, *Origanum vulgare* +, *Orlaya grandiflora* +, *Orobanche teucritii* +, *Peucedanum alsaticum* +, *Phleum phleoides* +, *Physospermum cornubiense* +, *Pimpinella saxifraga* +, *Plantago media* +, *Poa angustifolia* +, *Potentilla argentea* +, *Pulsatilla vulgaris* subsp. *grandis* +, *Sanguisorba minor* subsp. *muricata* +, *Tanacetum corymbosum* +, *Taraxacum serotinum* +, *Teucrium chamaedrys* +, *Thalictrum minus* 1, *Thesium arvense* +, *Thymus pannonicus* +, *Trifolium campestre* +, *T. montanum* +, *Verbascum lychnitis* +, *Veronica austriaca* subsp. *jacquinii* +, *Vicia cracca* +, *Vinca herbacea* +.

Locality: Vojvodina, Fruška gora, Glavica, marly limestone, relevé area 25 m<sup>2</sup>, total cover 100 %, aspect SW, slope 5°.

***Koelerio gracilis-Chrysopogonetum grylli*** M. Vučković 1985 *Phantom name*

Note: Unknown reference used in KOJIĆ et al. (2004).

***Medicago falcatae-Chrysopogonetum grylli*** M. Vučković ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Chrysopogonetum grylli* M. Vučković 1986 prov. nom. inval. [Art. 3b], *Medicago falcatae-Chrysopogonetum grylli* M. Vučković 1991 nom. inval. [Art. 5]

Typus: VUČKOVIĆ, M. 1991, Tab. 7, rel. 13 – holotypus hoc loco

Note: VUČKOVIĆ (1986) published the name only provisionally and then printed in a monograph (VUČKOVIĆ 1991), but without nomenclatural type.

***Seselio hipomarthri-Chrysopogonetum grylli*** Parabućski et Butorac ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Seseli hippomarthro-Chrysopogonetum grylli* Parabućski et Butorac 1993 nom. inval. [Art. 5]

Typus: PARABUĆSKI & BUTORAC 1993, Tab. 1, rel. 5 – holotypus hoc loco

***Thymo pannonicum-Chrysopogonetum grylli*** Stojanović ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Thymo-Chrysopogonetum grylli* Stojanović 1983 nom. inval. [Art. 5]

Typus: STOJANOVIĆ 1983, Tab. 1, rel. 4 – holotypus hoc loco

***Trifolio campestris-Chrysopogonetum grylli*** Butorac ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Trifolio campestre-Chrysopogonetum grylli* Butorac 1989 nom. inval. [Art. 1], *Trifolio campestre-Chrysopogonetum grylli* Butorac 1992 nom. inval. [Art. 5]

Typus: BUTORAC 1992, Tab. 12, rel. 4 – holotypus hoc loco

Note: The association was described in the doctoral thesis of BUTORAC (1989) and then printed in a monograph (BUTORAC 1992), but without indication of a nomenclatural type.

***Calamagrostio-Festucetum rupicolae*** R. Jovanović 1985 *nomen ineditum* [Art. 1]

Note: This association has never been published, but the data were taken from the reports of a mapping project of the vegetation of Yugoslavia (ZUPANČIĆ 1986).

***Coronillo variaie-Festucetum rupicolae*** Parabućski ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Coronillo-Festucetum sulcatae* Parabućski 1982 [Art. 5]

Typus: PARABUĆSKI 1982, Tab. 1, rel. 12 – holotypus hoc loco

***Verbasco phoeniceii-Festucetum rupicolae*** Gajić ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Verbasco-Festucetum rupicolae* Gajić 1986 nom. inval. [Art. 5]

Typus: GAJIĆ 1986, Tab. 6, rel. 5 – holotypus hoc loco

***Rhinantho rumelici-Festucetum pseudovinae*** Purger ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Rhinantho-Festucetum pseudovinae* Purger 1993 nom. ined. [Art. 1, 5]

Note: This association was published in a master thesis (PURGER 1993), so we selected a representative relevé together with the description of its habitat.

The association *Rhinantho rumelici-Festucetum pseudovinae* is Pannonian steppe grassland developed on chernozem on loess.

Holotypus: *Briza media* 1, *Festuca pseudovina* 3, *Filipendula vulgaris* +, *Galium verum* +, *Lotus angustissimus* +, *Ononis spinosa* +, *Plantago media* subsp. *media* var. *urvilleana* 1, *Rhinanthus rumeli-*

*cus* 2, *Salvia nemorosa* 1, *Scabiosa ochroleuca* +, *Thymus pannonicus* 3, *Trifolium campestre* 1, *Vicia angustifolia* 1.

Locality: West Bačka, near Doroslov, altitude 88 m, relevé area 25 m<sup>2</sup>, total cover 90%, chernozem on loess.

***Thymo pannonici-Festucetum pseudovinae* Stevanović ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Thymo-Festucetum pseudovinae* Stevanović 1984 nom. ined. [Art.1, 5]

Note: This association was published in a doctoral thesis (STEVANOVIĆ 1984), so we selected a representative relevé together with the description of its habitat.

The association *Thymo pannonici-Festucetum pseudovinae* is Pannonian steppe grassland developed on loess.

Holotypus: *Allium flavum* +, *Alyssum alyssoides* +, *Artemisia scoparia* +, *Asperula cynanchica* +, *Astragalus austriacus* +, *A. onobrychis* +, *Bassia prostrata* +, *Berteroa incana* +, *Bromus hordeaceus* subsp. *hordeaceus* +, *Campanula sibirica* +, *Cardaria draba* +, *Carduus acanthoides* +, *Centaurea biebersteinii* subsp. *biebersteinii* +, *Consolida regalis* +, *Convolvulus cantabrica* +, *Cynodon dactylon* +, *Eryngium campestre* +, *Euphorbia nicaeensis* +, *E. seguierana* +, *Festuca pseudovina* 3, *Koeleria macrantha* +, *Linum tenuifolium* +, *Nonea pulla* +, *Poa bulbosa* +, *Petrorhagia saxifraga* +, *Potentilla cinerea* +, *Stachys recta* +, *Stipa capillata* +, *Taraxacum serotinum* +, *Thymus pannonicus* 1.

Locality: Vojvodina, Fruška gora, Slankamen-Koševac, relevé area 25 m<sup>2</sup>, total cover 70 %, aspect S, slope 35°, loess.

***Agrostio capillaris-Festucetum valesiacaе* Gajić 1961**

Orig. (GAJIĆ 1961): *Agrostideto-Festucetum valesiacaе* [Art. 41a, b]

Syn.: *Festucetum valesiacaе* Gajić 1954 [Art. 31], *Festucetum valesiacaе* Borisavljević et al. 1955 [Art. 31]

Typus: GAJIĆ 1961, Tab. 27, rel. 2 – lectotypus hoc loco

***Bothriochloo ischaemi-Festucetum valesiacaе* A. Marković ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Andropogoneto-Festucetum valesiacaе* Marković 2007 nom. inval. [Art. 5]

Typus: MARKOVIĆ A. 2007, Tab. 7, rel. 2 – holotypus hoc loco

***Bromo squarrosi-Festucetum valesiacaе* Danon et Blaženčić in Mišić et al. ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Bromo-Festucetum valesiacaе* Danon et Blaženčić in Mišić et al. 1978 prov. nom. inval. [Art. 3b]

Typus: MIŠIĆ et al. 1978, Tab. 46, rel. 2 – holotypus hoc loco

***Chrysopogono grylli-Festucetum valesiacaе* Veljović 1971**

Orig. (VELJOVIĆ 1971): *Chrysopogoneto-Festucetum valesiacaе* [Art. 41a, b]

Typus: VELJOVIĆ 1971, Table on page 116, rel. 4 – lectotypus hoc loco

***Convolvulo cantabricae-Festucetum valesiacaе* Ž. Blaženčić et R. Vučković ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Convolvulo-Festucetum valesiacaе* Blaženčić et Vučković 1983 prov. nom. inval. [Art. 3b, 5]

Typus: BLAŽENČIĆ & VUČKOVIĆ 1983, Tab. 1, rel. 13 – holotypus hoc loco

***Dorycnio herbacei-Festucetum valesiacaе* A. Marković ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Dorycnio-Festucetum valesiacaе* Marković 2007 nom. inval. [Art. 5]

Typus: MARKOVIĆ A. 2007, Tab. 5, rel. 1 – holotypus hoc loco

***Euphorbio cyparissiae-Festucetum valesiaca*** A. Marković ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Euphorbieto-Festucetum valesiaca* Marković 2007 nom. inval. [Art. 5, 41a]

Typus: MARKOVIĆ A. 2007, Tab. 6, rel. 1 – holotypus hoc loco

***Galio purpurei-Festucetum valesiaca*** Jovanović-Dunjić 1956

Orig. (JOVANOVIĆ-DUNJIĆ 1956): *Galieta-Festucetum vallesiaca* [Art. 41a, b]

Typus: JOVANOVIĆ-DUNJIĆ 1956, Tab. 2, rel. 5 – lectotypus hoc loco

Note: This association was studied also by DIKLIĆ & NIKOLIĆ (1962).

***Hieracio pilosellae-Festucetum valesiaca*** M. Vučković ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Hieracio pilosellae-Festucetum valesiaca* M. Vučković 1988 nom. ined. [Art. 1], *Hieracio pilosellae-Festucetum valesiaca* M. Vučković 1991 nom. inval. [Art. 5]

Typus: VUČKOVIĆ, M. 1991, Tab. 8, rel. 4 – holotypus hoc loco

Note: The association was described in VUČKOVIĆ's doctoral thesis (1988) and then printed in a monograph (VUČKOVIĆ 1991), but without indication of a nomenclatural type.

***Koelerio macranthae-Festucetum valesiaca*** Parabučki et Butorac ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Koelerio gracilis-Festucetum valesiaca* Parabučki et Butorac 1993 [Art. 5]

Typus: PARABUČSKI & BUTORAC 1993, Tab. 3, rel. 5 – holotypus hoc loco

***Nepeto rtanjensis-Festucetum valesiaca*** Diklić et Milojević 1976

Orig. (DIKLIĆ & MILOJEVIĆ 1976): *Nepeto-Festucetum vallesiaca* [Art. 41a]

Typus: DIKLIĆ & MILOJEVIĆ 1976, Tab. 1, rel. 3 – lectotypus hoc loco

***Poo alpinae-Festucetum valesiaca*** Danon et Radmić 1962

Orig. (DANON & RADMIĆ 1962): *Poeto-Festucetum vallesiaca* [Art. 41a, b]

Typus: DANON & RADMIĆ 1962, Tab. 4, rel. 6 – lectotypus hoc loco

***Taraxaco serotini-Festucetum valesiaca*** Stojanović ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Taraxaco-Festucetum valesiaca* Stojanović 1983 nom. inval. [Art. 5]

Typus: STOJANOVIĆ 1983, Tab. 2, rel. 4 – holotypus hoc loco

***Koelerio macranthae-Festucetum wagnerii*** Stjepanović-Veseličić 1953

Orig. (STJEPANOVIĆ-VESELIČIĆ 1953): *Koelerieto-Festucetum wagnerii* [Art. 41 b]

Typus: STJEPANOVIĆ-VESELIČIĆ 1953, Tab. 3, rel. 11 – lectotypus hoc loco

Note: There is some confusion as to the year of printing because the monograph was reprinted in 1979. This association was mentioned for Serbia by GAJIĆ (1986).

***Poetum alpinae*** Wagner 1965

Syn.: *Poetum alpinae* R. Jovanović 1963 prov. [Art. 1, 3b], *Poetum alpinae* R. Jovanović in Mišić et al. 1978 prov. nom. inval. [Art. 3b, 31]

Note: The association was mentioned in the reports of a mapping project of the vegetation of Stara planina (JOVANOVIĆ 1963) and then described as provisional in the monograph of MIŠIĆ et al. (1978) without an indication of a nomenclatural type.

***Cynodonto-Poetum angustifoliae*** (Rapaics 1926) Soó 1957

Syntax. syn.: association with *Cynodon dactylon* (CINCOVIĆ, 1959)

***Festuco-Potentilletum arenariae*** Stjepanović-Veseličić 1953

Orig. (STJEPANOVIĆ-VESELIČIĆ 1953): *Festuceto-Potentilletum arenariae* [Art. 41 b]

Typus: STJEPANOVIĆ-VESELIČIĆ 1953, Tab. 5, rel. 11 – lectotypus hoc loco

Note: It is not possible to add an epitheton to the first genus since STJEPANOVIĆ-VESELIČIĆ (1953) refer to different *Festuca* taxa (*F. valesiaca* and *F. pseudovina*).

***Bothriochloo ischaemi-Stipetum bromoides*** B. Jovanović 1968 *nomen ineditum* [Art. 1]

Note: This association has never been published, but the name was taken from the reports of a mapping project of the vegetation of Yugoslavia (ZUPANČIĆ 1986).

***Peucedano cervariae-Stipetum tirsae*** (Less 1998) Borhidi 2012

Syn.: *Stipetum tirsae* Jovanović-Dunjić 1956 [Art. 31]

Note: The association *Stipetum tirsae* Meusel 1938 was recently divided into several ecologically narrow syntaxa. We selected the name *Peucedano cervariae-Stipetum tirsae* because it thrives in hilly areas on limestone (BORHIDI et al. 2012).

**Phytocoenosis *Poa angustifolia-Achillea collina*** R. Jovanović in Borisavljević et al. 1955

**Phytocoenosis *Bromus arvensis-Bromus mollis*** R. Jovanović in Borisavljević et al. 1955

**1.2.2 *Artemisio-Kochion*** Soó 1964

***Agropyro cristati-Kochietum prostratae*** Zólyomi 1958

Note: This association was published for Serbia in STOJANOVIĆ (1983) and IGIĆ et al. (1997).

**1.3 *Stipo pulcherrimae-Festucetalia pallentis*** Pop 1968

**1.3.1 *Chrysopogono-Festucion dalmaticae*** Borhidi 1996

Syn.: *Koelerio-Festucion dalmaticae* N. Randelović et Ružić 1986 nom. inval. [2b, 5, 8]

In phytocoenological literature of Serbia, the alliance *Koelerio-Festucion dalmaticae* was classified within the Balkan order *Astragalo-Potentilletalia*. There are needs for further research on these associations because the alliance *Koelerio-Festucion dalmaticae* was invalidly published.

***Diantho gracilis-Centaureetum diffusae*** N. Randelović et Ružić ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Diantho-Centaureetum diffusae* N. Randelović et Ružić 1986 nom. inval. [Art. 5]

Typus: RANDELOVIĆ & RUŽIĆ 1986, Tab. 2, rel. 7 – holotypus hoc loco

***Festuco dalmaticae-Plantaginetum serpentini*** Randelović et Ružić ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Festuco-Plantaginetum serpentini* Randelović et Ružić 1983 [Art. 5]

Typus: RANDELOVIĆ & RUŽIĆ 1983, Tab. 1, rel. 6 – holotypus hoc loco



### 1.3.2 *Saturejion montanae* Horvat in Horvat et al. 1974

Syn.: *Saturejion kitaibelii* N. Randelović et V. Randelović in Milosavljević et al. 2008 nom. inval. [Art. 2b, 8]

In a recent paper, PEDASHENKO et al. (2013) confirmed the Balkan alliance *Saturejion montanae* for Bulgaria. In phytocoenological literature of Serbia and Prodrum phytocoenosum Jugoslaviae (ZUPANČIĆ 1986), this alliance is not mentioned for Serbia.

Since JOVANOVIĆ-DUNJIĆ (1955) classified the association *Potentillo tommasiniana-Caricetum humilis* in the alliance *Festucion valesiaca*, there is a need for further research on the position of this association and the alliance related to the order *Stipo pulcherrimae-Festucetalia pallentis*.

#### ***Potentillo tommasiniana-Caricetum humilis* Jovanović-Dunjić 1955**

Orig. (JOVANOVIĆ-DUNJIĆ 1955): *Potentilieto-Caricetum humilis* [Art. 41b]

Typus: JOVANOVIĆ-DUNJIĆ 1955, Tab. 6, rel. 8 – lectotypus hoc loco

#### ***Carici-Festucetum stojanovii* Milosavljević et al. 2008 *nomen nudum* [Art. 2b, 5]**

Note: The name of the syntaxon is not validly published since no phytocoenological table or relevé was published, but it was mentioned in MILOSAVLJEVIĆ et al. (2008).

#### ***Astragalo-Silenetum supinae* Milosavljević et al. 2008 *nomen nudum* [Art. 2b, 5]**

Note: The name of the syntaxon is not validly published since no phytocoenological table or relevé was published, but it was mentioned in MILOSAVLJEVIĆ et al. (2008).

#### ***Carici humilis-Stipetum grafiana* Jovanović-Dunjić 1955**

Note: PEDASHENKO et al. (2013) typified this association.

### 1.3.3 *Seslerion rigidae* Zólyomi 1936

ZÓLYOMI (1939) originally classified the alliance *Seslerion rigidae* into the alpine class *Elyno-Seslerietea* Br.-Bl. 1948, while SOÓ (1947) subordinated this alliance to *Festuco-Brometea*. As DENGLER et al. (2012) pointed out, the alliance *Seslerion rigidae* belongs to the order *Stipo pulcherrimae-Festucetalia pallentis* and is a geographic vicariant of *Diantho lumnitzeri-Seslerion* found mainly in the western Carpathians and the Alps (CHYTRÝ 2007). In the phytocoenological literature of Serbia, dealpine xerophilous grasslands of the alliance *Seslerion rigidae* occurring on calcareous substrates were classified into the class *Festuco-Seslerietea* Barbero et Bonin 1969. Nevertheless, we are of the opinion that, according to the floristic composition, these grasslands should be the part of the class *Festuco-Brometea*. There is a need for further research on associations of the alliance *Seslerion rigidae* in Serbia.

#### ***Cephalario laevigatae-Seseliatum rigidae* Tatić et Atanacković 1973**

Orig. (TATIĆ & ATANACKOVIĆ 1973): *Cephalario-Seseliatum rigidae*

Phantom name: *Cephalario-Seslerietum rigidae* Tatić et Atanacković 1973 (JOVANOVIĆ & JOVANOVIĆ 1976)

Typus: TATIĆ & ATANACKOVIĆ 1973, Table on page 70, rel. 14 – lectotypus hoc loco

Note: This association was mistakenly listed in the Prodrromus of the vegetation of Serbia excluding territories of provinces (JOVANOVIĆ & JOVANOVIĆ 1976) as *Cephalario-Seslerietum rigidae* Tatić et Atanacković 1973.

#### ***Seslerietum filifoliae* Zólyomi 1939**

Note: The association *Seslerietum filifoliae* Zólyomi 1939 was mentioned for Serbia by NIKETIĆ & LAKUŠIĆ (1988).

#### **1.4 *Astragalo-Potentilletalia* Micevski 1971**

Balkan submediterranean montane steppic grasslands on calcareous substrates of the order *Astragalo-Potentilletalia* were considered to be part of the class *Festucetea vaginatae* (KOJIĆ et al. 1998) and were later classified into the *Festuco-Brometea* class (KOJIĆ et al. 2004). According to MUCINA et al. (in review), the order *Festucetalia vaginatae* is a syntaxonomical synonym, and therefore all alliances and orders were transferred to the class *Koelerio-Corynophoretea*. We are of the opinion that, according to their floristic composition, associations of the order *Astragalo-Potentilletalia* should be part of the class *Festuco-Brometea*.

##### **1.4.1 *Saturejo-Thymion* Micevski 1971**

#### ***Echinario capitatae-Convolutum althaeoidis* Rexhepi ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Echinario-Convolutum althaeoides* Rexhepi 1978 nom. ined. [Art. 1], *Echinario-Convolutum althaeoides* Rexhepi 1979 nom. inval. [Art. 5]

Typus: REXHEPI 1979a, Table on page 1033, rel. 1 – holotypus hoc loco

Note: The association was described in the doctoral thesis of REXHEPI (1978) and then published in a paper (REXHEPI 1979a).

#### **1.5 *Scorzonero villosae-Chrysopogonetalia grylli* Horvatić et Horvat in Horvatić 1963**

##### **1.5.1 *Chrysopogono-Saturejion subspicatae* Horvat et Horvatić 1934**

#### ***Artemisia albae-Salvietum officinalis* Grebenščikov 1950 *nomen mutatum propositum et nomen inversum propositum***

Orig. (GREBENŠČIKOV 1950): association *Salvia officinalis-Artemisia lobelii* [Art. 10b, 42, 45]

Typus: GREBENŠČIKOV 1950, Table on page 189, rel. 1 – holotypus

Note: NIKOLIĆ & DIKLIĆ (1966) stated that the association was invalidly published, so they added their names. The association is validly published with one phytocoenological relevé in GREBENŠČIKOV (1950), and according to Art. 18a, that is the holotype of the association. There is a need for further research on the position of this association, in particular within the Balkan alliance *Saturejion montanae* described by HORVAT et al. (1974) and distributed in the same area of Serbia.

#### ***Diantho petraeae-Seslerietum juncifoliae* Vukojičić et D. Lakušić in Kabaš et al. 2014**

#### **2. *Koelerio glaucae-Corynephoretea canescentis* Klika in Klika et Novák 1941**

Syntax. syn.: *Festucetea vaginatae* Soó ex Vicherek 1972

## 2.1 *Festuco-Sedetalia acris* Tx. 1951

Syntax. syn.: *Festucetalia vaginatae* Soó 1957

Steppic sandy grassland was traditionally considered to be a separate class, *Festucetea vaginatae*, in Serbia and surrounding countries (SANDA et al. 2008, BORHIDI et al. 2012), but has recently been classified within the atlantic class of dry grasslands of sandy soils and rocky outcrops, *Koelerio-Corynophoretea* (MUCINA et al. in review). Our analyses show floristic similarities to the alliances *Festucion vaginatae* and *Festucion rupicolae* from the Pannonian region and thus indicate classification into the class *Festuco-Brometea* (Ačić et al. unpubl.).

### 2.1.1 *Festucion vaginatae* Soó 1929

*Alyso gmelini-Festucetum vaginatae* Stjepanović-Veseličić 1956

Orig. (STJEPANOVIĆ-VESELIČIĆ 1956): *Alyseto-Festucetum vaginatae* [Art. 41b]

Syn.: *Festucetum vaginatae delibaticum* Stjepanović-Veseličić 1953 [Art. 34a], *Festucetum vaginatae mixtum* Gajić 1986 [Art. 5, 34a]

Typus: STJEPANOVIĆ-VESELIČIĆ 1956, Tab. 1, rel. 25 – lectotypus hoc loco

*Corispermo nitidi-Polygonetum arenariae* Stjepanović-Veseličić 1953

Orig. (STJEPANOVIĆ-VESELIČIĆ 1953): *Corispermeto-Polygonetum arenariae* [Art. 41b]

Typus: STJEPANOVIĆ-VESELIČIĆ 1953, Tab. 1, rel. 4 – lectotypus hoc loco

*Herniario hirsutae-Tragetum racemosi* Stjepanović-Veseličić 1956

Orig. (STJEPANOVIĆ-VESELIČIĆ 1956): *Herniarieto-Tragetum racemosi* [Art. 41b]

Typus: STJEPANOVIĆ-VESELIČIĆ 1956, Tab. 2, rel. 11 – lectotypus hoc loco

## 2.2 *Sedo albi-Scleranthetalia biennis* Br.-Bl. 1955

### 2.2.1 *Scabioso-Trifolion dalmatici* Horvatić et N. Randelović in N. Randelović 1977

According to traditional syntaxonomical schemes in Serbia (KOJIĆ et al. 1998, 2004), the alliance of silicicolous therophyte swards of submediterranean-continental Serbia *Scabioso-Trifolion dalmatici* was classified within the class *Festucetea vaginatae* and Balkan order *Astragalo-Potentilletalia*. Floristic composition has shown high presence of typical *Festuco-Brometea* species, and we are of the opinion that this alliance should be part of the class *Festuco-Brometea* (Ačić et al. unpubl.).

*Teucrio montanae-Artemisietum albae* Rexhepi 1975 *nomen mutatum propositum*

Orig. (REXHEPI 1975): *Teucrio-Artemisietum camphoratae* [Art. 45]

Typus: REXHEPI 1975, Tab. 1, rel. 4 – lectotypus hoc loco

*Astragalo onobrychidis-Calaminthetum alpinae* Horvatić et N. Randelović in N. Randelović 1977

Orig. (RANDELOVIĆ 1977): *Astragalo-Calaminthetum alpinae* Horvatić et Randelović 1977

Syn.: *Astragalo-Calaminthetum hungaricae* Horvatić et Randelović in Randelović 1974 nom. ined. [Art. 1]

Typus: RANDELOVIĆ 1977, Tab. 1, rel. 5 – lectotypus hoc loco

Note: The association was first published in a master thesis (RANDELOVIĆ 1974) and then validly in RANDELOVIĆ (1977).

***Onobrychido arenariae-Haynaldietum villosae* Rexhepi 1976**

Orig. (REXHEPI 1976): *Onobrychi-Haynaldietum villosae* Feri 1976 [Art. 41 b]

Typus: REXHEPI 1976, Table on page 47, rel. 13 – lectotypus hoc loco

Note: The author's name given was Feri, although the author's surname is Rexhepi.

***Sedo rubentis-Dianthetum pinifoliae* N. Radelović 1977**

Orig. (RANDELOVIĆ 1977): *Sedo-Dianthetum pinifoliae*

Syn.: *Sedo-Dianthetum pinifoliae* Radelović 1974 nom. ined. [Art. 1]

Typus: RANDELOVIĆ 1977, Tab. 4, rel. 6 – lectotypus hoc loco

Note: The association was first published in a master thesis (RANDELOVIĆ 1974) and then validly in RANDELOVIĆ (1977).

***Trifolio subterranei-Lotetum angustissimi* Horvatić et Radelović in Radelović 1977**

Orig. (RANDELOVIĆ 1977): *Trifolio-Lothetum angustissimi* Horvatić et Radelović 1977 [Art. 41 a]

Syn.: *Trifolio-Lothetum angustissimi* Horvatić et Radelović in Radelović 1974 nom. ined. [Art. 1]

Typus: RANDELOVIĆ 1977, Tab. 2, rel. 5 – lectotypus hoc loco

Note: The association was first published in a master thesis (RANDELOVIĆ 1974) and then validly in RANDELOVIĆ (1977).

***Sedo albae-Potentilletum arenariae* Ružić 1978**

Orig. (RUŽIĆ 1978): *Sedo-Potentilletum arenariae* Ružić 1976

Typus: RUŽIĆ 1978, Tab. 1, rel. 4 – lectotypus hoc loco

***Koelerio splendentis-Silenetum frivaldszkyanae* Radelović et Stamenković ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Koelerio-Silenetum frivaldszkyanae* Radelović et Stamenković 1991 nom. inval. [Art. 5]

Typus: RANDELOVIĆ & STAMENKOVIĆ 1991, Tab. 2, rel. 2 – holotypus hoc loco

Note: In the original publication, authors and year (Radelović et Stamenković 1983 (86)) were added to the association's name.

***Astragalo onobrychidis-Stipetum capillatae* N. Radelović 1977**

Orig. (RANDELOVIĆ 1977): *Astragalo-Stipetum capillatae*

Syn.: *Astragalo-Stipetum capillatae* N. Radelović 1974 nom. ined. [Art. 1]

Typus: RANDELOVIĆ 1977, Tab. 5, rel. 4 – lectotypus hoc loco

Note: The association was first published in a master thesis (RANDELOVIĆ 1974) and then validly in RANDELOVIĆ (1977).

***Hyperico olympici-Trifolietum trichopteri* N. Radelović et Stamenković ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Hyperico-Trifolietum trichopteri* N. Radelović et Stamenković 1991 nom. inval. [Art. 5]

Typus: RANDELOVIĆ & STAMENKOVIĆ 1991, Tab. 1, rel. 5 – holotypus hoc loco

Note: In the original publication, authors and year (Radelović et Stamenković 1983 (86)) were added to the association's name.

***Ornithopo compressae-Tuberarietum gutatae* Rexhepi ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Compresso-Tuberarietum gutatae* Rexhepi 1978 nom. ined. [Art. 1], *Compresso-Tuberarietum gutatae* Rexhepi 1993 [Art. 5, 41 b]

Typus: REXHEPI 1993, Tab. 1, rel. 7 – holotypus hoc loco

Note: The association was first published in a doctoral thesis (REXHEPI 1978) and then invalidly in REXHEPI (1993).

***Hordeo caput-medusae-Xeranthemetum annui* Randelović 1977**

Orig. (RANĐELOVIĆ 1977): *Hordeo-Xeranthemetum annui*

Typus: RANĐELOVIĆ 1977, Tab. 3, rel. 1 – lectotypus hoc loco

***Trifolio hirti-Festucetum valesiaca* N. Randelović et al. ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Trifolio-Festucetum valesiaca* Randelović et al. 1979 nom. inval. [Art. 5]

Typus: RANĐELOVIĆ et al. 1979, Tab. 7, rel. 5 – holotypus hoc loco

**3.4. *Halacsyetalia sendtneri* Ritter-Studnička 1970**

This order of Balkan ultramafic xeric rocky grasslands developed in Bosnia, Albania and Serbia was described by RITTER-STUDNIČKA (1970) in Bosnia. In the original description, the order was classified in *Festuco-Brometea*. According to KOJIĆ et al. (1998), the order *Halacsyetalia sendtneri* was considered to be part of the class *Festucetea vaginatae*, but these associations were later classified into the class *Festuco-Brometea* (KOJIĆ et al. 2004). According to MUCINA et al. (in review), the order *Festucetalia vaginatae* is a syntaxonomical synonym, and therefore all alliances and orders were transferred to the class *Koelerio-Corynophoretea*. We are of the opinion that, according to the floristic composition, the order *Halacsyetalia sendtneri* should be part of the class *Festuco-Brometea* (Jovanović et al. unpubl.).

**3.4.1 *Centaureo-Bromion fibrosi* Blečić et al. 1969**

***Artemisio albae-Achnatheretum calamagrostis* Jovanović-Dunjić et S. Jovanović ex Ačić et al. *ass. nov. hoc loco***

Syn.: *Artemisio-Achnatheretum calamagrostis* Jovanović-Dunjić et S. Jovanović 1987 nom. nud. [Art. 2b, 5]

Note: This association was registered in Prodrromus phytocoenosum Jugoslaviae (ZUPANČIĆ 1986), and JOVANOVIĆ-DUNJIĆ & JOVANOVIĆ (1987) published this association only with a synoptic table and without nomenclatural type. We have selected a nomenclatural type and described the habitat of this association based on field notes.

The association *Artemisio albae-Achnatheretum calamagrostis* is secondary rocky grassland developed on serpentine.

Holotypus: *Achnatherum calamagrostis* 2, *Acinos alpinus* subsp. *alpinus* +, *Aethionema saxatile* subsp. *saxatile* +, *Alyssum murale* +, *Artemisia alba* 1, *Asperula purpurea* +, *Bromus fibrosus* 1, *Carduus hamulosus* subsp. *hamulosus* +, *Danthonia alpina* +, *Dianthus* sp. 1, *Dorycnium pentaphyllum* subsp. *germanicum* 1, *Euphorbia glabriflora* +, *Festuca panciana* +, *Hieracium piloselloides* subsp. *piloselloides* +, *Hieracium* sp. +, *Juniperus oxycedrus* subsp. *oxycedrus* +, *Koeleria pyramidata* +, *Leontodon crispus* subsp. *crispus* +, *Psilurus incurvus* +, *Rosa pendulina* +, *Rumex acetosella* subsp. *acetosella* +, *Sanguisorba minor* subsp. *minor* +, *Teucrium montanum* +, *Thesium bavarum* +, *Thymus praecox* subsp. *skorpilii* +.

Locality: Kopaonik, Rajičeva gora, UTM grid 34T DN97, 43.34 N, 20.94 E, cover 40%, aspect SE, slope 70°, authors of relevé R. Jovanović-Dunjić and S. Jovanović, 27.06.1984.

***Alyso markgrafii-Artemisietum albae*** Aćić et al. *ass. nov. hoc loco*

Syn.: *Artemisio-Teucrietum montani* Blaženčić et Vučković 1986 nom. inval. [Art. 5, 32d]

Non: *Teucro montanae-Artemisietum albae* Rexhepi 1975

Typus: BLAŽENČIĆ & VUČKOVIĆ 1986, Tab. 1, rel. 1 – holotypus hoc loco

Note: REXHEPI (1975) published an association with a similar name, *Teucro montanae-Artemisietum albae* Rexhepi 1975 from the order *Astragalo-Potentilletalia*, but this is a different association with a different floristic composition developed on limestone. We changed the name of the association developed on serpentine to *Alyso markgrafii-Artemisietum albae* to avoid homonymy [Art. 32d].

***Bromo fibrosi-Artemisietum albae*** A. Marković ex Aćić et al. *ass. nov. hoc loco*

Syn.: *Bromo-Artemisietum albae* Marković et al. 1998 prov. nom. inval. [Art. 3b], *Bromo-Artemisietum albae* A. Marković 2007 nom. inval. [Art. 5]

Typus: MARKOVIĆ, A. 2007, Tab. 11, rel. 3 – holotypus hoc loco

***Sedo serpentini-Bornmuellerietum dieckii*** Blečić et al. 1969

Orig. (BLEČIĆ et al. 1969): *Sedo-Bornmüllerietum dieckii*

Typus: BLEČIĆ et al. 1969, Tab. 1, rel. 25 – lectotypus hoc loco

***Brometum fibrosi*** Pavlović 1962

Syn.: *Eryngio-Brometum fibrosi* Z. Pavlović ex V. Randelović 2004 *nom. superf.* [Art. 29c]

Typus: PAVLOVIĆ 1962, Tab. 2, rel. 1 on locality Stolovi – lectotypus hoc loco

Note: The changed name was published in a report of the project “Harmonization of National Habitats Classification Nomenclature with European Community Standards” (LAKUŠIĆ et al. 2005, LAKUŠIĆ & SABOVLJEVIĆ 2005).

***Seslerio serbicae-Caricetum humilis*** D. Lakušić et Kabaš in Aćić et al. *ass. nov. hoc loco*

Incl.: *Carici humilis-Festucetum pancicianae* R. Jovanović-Dunjić et S. Jovanović 1987 subass. *cytisetosum petrovicii* D. Lakušić 1989 nom. nud. [Art. 2b, 4a]

Note: We have selected a nomenclatural type and described the habitat of this association based on field notes.

The association *Seslerio serbicae-Caricetum humilis* is secondary rocky grassland developed mostly on southerly exposed serpentine.

Holotypus: *Asperula cynanchica* 1, *Asplenium ruta-muraria* subsp. *ruta-muraria*, *Bromus fibrosus* +, *Carex humilis* 4, *Cytisus procumbens* var. *petrovicii* 1, *Dorycnium pentaphyllum* subsp. *germanicum* 1, *Festuca panciana* +, *Gentiana utriculosa* 1, *Leucanthemum vulgare* 1, *Minuartia verna* agg. +, *Plantago holosteum* 1, *Potentilla heptaphylla* 1, *Scabiosa columbaria* agg. +, *Sedum serpentini* 1, *Sesleria serbica* 1, *Thymus praecox* subsp. *skorpilii* 1, *Trinia glauca* subsp. *glauca* +.

Locality: Kopaonik Mt., Kukavica, UTM grid 34T DN79, 43.33 N, 20.74 E, altitude 1650 m, relevé area 50 m<sup>2</sup>, aspect S, slope 50°, cover 70 %, serpentine, author of relevé D. Lakušić, date 04.07.1989.

***Bromo fibrosi-Chrysopogonetum grylli*** Tatić 1969

Orig. (TATIĆ 1969): Association *Bromus fibrosus-Chrysopogon gryllus*

Typus: TATIĆ 1969, Table between pages 50 and 51, rel. 5 – lectotypus hoc loco

***Stipo mayerii-Convolvuletum compacti*** Millaku et al. 2011

Orig. (MILLAKU et al. 2011): *Stipeto-Convolvuletum compacti* [Art. 41b]

***Sedo serpentini-Dianthetum serbici*** Pavlović 1967

Orig. (PAVLOVIĆ 1967): *Sedo-Dianthetum serbici*

Typus: PAVLOVIĆ 1967, Table on page 191, rel. 4 – lectotypus hoc loco

***Halacsyo sendtneri-Potentilletum mollis*** Pavlović 1955

Orig. (PAVLOVIĆ 1955b): Association *Halacsya Sendtneri-Potentilla mollis* [Art. 14, 41b]

Typus: PAVLOVIĆ 1955b, rel. 1 on page 17 – holotypus

Note: The original diagnosis contains only one releve which is the holotype of the name.

***Centaureo kosaninii-Euphorbietum glabriflorae*** S. Jovanović et V. Stevanović in Ačić et al. *ass. nov. hoc loco*

Syn.: *Centaureo kosaninii-Euphorbietum glabriflorae* S. Jovanović et V. Stevanović 1990 nom. inval. [Art. 1]

Note: This association was published in the reports of a project worked on by JANKOVIĆ et al. (1990). We have selected a nomenclatural type and described the habitat of this association based on field notes.

The association *Centaureo kosaninii-Euphorbietum glabriflorae* is secondary rocky grassland developed mostly on southerly exposed serpentine.

Holotypus: *Acinos alpinus* subsp. *alpinus* +, *Agrostis* sp. +, *Alyssum markgrafii* +, *A. repens* 1, *Asplenium ceterach* +, *A. cuneifolium* +, *Astragalus onobrychis* 1, *Bromus erectus* 1, *Centaurea alba* subsp. *ipeensis* +, *C. kosaninii* 2, *Cytisus procumbens* var. *petrovicii* 1, *Danthonia alpina* 1, *Euphorbia glabriflora* 3, *Festuca rupicola* subsp. *rupicola* 1, *Galium album* subsp. *album* +, *Hieracium praealtum* subsp. *bauhinii* +, *Juniperus oxycedrus* subsp. *oxycedrus* 1, *Leontodon crispus* subsp. *crispus* 1, *Melica ciliata* subsp. *ciliata* 1, *Minuartia verna* 1, *Poa perconcinna* 1, *Plantago holosteum* 1, *Petrorhagia saxifraga* 1, *Saponaria sicula* subsp. *intermedia* +, *Sedum ochroleucum* +, *S. serpentini* 1, *Silene bupleuroides* subsp. *staticifolia* +, *Stachys officinalis* +, *S. recta* 1, *Stipa* sp. 1, *Vincetoxicum huteri* +.

Locality: Kosovo, Šara Mt., Gradište, UTM grid 34T EM07, 42.22 N, 21.01 E, serpentine, relevé area 25 m<sup>2</sup>, altitude 1100 m, aspect SW, authors of relevé S. Jovanović and V. Stevanović, date 30.06.1990.

***Festuco ovinae-Euphorbietum glabriflorae*** S. Jovanović et R. Jovanović-Dunjić in S. Jovanović et al. ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Festuco duriusculae-Euphorbietum glabriflorae* S. Jovanović et R. Jovanović-Dunjić 1992 nom. inval. [Art. 5]

Typus: JOVANOVIĆ, S. et al. 1992, Tab. 1, rel. 7 – holotypus hoc loco

Note: Since *Festuca duriuscula* L. is a heterotypic synonym of *Festuca rubra* L. subsp. *rubra* (FOGGI & MÜLLER 2009), the name of the association was changed. The name *Festuca duriuscula* in the association *Festuco duriusculae-Euphorbietum glabriflorae* was applied on the basis of the concept of the genus *Festuca* published in the Flora of SR Serbia 8 (GAJIĆ 1976: 422). Considering that the above solution was explicitly based on Hackel's and Markgraf's concept of the *Festuca* genus (*F. ovina* var. *duriuscula* (L.) Hack. sensu Hackel 1882 (Monographia Festucarum Europearum: 89); *F. durisucula* L. sensu Markgraf in Hayek 1933 (Prodromus Florae peninsulae Balkanicae 3: 277)), there is no doubt that *F. duriuscula* from serpentine of the Western Serbia belongs to the complex of *F. ovina* and not of *F. rubra*.

***Hyperico barbati-Euphorbietum glabriflorae*** Rexhepi ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Hyperico-Euphorbietum glabriflorae* Rexhepi 1978 nom. ined. [Art. 1]

Note: The name was described in REXHEPI'S doctoral thesis (1978). The association was mentioned in RANĐELOVIĆ et al. (1979) and KRASNIQI & MILLAKU (2007), but without nomenclatural type. We have selected a representative relevé from the table in the PhD thesis and described the habitat of this association.

The association *Hyperico barbati-Euphorbietum glabriflorae* is Balkan semi-dry pasture developed on serpentine.

Holotypus: *Artemisia alba* 1, *Alyssum montanum* +, *Astragalus onobrychis* var. *multijugis* +, *Bromus fibrosus* 1, *Carex praecox* +, *Centaurea kosanini* +, *C. stereophylla* +, *Cephalaria laevigata* +, *Danthonia alpina* +, *Dorycnium pentaphyllum* subsp. *germanicum* 2, *Echium rubrum* +, *Eryngium campestrite* +, *Euphorbia cyparissias* +, *E. glabriflora* 2, *Erysimum diffusum* +, *Festuca panciciana* 2, *Galium lucidum* +, *Hieracium cymosum* 1, *H. praealtum* subsp. *bauhinii* +, *Hypericum barbatum* 1, *Hippocrepis comosa* +, *Koeleria macrantha* +, *Linum tauricum* var. *serbicum* +, *Minuartia verna* +, *Plantago argentea* +, *P. holosteam* 1, *Poa badensis* +, *Potentilla pedata* +, *P. visianii* +, *Sanguisorba minor* 1, *Scabiosa columbaria* +, *Stachys officinalis* +, *S. recta* subsp. *baldacci* 1, *S. scardica* 1, *Stipa pennata* 1, *Thesium arvense* +, *Thymus longicaulis* 1, *Veronica austriaca* subsp. *austriaca* +.

Locality: Kosovo, Goleš, altitude 800 m, aspect E, slope 20°, serpentine.

***Festuco pancicianae-Caricetum humilis*** Jovanović-Dunjić et S. Jovanović ex Ačić et al.  
*ass. nov. hoc loco*

Syn.: *Carici humilis-Festucetum pancicianae* Jovanović-Dunjić et S. Jovanović 1987 nom. nud. [Art. 2b, 5]

Note: The association was described by JOVANOVIĆ-DUNJIĆ & JOVANOVIĆ (1987), but with a synoptic table only. We have selected a nomenclatural type and described the habitat of this association based on field notes.

The association *Festuco pancicianae-Caricetum humilis* is secondary rocky grassland developed mostly on southerly exposed serpentine slopes.

Holotypus: *Acinos alpinus* subsp. *alpinus* +, *Agrostis capillaris* +, *Alyssum murale* +, *Artemisia alba* +, *Asperula purpurea* 1, *Bromus erectus* +, *B. pannonicus* subsp. *pannonicus* +, *Carex humilis* 3, *C. montana* +, *Centaurea biebersteinii* subsp. *biebersteinii* +, *Dorycnium pentaphyllum* subsp. *germanicum* 2, *Euphrasia pectinata* +, *Festuca panciciana* 2, *Hypericum richeri* subsp. *grisebachii* +, *Juniperus oxycedrus* subsp. *oxycedrus* +, *Koeleria pyramidata* +, *Leontodon hispidus* subsp. *hispidus* +, *Minuartia verna* +, *Orobanche teucrii* +, *Potentilla heptaphylla* +, *P. visianii* +, *Rumex acetosella* subsp. *acetosella* +, *Sanguisorba minor* subsp. *minor* 1, *Scabiosa columbaria* +, *Scleranthus perennis* subsp. *Perennis* +, *Teucrium montanum* 1, *Thymus praecox* subsp. *skorpilii* 1, *Veronica austriaca* subsp. *Austriaca* +, *Viola aetolica* +.

Locality: Kopaonik Mt., Rajičeva gora, UTM grid 34T DN97, 43.17 N, 20.89 E, altitude 1160 m, aspect S, authors of relevé R. Jovanović-Dunjić and S. Jovanović, date 27.06.1984.

***Potentilo tommasinianae-Festucetum pancicianae*** D. Lakušić et Kabaš in Ačić et al. *ass. nov. hoc loco*

Syn.: *Potentilo tommasinianae-Festucetum pancicianae* D. Lakušić 1989 nom. nud. [Art. 2b]

Note: We have selected a nomenclatural type and described the habitat of this association based on field notes.

The association *Potentilo tommasinianae-Festucetum pancicianae* is secondary rocky grassland developed on serpentine.

Holotypus: *Alyssum montanum* subsp. *montanum* 1, *Arenaria leptoclados* 1, *Asperula cynanchica* 1, *Astragalus onobrychis* 1, *Bromus erectus* 1, *Carex humilis* 1, *Euphorbia glabriflora* 1, *Festuca panciciana* 2, *Leontodon crispus* subsp. *crispus* 1, *Paronychia kapela* subsp. *kapela* 1, *Pinus nigra* subsp. *nigra* 1, *Plantago holosteam* 1, *Potentilla tommasiniana* 2, *Rumex acetosella* subsp. *acetosella* 1, *Stachys recta* 1, *Teucrium montanum* 1, *Thymus praecox* subsp. *skorpilii* 1.



Locality: Kopaonik Mt., Krmeljica, UTM grid 34T DN99, 43.26 N, 20.74 E, altitude 1070 m, relevé area 25 m<sup>2</sup>, cover 50 %, aspect SE, slope 5°, serpentine, author of relevé D. Lakušić, date 04.07.1989.

***Potentillo tommasinianae-Fumanetum bonapartei*** Rexhepi ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Potentillo-Fumanetum bonaparti* Rexhepi 1979 [Art. 5]

Typus: REXHEPI 1979b, Tab. 1, rel. 4 – holotypus hoc loco

***Polygalo dörfleri-Genistetum hassertianae*** Blečić et al. 1969

Orig. (BLEČIĆ et al. 1969): *Polygalo-Genistetum hassertianae*

Typus: BLEČIĆ et al. 1969, Tab. 1, rel. 18 – lectotypus hoc loco

***Poo molinerii-Plantaginetum holostei*** Pavlović 1951 *nomen mutatum propositum*

Orig. (PAVLOVIĆ 1951): *Poëto Molinerii-Plantaginetum carinatae* [Art. 41 b, 45]

Syn.: *Poo alpinae-Plantaginetum carinatae* Kojić et Ivanović 1954 [Art. 31]

Typus: PAVLOVIĆ 1951, Tab. 6, rel. 7 – lectotypus hoc loco

***Cynancho vincetoxici-Saponarietum intermediae*** Blečić et al. 1969

Orig. (BLEČIĆ et al. 1969): *Cynancho-Saponarietum intermediae*

Typus: BLEČIĆ et al. 1969, Tab. 1, rel. 7 – lectotypus hoc loco

***Onosmo echioidis-Scabiosetum fumarioidis*** Rexhepi ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Onosmato-Scabiosetum fumarioides* Rexhepi 1978 nom. ined. [Art. 1], *Onosmo-Scabiosetum fumarioides* Rexhepi 1985 [Art. 5]

Typus: REXHEPI 1985, Tab. 1, rel. 2 – holotypus hoc loco

Note: The association was described in the doctoral thesis of REXHEPI (1978) and then printed in a paper (REXHEPI 1985), but without indication of a nomenclatural type.

***Artemisio albae-Silenetum armeriae*** D. Lakušić et Kabaš in Ačić et al. *ass. nov. hoc loco*

Syn.: *Artemisio-Silenetum armeriae* D. Lakušić 1989 nom. nud. [Art. 2b]

Note: We have selected a nomenclatural type and described the habitat of this association based on field notes.

The association *Artemisio albae-Silenetum armeriae* is secondary rocky grassland developed on serpentine.

Holotypus: *Acinos alpinus* 1, *Allium flavum* 1, *Alyssum murale* 2, *Artemisia alba* 1, *Asplenium ruta-muraria* subsp. *ruta-muraria* 1, *Centaurea rhenana* subsp. *rhenana* 1, *Festuca panciciana* 1, *Petrorhagia saxifraga* 1, *Sedum acre* 1, *S. album* 1, *Silene armeria* 3, *Stachys recta* 1.

Locality: Kopaonik Mt., Vlajkovci, UTM grid 34T DN79, 43.35 N, E 20.94 E, altitude 715 m, relevé area 25 m<sup>2</sup>, aspect SW, slope 40°, serpentine, author of relevé D. Lakušić, date 04.07.1989.

***Stipetum novakii*** Kabaš et D. Lakušić in Kabaš et al. 2013

***Potentillo tommasinianae-Stipetum pennatae*** A. Marković ex Ačić et al. *ass. nov. hoc loco*

Syn.: *Potentillo-Stipetum pennatae* A. Marković 2007 nom. inval. [Art. 5]

Typus: MARKOVIĆ A., 2007, Tab. 10, rel. 1 – holotypus hoc loco

#### 4. Discussion and conclusion

The present work includes a list of all syntaxa of dry grasslands of Serbia based on a literature and relevé database review. A total of 134 dry grassland syntaxa have been described within the studied region, 53 of which were validly published and 65 of which, previously incorrectly typified, were validated.

There is a disproportion of the number of syntaxa between the studied region and other countries (CHYTRÝ 2007, BORHIDI et al. 2012, ŠILC & ČARNI 2012). One reason might be that the Balkan, located in a transitional position between different biogeographical regions, is a biodiversity hotspot. The other is that the vegetation was studied very regionally, without taking into account larger areas and larger sets of vegetation relevés. Therefore many regional associations were described, but no synthesis was made.

The present syntaxonomic scheme of the class *Festuco-Brometea* is the first attempt of such scope in the studied area based on literature review and a relevé database. We also applied rules of ICPN that were not always followed by researchers in previous times. For some syntaxa we critically highlighted the syntaxonomic problems for further numerical analysis of collected relevé material, which is the next step in the classification of dry grasslands in the Central Balkan.

This paper will contribute to the synchronization of plant communities from the Balkan region with the European syntaxonomical system and the EU Habitat list and thus help to assign their legal conservation status, which will bring about the establishment of the Red list of Habitats (BERG et al. 2014).

#### Erweiterte deutsche Zusammenfassung

**Einleitung** – Flora und Vegetation des trockenen Graslands des Balkans umfassen zahlreiche Taxa und Syntaxa mit einem erheblichen Anteil an endemischen Arten; für Serbien und die Klasse *Festuco-Brometea* wurde dies von DAJČ STEVANOVIĆ et al. (2010) gezeigt. Gleichzeitig finden in vielen Ländern Europas besondere Bemühungen zum Erhalt der Gesellschaften der *Festuco-Brometea* statt (z. B. HEGEDŮŠOVÁ & SENKO 2011). Die Trockenrasen des Zentral-Balkans – darunter verstehen wir hier das Gebiet Serbiens und des Kosovo – wurden bereits mehrfach untersucht (z. B. KOJIĆ et al. 2004). Dabei wurden jedoch die Regeln des internationalen Codes der pflanzensoziologischen Nomenklatur (ICPN) (WEBER et al. 2000) oft nicht strikt befolgt, sodass zahlreiche Syntaxa ungültig publiziert wurden (AČIĆ et al. 2013a). Das Hauptziel der vorliegenden Arbeit ist eine nomenklatorische Validierung der Trockenrasen-Assoziationen der Klassen der *Festuco-Brometea* und *Festucetea vaginatae* des Zentral-Balkans nach den Kriterien des ICPN. Ungültig beschriebene Syntaxa werden ggf. korrigiert oder nachträglich typisiert.

**Methoden** – Als Basis für die Erstellung der Liste der Trockenrasengesellschaften des zentralen Balkans diente die Vegetationsdatenbank des Graslands Serbiens (GIVD ID EU-RS-02, AČIĆ et al. 2012). Die Zuordnung der Gesellschaften zu Verbänden und höheren Syntaxa richtete sich nach den Originalquellen sowie nach MUCINA et al. (im Review). Die Nomenklaturregeln des ICPN wurden dabei strikt befolgt. Die Nomenklatur der Pflanzenarten richtete sich nach Flora Europaea (FLORA EUROPAEA DATABASE) mit Ausnahme von *Bothriochloa ischaemum* (L.) Keng., *Bromus fibrosus* Hack., *Echium rubrum* Forssk., *Koeleria pyramidata* subsp. *montana* (Hausm.) Domin, *Nepeta rtanjensis* Diklić & Milojević, *Potentilla arenaria* Borkh. ex G. Gaertn., *Potentilla tommasiniana* F. W. Schultz, *Sedum*

*serpentini* Janch., *Stachys recta* subsp. *baldaccii* (K. Malý) Hayek, *Veronica austriaca* subsp. *jacquinii* (Baumg.) Eb. Fisch and *Cytisus procumbens* Bojer ex Baker var. *petrovicii* (Adamović) Diklić.

**Ergebnisse und Diskussion** – Insgesamt wurden 134 Trockenrasen-Gesellschaften überprüft; 53 Gesellschaften davon waren bereits gültig publiziert. Zwei Assoziationen wurden umbenannt: das *Chrysopogonetum pannonicum* in *Adonido vernalis-Chrysopogonetum grylli* und das *Agrostidetum vulgaris* in *Rhinantho rumelici-Agrostietum capillaris*. Die syntaxonomische Stellung mehrerer Trockenrasen-Verbände wird diskutiert. Der von KOJIĆ (1957) publizierte Verband *Chrysopogono-Danthonion calycinae* z. B. stand anfänglich in der Ordnung der *Festucetalia valesiaca* und in einer späteren syntaxonomischen Revision der Vegetation Serbiens (KOJIĆ et al. 2004) in der Ordnung der *Brometalia erecti* Br.-Bl. 1936. Eine weitere Möglichkeit der pflanzensoziologischen Stellung dieses Verbands bildet die Ordnung der *Brachypodietalia pinnati* (früher *Brometalia erecti*). Insgesamt erachten wir weitere Untersuchungen der syntaxonomischen Stellung und Verbreitung des *Chrysopogono-Danthonion calycinae* auf dem Balkan als notwendig.

Der Verband des *Koelerio-Festucion dalmaticae* stand bisher in der balkanischen Ordnung der *Astragalo-Potentilletalia*. Allerdings wurde der Verband ungültig publiziert, womit sich die Notwendigkeit einer erneuten Klärung seiner syntaxonomischen Stellung und auch der Stellung seiner Assoziationen ergibt.

Entsprechend der derzeit gebräuchlichen syntaxonomischen Gliederung der Vegetation Serbiens (KOJIĆ et al. 1998, 2004) rechnen wir die submediterranean-kontinental-geprägten Silikat-Therophytenrasen des *Scabioso-Trifolion dalmatici* zur balkanischen Ordnung der *Astragalo-Potentilletalia* innerhalb der Klasse der *Festucetea vaginatae*. Eine floristische Analyse zeigte jedoch, dass der Verband *Scabioso-Trifolion dalmatici* zahlreiche typische *Festuco-Brometea*-Arten enthält und daher auch zur Klasse *Festuco-Brometea* gestellt werden könnte (AČIĆ et al. in Vorbereitung).

Der balkanische Verband *Saturejion montanae* wurde in der pflanzensoziologischen Literatur Serbiens sowie auch im Prodromus phytocoenosum Jugoslaviae (ZUPANČIĆ et al. 1986) bisher noch nicht beachtet. Aktuelle Ergebnisse zeigen jedoch, dass aus Ost-Serbien beschriebene Gesellschaften des Verbands *Festucion valesiaca* wohl zum *Saturejion montanae* gehören.

Nach neuen Untersuchungen gibt es mit dem *Festucion sulcatae* nur (noch) einen Verband der subkontinentalen Steppenrasen (z. B. MUCINA et al. im Review). Da sich in Serbien jedoch die floristische Zusammensetzung der Assoziationen der Verbände des *Festucion rupicola* und *Festucion valesiaca* stark unterscheidet, sind wir der Meinung, dass die beiden Verbände als Unterverbände berücksichtigt werden sollten, wie es auch BORHIDI et al. (2012) vorgeschlagen haben.

Dealpines, xerophytisches Grasland auf kalkreichem Untergrund wurde in Serbien bisher als *Seslerion rigidae* innerhalb der Klasse *Festuco-Seslerietea* klassifiziert. Wir sind jedoch von der floristischen Zusammensetzung der Bestände her der Überzeugung, dass die Gesellschaften in die Klasse der *Festuco-Brometea* gestellt werden sollten.

Steppenrasen auf sandigem Untergrund werden in Serbien traditionell in die Klasse der *Festucetea vaginatae* gestellt. Kürzlich wurde allerdings vorgeschlagen, sie innerhalb der *Koelerio-Corynophoretea* zu klassifizieren (MUCINA et al. im Review). Unsere Untersuchung zeigt dagegen deutlich floristische Ähnlichkeiten zwischen den serbischen Beständen

des *Festucion vaginatae* und den pannonischen Beständen des *Festucion rupicolae*, was für einen Anschluss der serbischen Sand-Steppenrasen an die Klasse der *Festuco-Brometea* spricht.

Die Ordnung *Halacsysetalia sendtneri* wurde von KOJIĆ et al. (1998) zuerst in die Klasse der *Festucetea vaginatae* gestellt und später die Assoziationen den *Festuco-Brometea* angeschlossen (KOJIĆ et al. 2004). Wie MUCINA et al. (im Review) deutlich machen, sind die *Festucetalia vaginatae* aber ein syntaxonomisches Synonym, sodass ihre Verbände und Ordnungen in die Klasse *Koelerio-Corynophoretea* übertragen werden können. Wir sind dagegen der Meinung, dass die Ordnung *Halacsysetalia sendtneri* in die Klasse der *Festuco-Brometea* gestellt werden sollte.

Die hier präsentierten Ergebnisse könnten zu einem Abgleich der serbischen Pflanzengesellschaften mit den EU-Habitattypen führen und auf diese Weise ihren gesetzlichen Schutzstatus ermöglichen oder auch die Erstellung einer Roten Liste der Trockenrasen-Gesellschaften Serbiens erlauben.

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