

TYPIIFICATION AND CORRECTION OF SYNTAXA FROM THE CLASS *MOLINIO-ARRHENATHERETEA* TX. 1937 IN SERBIA

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Abstract

A list of corrected and typified grassland communities of the class *Molinio-Arrhenatheretea* Tx. 1937 occurring in Serbia was provided. The nomenclature rules of the International Code of Phytosociological Nomenclature were strictly followed. Syntaxonomic affiliation of communities to higher syntaxa was assessed according to the existing syntaxonomical schemes for Serbia, i.e. according to the position determined by the original source. Higher syntaxa followed the synsystem of the so-called “EuroVegChecklist”. Since syntaxonomic disagreements concerning a certain plant association’s position within the whole classification system have not been discussed, such a list should serve as the starting point for a further revision of the status of grassland communities in Serbia. So far, a total of 87 plant communities of the class *Molinio-Arrhenatheretea* were described for Serbia.

The list provided here will enable more precise and more accurate mapping of vegetation in Serbia, as well as classification of these communities into the Habitat Directive which will enable the establishment of the Red list of Habitats for Serbia.

Key words: phytosociology, syntaxonomy, International Code of Phytosociological Nomenclature.

Izveček

V članku so predstavljene nomenklaturno popravljene in tipifisirane traviščne združbe razreda *Molinio-Arrhenatheretea* Tx. 1937, ki se pojavljajo v Srbiji. Dosledno smo upoštevali pravila Mednarodnega kodeksa fitocenološke nomenklature. Sintaksonomsko pripadnost združb višjim sintaksonom smo ohranili glede na obstoječe sintaksonomske sheme v Srbiji oziroma glede na uvrstitev v originalnem viru. Višji sintaksoni sledijo sintaksonomiji po “EuroVegChecklist”. Glede na to, da nismo obravnavali uvrstitve posameznih rastlinskih združb v sintaksonomski sistem, bo ta seznam omogočil sintaksonomsko revizijo traviščnih združb Srbije. Do sedaj je bilo na ozemlju Srbije opisanih 87 rastlinskih združb razreda *Molinio-Arrhenatheretea*. Seznam bo omogočil tudi bolj natančno kartiranje vegetacije Srbije in povezavo teh združb s Habitatno direktivo in izdelavo Rdečega seznama habitatnih tipov Srbije.

Ključne besede: fitosociologija, sintaksonomija, Mednarodni kodeks fitocenološke nomenklature.

1. INTRODUCTION

Phytocoenological studies of vegetation of Serbia encompassing floristic, ecological and other characteristics of plant communities started more than 70 years ago (Sarić 1984). Situated in the Balkan Peninsula, Serbia is characterized by diverse climatic, edaphic, geomorphological and

phytogeographical conditions causing, along with long-lasting human impact, the occurrence of complex meadow and pasture vegetation.

The first vegetation studies in Serbia were conducted by Josif Pančić in 1846 and were continued with research of Balkans vegetation by Lujko Adamović from 1909. Researchers from Serbia used the methodology of the French-Swiss phy-

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tocoenological school of Braun-Blanquet (1928). Igor Rudsky was the first scientist from Serbia using Braun-Blanquet's method in vegetation studies that started already before the Second World War (Rudskij 1934, Rudski 1938, Dinić et al. 2010).

The most significant progress in vegetation research was made in the period after the Second World War until the early 1990's when field studies stagnated due to the political and economic crisis and transition. Previous intensive phytosociological investigations led to the description and definition of a large number of plant communities of different vegetation classes, as well as to the elaboration of a syntaxonomical system for the vegetation of Serbia.

The syntaxonomy and diversity of the vegetation of the territory of the western Balkans were first considered by the Vegetation map of Yugoslavia (Jovanović et al. 1986) and Prodrumus phytocenosum Jugoslaviae (Zupančič et al. 1986), Prodrumus of vegetation of Serbia excluding territories of provinces (Jovanović & Jovanović 1976), Prodrumus of vegetation of Kosovo (Randelović & Rexhepi 1980) and Prodrumus of vegetation of Vojvodina (Parabučki et al. 1986). Unfortunately, these reviews are not sufficiently detailed and precise and do not encompass the entire herbaceous vegetation, including particular meadows and pastures. The next, much more comprehensive portrait of Serbian vegetation was the "Syntaxonomical Review of Vegetation of Serbia" (Kojić et al. 1998) in which grassland communities were presented in more detail. Nevertheless, this review failed to follow the recommendations of the Code of Phytosociological Nomenclature (Barkman et al. 1976, 1986), omitting standardization and nomenclatural correction of plant associations. Grassland vegetation of Serbia is presented in the monograph "Meadows and pastures of Serbia" (Kojić et al. 2004), which established the presence of 273 associations from 46 vegetation alliances and 10 classes. The characteristics of 10 broadly understood grassland associations was described in detail.

Very important are the results obtained from the Project "Harmonization of National Habitats Classification Nomenclature with European Community Standards" (Lakušić et al. 2005, Lakušić & Sabovljević 2005). However, more attention was paid to habitats than to the nomenclature of communities.

Serbian botanists have more or less compiled

the rules of the Code of Phytosociological Nomenclature (Barkmann et al. 1976, 1986), but there had been no previous practice of attaching the nomenclature type to the description of a new community. All communities described since 1979 are therefore invalid. So far, there have been no attempts in Serbia aimed at the correction and standardization of community denomination according to the International Code of Phytosociological Nomenclature (Weber et al. 2000; hereinafter: ICPN); hence, the present work could be considered as the first report in this area.

Our main goal was to check the validity and legitimacy of the existing nomenclature according to the ICPN and correct and typify the names of grassland communities belonging to the class *Molinio-Arrhenatheretea* in Serbia. The next step will be associated with appropriate positioning of these community types in supraregional classification schemes.

2. METHODS

The vegetation database of grassland vegetation of Serbia (Ačić et al. 2012) was the starting point for creating a list of grassland communities belonging to the class *Molinio-Arrhenatheretea* in Serbia. An extensive survey of relevant literature sources allowed us to check the validity and legitimacy of the nomenclature of grassland associations belonging to this class. The nomenclature rules of the ICPN were strictly followed. 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 the Flora Europaea (Flora Europaea Database), except for the moss species *Brachythecium rivulare* where the nomenclature follows Corley et al. (1981). Syntaxa were nominated according to their orthographically correct form according to ICPN Art. 41. The original name is provided in brackets with an indication of the relevant ICPN Article (indicated as Art.) according to which they are invalid or illegitimate.

All synonyms older than the respective accepted name include a reference to the article or paragraph of the Code according to which the name has to be rejected as ineffective, invalid or illegitimate.

Initials of the first author's names are added whenever necessary to avoid a homonymy. The

dates of effective publication of syntaxa were deduced from the dates in the journals in which they were validly published, regardless of eventual different indications reported by the authors in the papers. Doctoral or degree theses, which are generally not available to libraries accessible to botanists, were not considered as effective publications [Art. 1]. In that case, we published a relevé as the holotype and a short description of the habitat of the association.

For the determination of correct names for syntaxa not yet typified lectotypes or neotypes were defined.

There was no intention to resolve association names which are frequently used in Serbian syntaxonomic overviews originating from other regions.

The accepted names of associations and alliances that contained only the genus name(s) in the original diagnosis were supplemented with species epithets in accordance with Recommendation 10c of the Code. In some cases, for practical reasons the modified form of names subject to approval by the Nomenclature Commission of the International Association for Vegetation Science was used. The form used is considered as a proposal for name modification. This concerns *nomina inversa*. 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 was changed so that the dominant taxon or the taxon of the higher layer is in the second place.

According to Article 43 of the Code, the name of a syntaxon must be corrected due to taxonomic errors when the name of an aggregate species is replaced by the name of a narrowly defined species.

A 'phantom name' is a name that has not been used by the person(s) named in the author citation in the stated source, either literally or in a form which is homonymous according to the regulations of ICPN. The 'cited' source may even be non-existent. Mucina (1993) introduced the striking term 'phantom name' for such cases. They are attributions by later authors and do not have any nomenclatural significance.

Despite our comprehensive overview of the relevant phytosociological literature, it is still possible that another, older and valid name will be appointed as relevant for some syntaxa in future phytosociological literature, and this name will have to be accepted as the correct name.

Abbreviations: Art. = article of ICPN; nom. corr. = nomen correctum; nom. ined. = nomen ineditum; nom. invers. propos. = nomen inversum propositum; nom. mut. prop. = nomen mutatum propositum; nom. nud. = nomen nudum; ass. nov. = associatio nova; nom. inval. = nomen invalidum; Tab. = phytocoenological table in publication; rel. = relevé.

3. RESULTS AND DISCUSSION

The list of corrected and typified grassland communities of the class *Molinio-Arrhenatheretea* occurring in Serbia:

1. *Molinio-Arrhenatheretea* Tx. 1937

1.1 *Molinetalia* Koch 1926

1.1.1 *Molinion caeruleae* Koch 1926

1. *Caltho palustris-Alopecuretum pratensis* Butorac et Hulo ex Ačić et al. *ass. nov. hoc loco* (Orig. *Caltho laetae-Alopecuretum pratensis* Butorac et Hulo 1993 nom. inval.) [Art. 5]
Typus: Butorac & Hulo 1993, Tab. 2, rel. 2 – holotypus hoc loco

2. *Carici gracilis-Poetum palustris* Ilijanić 1968

Note: This association was described for Serbia in Čapaković (1979).

3. *Scirpo holoschoeni-Salicetum rosmarinifoliae* Stjepanović-Veseličić 1953 *nomen mutatum propositum*

(Orig. *Salicetum rosmarinifoliae* Stjepanović-Veseličić 1953, *Asoc. Salix rosmarinifolia-Holoschoenus vulgaris* Stjepanović-Veseličić 1953) [Art. 41b, 45]

Typus: Stjepanović-Veseličić 1953, Tab. 6, rel. 3 – lectotypus hoc loco

4. *Lathyro pannonic-Molinetum caeruleae* Tatić et al. ex Ačić et al. *ass. nov. hoc loco* (Orig. *Lathyreto-Molinetum caeruleae* Tatić et al. 1988 nom. inval.) [Art. 5]
Typus: Tatić et al. 1988, Table on page 33, rel. 5 – holotypus hoc loco

Note: There is some confusion as to the year of printing, because of the indication "1977 (1988)", which means that the year of printing was 1988.

5. *Molinietum caeruleae* W. Koch 1926

Note: This community was described for Serbia in Stjepanović-Veseličić (1953), Kojić & Ivanović (1953), Cincović & Kojić (1956), Tatić (1969), Parabućski & Butorac (1988) and Butorac & Hulo (1993).

6. *Molinio caeruleae-Deschampsietum cespitosae*

Pavlović 1951

(Orig. *Molinieto-Deschampsietum* Pavlović 1951)

[Art. 41b]

Typus: Pavlović 1951, Tab. 11, rel. 2 – lectotypus hoc loco

1.1.2 *Calthion palustris* Tx. 1937

7. *Brachythecio rivularis-Menthetum longifoliae*

V. Randelović et Zlatković ex Ačić et al. *ass. nov. hoc loco*

(Orig. *Brachythecio-Menthetum longifoliae* V. Randelović 2001 nom. inval.) [Art. 5]

Typus: Randelović & Zlatković 2010, Tab. 22, rel. 5 – holotypus hoc loco

Note: The association was described in the doctoral thesis of V. Randelović (2002) and subsequently printed in the monograph (Randelović & Zlatković 2010), but without an indication of the nomenclatural type.

8. *Scirpetum sylvatici* Ralski 1931

(syn. *Polygono-Scirpetum sylvaticae* Schwickerath 1944, *Scirpetum sylvaticae* Knapp 1946, *Equiseto-Scirpetum sylvatici* prov. R. Jovanović 1969, *Equiseto palustris-Scirpetum sylvatici* Šegulja 1974)

Note: The association *Equiseto palustris-Scirpetum sylvatici* was described for Serbia in Randelović & Zlatković (1994), and *Polygono-Scirpetum sylvaticae* in Petković (1983) and Randelović & Zlatković (1994).

9. *Equisetetum palustris* Danon et Blaženčić 1965

(Orig. *Equisetetum palustrae* Danon et Blaženčić 1965) [Art. 41a]

Typus: Danon & Blaženčić 1965, Tab. 2, rel. 1 – lectotypus hoc loco

10. *Cirsio palustris-Eriophoretum latifolii* B. Jovanović 1969 *nomen ineditum*

(Orig. *Cirsio palustre-Eriophoretum latifolii* B. Jovanović 1969 [Art. 1])

Note: This association has never been published, but the data was taken from the reports for the mapping project of vegetation of Serbia (Jovanović B. et al. 1969). The name has not been published in a printed publication and is therefore rendered ineffective (*nomen ineditum*).

11. *Equiseto palustris-Eriophoretum latifolii* Petković ex Ačić et al. *ass. nov. hoc loco*

(Orig. *Equiseto-Eriophoretum latifolii* prov. Petković 1983 nom. inval.) [Art. 3b, 5]

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

12. *Selaginello selaginoidis-Eriophoretum latifolii*

Petković et al. ex Ačić et al. *ass. nov. hoc loco*

(Orig. *Selaginello-Eriophoretum latifolii* Petković et al. 1996 nom. inval.) [Art. 5]

Typus: Petković et al. 1996, Tab. 1, rel. 1 – holotypus hoc loco

13. *Sparganio polyedrae-Eriophoretum latifolii*

Jovanović-Dunjić 1979 *nomen invalidum*

(Orig. *Sparganio-Eriophoretum latifolii* R. Jovanović 1976 nom. inval.) [Art. 2b]

Note: The name of this syntaxon was not validly published because only a synoptic table was provided (Jovanović-Dunjić 1979). No single relevé is available as the nomenclatural type. Although the author states the year 1976, the year of printing was 1979.

1.1.3 *Deschampsion cespitosae* Horvatić 1930

14. *Agrostio stoloniferae-Juncetum effusi* Cincović 1959

(Orig. *Agrostideto-Juncetum effusi* Cincović 1959) [Art. 41b]

Typus: Cincović 1959, Tab. 1, rel. 10– lectotypus hoc loco

15. *Caricetum tricostatae-vulpinae* Horvatić 1930

Note: This association was described for Serbia in Babić (1955), Cincović (1956) and Danon (1960).

16. *Junco articulati-Deschampsietum cespitosae* Petković ex Ačić et al. *ass. nov. hoc loco* (Orig. *Junco-Deschampsietum caespitosae* prov. Petković 1983 nom. inval.) [Art. 3b, 5] Typus: Petković 1983, Tab. 7, rel. 3 – holotypus hoc loco
17. *Deschampsietum cespitosae* Horvatić 1930
Note: This association was described for Serbia in Babić (1955), Gajić (1986), Purger (1993) and Randelović (2002).
18. *Festucetum pratensis* Gajić 1989 *nomen nudum* (Orig. *Festucetum pratensis* Gajić 1989 *nomen nudum*) [Art. 2]
Note: The name of the syntaxon is not validly published as there was no published phyto-coenological table or relevé (Gajić 1989).
19. *Rhynantho borbasii-Festucetum pratensis* Gajić ex Ačić et al. *ass. nov. hoc loco* (Orig. *Rhynantho-Festucetum pratensis* Gajić 1986 nom. inval.) [Art. 5] Typus: Gajić 1986, Tab. 5, rel. 1 – holotypus hoc loco
20. *Trifolio hybridi-Agrostietum stoloniferae* Veljović 1967 (Orig. *Trifolio-Agrostidetum* Veljović 1967) [Art. 41b] Typus: Veljović 1967a, Tab. 4, rel. 10 – lectotypus hoc loco
- 1.2 Arrhenatheretalia elatioris Tx. 1931**
- 1.2.1 Arrhenatherion elatioris Luquet 1926**
21. *Rumici acetosellae-Agrostietum caninae* Cincović 1959 (Orig. *Rumiceto-Agrostidetum caninae* Cincović 1959) [Art. 41b] Typus: Cincović 1959, Tab. 4, rel. 8 – lectotypus hoc loco
22. *Cynosuro cristati-Agrostietum stoloniferae* Danon et Blaženčić in Mišić et al. ex Ačić et al. *ass. nov. hoc loco* (Orig. *Cynosuro-Agrostidetum albae* prov. Danon et Blaženčić 1978 nom. inval.) [Art. 3b] Typus: Mišić et al. 1978, Tab. 44, rel. 6 – holotypus hoc loco
23. *Cynosuro-Agrostietum vulgaris* A. Marković 1986 Phantom name
Note: Unknown reference used in Kojić et al. (2004).
24. *Festuco-Agrostietum capillaris* Horvat 1962
Note: This association was found in Serbia by Mišić et al. (1978), Petković (1985), Jovanović-Dunjić R. & Jovanović S. (1991).
25. *Salvio verticillati-Agrostietum capillaris* Gajić ex Ačić et al. *ass. nov. hoc loco* (Orig. *Agrostidetum montanum* Gajić 1961 nom. inval.) [Art. 34a] Typus: Gajić 1961, Tab. 26, rel. 13 – holotypus hoc loco
26. *Rhynantho alectorolophi-Agrostietum capillaris* Danon et Radmić 1962 *nomen mutatum propositum* (Orig. *Alectorolopho-Agrostidetum vulgare* Danon et Radmić 1962) [Art. 41b, 45] Typus: Danon & Radmić, 1962, Tab.3, rel. 2 – lectotypus hoc loco
Note: Affiliation of associations to alliances followed the original source. Further research of the syntaxonomical position of associations dominated by *Agrostis capillaris* is required because these communities were classified into different classes (*Molinio-Arrhenatheretea*, *Festuco-Brometea* and *Calluno-Ulicetea*) by different Serbian authors (Ačić et al. 2012).
27. *Ononido spinosiformis-Alopecuretum pratensis* Butorac ex Ačić et al. *ass. nov. hoc loco* (Orig. *Ononido-Alopecuretum pratensis* Butorac 1992 nom. inval.) [Art. 5] Typus: Butorac 1992, Tab. 7, rel. 2 – holotypus hoc loco
28. *Ononido arvensis-Arrhenatheretum elatioris* (Tomažič & Horvatić 1941) Ilijanić & Šegulja 1983
Note: This association was described for Serbia in Stojanović (1986).

29. *Pastinaco-Arrhenatheretum elatioris* Passarge 1964
(syn. *Arrhenatheretum medioeuropaeum* Scherr. 1925 (non Br.-Bl. 1915) H-ić 1941)

Note: This association was described for Serbia in Slavnić (1948), Parabućski et al. (1982), Stojanović S. (1983), Jovanović R. (1983, 1986), Vučković R. (1985) and Vučković M. (1991).

30. *Ranunculo bulbosi-Arrhenatheretum elatioris* Ellmauer in Ellmauer & Mucina 1993

Note: This association was first mentioned for Serbia by Ačić et al. (2013) and the association described as *Arrhenatheretum elatioris* Tüxen 1937 by Gajić et al. (1992) corresponds to this association.

While the description of the communities dominated by *Arrhenatherum elatius* for the province of Vojvodina used the name *Arrhenatheretum medioeuropaeum*, the name *Arrhenatheretum elatioris* was used for central Serbia. This wide and complex association (*Arrhenatheretum elatioris* Tüxen 1937) was reclassified into three ecologically narrower syntaxa by Ellmauer & Mucina (1993). Thus, the former nomination of *Arrhenatheretum medioeuropaeum* corresponds to *Pastinaco-Arrhenatheretum elatioris*, while in the central Serbia there are generally drier variants of the community characterized by high presence of species of the class *Festuco-Brometea*, corresponding to the ass. *Ranunculo bulbosi-Arrhenatheretum elatioris*.

31. *Salvio nemorosae-Arrhenatheretum elatioris* Parabućski ex Ačić et al. *ass. nov. hoc loco*
(Orig. *Salvio-Arrhenatheretum elatioris* Parabućski 1990 nom. inval.) [Art. 5]
Typus: Parabućski 1990, Tab. 1, rel. 6 – holotypus hoc loco
32. *Trifolio arvense-Brometum racemosi* Danon et Blaženčić 1965
(Orig. *Trifolieto-Brometum racemosi* Danon et Blaženčić 1965) [Art. 41a]
Typus: Danon & Blaženčić 1965, Tab. 2, rel. 2 – lectotypus hoc loco
33. *Elymo repentis-Cynodontetum dactyloni* Matović ex Ačić et al. *ass. nov. hoc loco*

(Orig. *Agropyro-Cynodenetum dactyloni* Matović 1986 nom. inval.) [Art. 5]
Typus: Matović 1986, Tab. 16, rel. 2 – holotypus hoc loco

34. *Diantho deltoidis-Festucetum nigrescentis* Pavlović 1951 corr. Ačić et al. *hoc loco nomen inversum propositum*
(Orig. As. *Festuca fallax-Dianthetum deltoides* Pavlović 1951) [Art. 41b, 42, 43]
Typus: Pavlović 1951, Tab. 9, rel. 4 – lectotypus hoc loco

Note: When a name of an association is formed from names of two taxa of which one is dominant then the name of that taxon appears on the second place. Names that do not follow this rule are legitimate, but must be inverted according to Art. 42 b. Species *F. nigrescens* has a higher cover value than reported for this association.

Because in the original diagnosis the *Festuca* species belongs to *F. nigrescens* Lam. (Flora Europaea Database), the syntaxon name must be corrected according to Art. 43.

35. *Helianthemo nummularium-Festucetum nigrescentis* Matović ex Ačić et al. *ass. nov. hoc loco*
(Orig. *Festucetum fallacis* Matović 1986 nom. inval.) [Art. 5]
Typus: Matović 1986, Tab. 15, rel. 4 – holotypus hoc loco
36. *Centaureo pannonicarum-Festucetum orientalis* Parabućski ex Ačić et al. *ass. nov. hoc loco*
(Orig. *Centaureo pannonicarum-Festucetum orientalis* Parabućski 1990 nom. inval.) [Art. 5]
Typus: Parabućski 1990, Tab. 2, rel. 19 – holotypus hoc loco
37. *Agropyro repentis-Festucetum pratensis* Veljović 1967
(Orig. *Agropyreto-Festucetum pratensis* Veljović 1967) [Art. 41b]
Typus: Veljović 1967a, Tab. 1, rel. 12 – lectotypus hoc loco
38. *Bromo-Cynosuretum cristati* Horvatić 1930
(syn. *Cynosuretum cristati* Horvatić 1930)

Note: This association was described in Serbia by Gajić (1954, 1961), Cincović & Kojić (1955), Cincović (1959) and Jovanović R. (1965).

39. *Festuco nigrescentis-Cynosuretum cristati* Petković et Tatić ex Ačić et al. *ass. nov. hoc loco* (Orig. *Festuco rubrae-Cynosuretum cristati* Petković et Tatić 1987 nom. inval.) [Art. 5]
Typus: Petković 1981, Tab. 8, rel. 3 – holotypus hoc loco

Note: The name was described in Petković's doctoral thesis (1981) and then published invalidly in the paper by Petković & Tatić (1987) with a synoptic table only. We have selected a representative relevé from the table in the PhD thesis and described the habitat of this association.

The association *Festuco nigrescentis-Cynosuretum cristati* is a mesotrophic pasture developed mainly on south slopes on limestone.

Holotype: *Festuca nigrescens* 1, *Cynosurus cristatus* 3, *Carum carvi* +, *Bromus racemosus* +, *Rhinanthus minor* +, *Trifolium pratense* 1, *Lotus corniculatus* 1, *Stachys officinalis* +, *Trifolium repens* 1, *Colchicum autumnale* +, *Prunella vulgaris* +, *Trifolium patens* +, *Holcus lanatus* +, *Lolium perenne* +, *Phleum pratense* +, *Briza media* +, *Anthoxanthum odoratum* 1, *Euphrasia rostkoviana* +, *Filipendula hexapetala* 1, *Agrostis capillaris* +, *Trifolium montanum* 1, *Galium verum* +, *Sanguisorba minor* +, *Plantago lanceolata* +, *Linum catharticum* +, *Ranunculus millefoliatus* +, *Danthonia alpina* +, *Achillea setacea* +, *Hypochoeris radicata* +, *Brachypodium pinnatum* +, *Oenanthe fistulosa* +, *Bromus mollis* +, *Dactylis glomerata* +, *Convolvulus arvensis* +, *Hieracium piloselloides* +, *Allium carinatum* +, *Hieracium praealtum* ssp. *bauhinii* +, *Centaurea pannonica* 1, *Ranunculus acris* 1, *Elymus repens* +, *Poa badensis* +, *Medicago sativa* ssp. *falcata* +.

Locality: Southwestern Serbia, Žedevac (around Tutin), altitude 936 m, aspect S, slope 3°, relevé area 100 m², limestone.

40. *Knautio arvensis-Cynosuretum cristati* Gajić 1989 ex Ačić et al. *ass. nov. hoc loco* (Orig. *Knautio-Cynosuretum cristati* Gajić 1989 nom. inval.) [Art. 5]
Typus: Gajić 1989, Tab. 12, rel. 2 – lectotypus hoc loco

Note: The association *Knautio-Cynosuretum cristati* Blečić et Tatić 1967 was described in Montenegro (Blečić & Tatić 1967). However, these plant communities are different from

the community from Montenegro with the dominant species *Knautia purpurea* var. *montenegrina*.

41. *Poa trivialis-Cynosuretum cristati* Jovanović-Dunjić ex Ačić et al. *ass. nov. hoc loco* (Orig. *Poa trivialis-Cynosurus cristatus* prov. Jovanović-Dunjić 1955 nom. inval.) [Art. 3b]
Typus: Jovanović-Dunjić 1955, table on page 33, rel. 1 – holotypus hoc loco
42. *Potentillo erectae-Cynosuretum cristati* Matović 1986 ex Ačić et al. *ass. nov. hoc loco* (Orig. *Potentilleto-Cynosuretum cristati* Matović 1986 nom. inval.) [Art. 5]
Typus: Matović 1986, Tab. 14, rel. 2 – holotypus hoc loco
43. *Rhinantho rumelici-Cynosuretum cristati* Blečić et Tatić 1960 *nomen mutatum propositum* (Orig. *Alectorolopho-Cynosuretum cristati* Blečić et Tatić 1960) [Art. 45]
Typus: Blečić & Tatić 1960, Tab. 1, rel. 13 – lectotypus hoc loco
44. *Trifolio patentis-Cynosuretum cristati* Veljović 1967 (Orig. *Trifolio-Cynosuretum cristati* Veljović 1967)
Typus: Veljović 1967a, Tab. 5, rel. 12 – lectotypus hoc loco
45. *Plantago lanceolatae-Poetum trivialis* Danon et Blaženčić 1965 *nomen inversum propositum* (Orig. *Poeto-Plantaginetum lanceolatae* Danon et Blaženčić 1965) [Art. 41a, 42]
Typus: Danon & Blaženčić 1965, Tab. 2, rel. 1 – lectotypus hoc loco

Note: As mentioned before, if a name of an association is formed from names of two taxa of which one is dominant, that taxon has to appear on the second place. Names that do not follow this rule are legitimate, but must be inverted according to Art. 42. *Poa trivialis* is the dominant species in this association.

46. *Polygono bistortae-Poetum trivialis* Pavlović 1951 corr. Ačić et al. *ass. hoc loco* (Orig. As. *Polygonum bistorta-Poa trivialis* Pavlović 1951) [Art. 41b]
Typus: Pavlović 1951, Tab. 10, rel. 2 – lectotypus hoc loco

47. *Gladiolo-Sanguisorbetum officinalis* N. Randalović et Rexhepi 1984 *nomen nudum*

Note: The name of the syntaxon is not validly published (Art. 2), as no table or relevé was provided.

48. *Armerio rumelicae-Trisetetum flavescens* Rexhepi 1974
(Orig. *Armerio-Trisetetum flavescens* Feri 1974)
Typus: Rexhepi 1974, Tab. 1, rel. 1 – lectotypus hoc loco

Note: The originally indicated author's name was Feri, although his surname is Rexhepi.

1.2.2 *Cynosurion cristati* Tx. 1947

49. *Lolio perennis-Cynosuretum cristati* Tx. 1937

Note: The association was described for Serbia in the publication Slavnić (1948) and Parabućski et al. (1986).

50. *Trifolio-Lolietum perennis* Krippelová 1967

Note: The association was described for Serbia in the publication Vučković R. (1985).

1.3 *Trifolio-Hordeetalia* Horvatić 1963

1.3.1 *Trifolion pallidi* Ilijanić 1969

51. *Oenanthe banatica-Alopecuretum pratensis* Parabućski et Stojanović ex Ačić et al. *ass. nov. hoc loco*
(Orig. *Oenanthe (banatica)-Alopecuretum pratensis* Parabućski et Stojanović 1988 nom. inval.) [Art. 5]
Typus: Parabućski & Stojanović 1988, Tab. 1, rel. 4 – holotypus hoc loco

52. *Ranunculo acris-Alopecuretum pratensis* M. Vučković ex Ačić et al. *ass. nov. hoc loco*
(Orig. *Ranunculo steveni-Alopecuretum pratensis* M. Vučković 1991 nom. inval.) [Art. 5]
Typus: Vučković M. 1991, Tab. 2, rel. 3 – holotypus hoc loco

Note: The association was described in doctoral thesis of Vučković M. (1988) and later

published in a monograph (Vučković M. 1991), but without the nomenclatural type.

53. *Trifolio pallidi-Alopecuretum pratensis* Cincović 1959
(Orig. *Trifolieto-Alopecuretum pratensis* Cincović 1959) [Art. 41a]
(syn. *Trifolium pallidum-Alopecurus pratensis* prov. Cincović 1956)
Typus: Cincović 1959, Tab. 3, rel. 22 – lectotypus hoc loco

Note: The association was first described as provisional (Cincović 1956) and then validly in Cincović (1959).

54. *Ornithogalo pyramidale-Trifolietum pallidi* M. Vučković ex Ačić et al. *ass. nov. hoc loco*
(Orig. *Ornithogalo pyramidale-Trifolietum pallidi* M. Vučković nom. inval.) [Art. 5]
Typus: Vučković, M. 1991, Tab. 1, rel. 3 – holotypus hoc loco

Note: The association was described in doctoral thesis of Vučković M. (1988) and later published in a monograph (Vučković M. 1991), but without the nomenclatural type.

1.3.2 *Trifolion resupinati* Micevski 1957

55. *Trifolio resupinati-Agrostietum stoloniferae* R. Jovanović ex Ačić et al. *ass. nov. hoc loco*
(Orig. *Agrostidetum albae* prov. R. Jovanović 1965 nom. inval.) [Art. 1, 3b]
Typus: Jovanović R. 1965, Tab. 9, rel. 16 – holotypus hoc loco

Note: This syntaxon was described as provisional in doctoral thesis, so we selected the nomenclatural type and changed the name by adding the differential species *Trifolium resupinatum*.

The association *Trifolio resupinati-Agrostietum stoloniferae* is a lowland mesophilous meadow developed on alluvial sediments.

Holotype: *Agrostis stolonifera* 4, *Beckmannia eruciformis* +, *Carex hirta* +, *Eleocharis palustris* 1, *Gratiola officinalis* +, *Hordeum secalinum* +, *Inula britannica* 1, *Juncus articulatus* +, *Lathyrus latifolius* +, *Lysimachia nummularia* 1, *Mentha longifolia* 1, *Mentha pulegium* 2, *Poa pratensis*

sis +, *Poa trivialis* 2, *Potentilla reptans* 2, *Prunella vulgaris* 1, *Rumex crispus* +, *Trifolium fragiferum* 1, *Trifolium hybridum* 1, *Trifolium repens* 2, *Trifolium resupinatum* 2, *Galium debile* 1, *Lotus tenuis* 1, *Carex otrubae* 1, *Glyceria maxima* 1.

Locality: Valley of the river Velika Morava-Bukovce, date June 1959, relevé area 100m², total cover 100%, alluvial sediments.

56. *Stachyo officinalis-Alopecuretum pratensis* Veljović 1967 *nomen mutatum propositum* (Orig. *Betonico-Alopecuretum pratensis* Veljović 1967) [Art. 45]

Typus: Veljović 1967b, Tab. 2, rel. 3 – lectotypus hoc loco

57. *Poo silvicolae-Alopecuretum pratensis* R. Jovanović 1972 *nomen ineditum* [Art. 1]

Note: This association has never been published, but the data was taken from the reports for the mapping project of vegetation of Yugoslavia. The name has not been published in a printed publication and is therefore rendered ineffective (*nomen ineditum*).

58. *Poo trivialis-Alopecuretum pratensis* Regel 1925

(homonym *Poo trivialis-Alopecuretum pratensis* R. Jovanović 1957)

Note: The association was described for Serbia in Jovanović R. (1957).

59. *Bromo commutati-Festucetum pratensis* B. Jovanović in Jovanović-Dunjić et al. 1986 *nomen nudum* [Art. 2]

(Orig. *Bromo commutati-Festucetum pratensis* B. Jovanović 1972 *nomen ineditum* [Art. 1])

Note: The name of this association was taken from the reports for the mapping of vegetation of Yugoslavia. In the publication of Jovanović R. (1986) it was described with a synoptic table without the nomenclatural type, so the name has not been published with a sufficient original diagnosis. As there is still no singular relevé available, the association remains as *nomen nudum*.

60. *Cynosuro-Caricetum hirtae* K. Micevski 1957

Note: The association was described for Ser-

bia in Micevski (1968), Jovanović V. (1977, 1979) and Randelović (1978).

61. *Hordeo-Caricetum distantis* K. Micevski 1957

Note: The association was described for Serbia in Micevski (1968), Jovanović V. (1979) and Hundozi (1982).

62. *Festuco pratensis-Hordeetum secalini* R. Jovanović 1957

(Orig. *Festuceto-Hordeetum secalini* R. Jovanović 1957) [Art. 41b]

Typus: Jovanović R., 1957, Tab. 2, rel. 18 – lectotypus hoc loco

63. *Festuco pratensis-Brometum racemosi* Danon et Blaženčić in Mišić et al. 1978

(Orig. *Festuco-Brometum racemosi* Danon et Blaženčić 1975)

Typus: Mišić et al. 1978, Tab. 43, rel. 2 – lectotypus hoc loco

64. *Lathyro pratensis-Galietum veri* Veljović 1967 (Orig. *Lathyro-Galietum veri* Veljović 1967)

Typus: Veljović, 1967b, Tab. 3, rel. 4 – lectotypus hoc loco

65. *Poo-Trifolietum fragiferi* K. Micevski 1968

Note: The association was described for Serbia in Randelović (1978) and Hundozi (1980).

66. *Trifolietum nigrescentis-subterranei* K. Micevski 1957

Note: The association was described for Serbia in Micevski (1978), Randelović (1978) and Jovanović V. (1979).

67. *Trifolietum resupinati* Veljović ex Ačić et al. *ass. nov. hoc loco*

(Orig. *Trifolietum resupinati* prov. Veljović 1967 *nom. inval.*) [Art. 3b]

Typus: Veljović 1967b, Tab. 1, rel. 4 – holotypus hoc loco

68. *Trifolietum resupinati-balansae* K. Micevski 1959

Note: The association was described for Serbia in Micevski (1968), Randelović (1978), Jovanović V. (1979) and Hundozi (1980).

1.3.3 *Trifolio-Ranunculion pedati* Slavnić 1948

69. *Cynosuro-Alopecuretum pratensis* Parabućski 1985 *nomen ineditum* [Art. 1]

Note: This association has never been published, but the name was taken from the reports for the mapping of vegetation of Yugoslavia and was later published in Prodrum of vegetation of Vojvodina (Parabućski et al. 1986).

70. *Rorippo kernerii-Alopecuretum pratensis* Purger ex Aćić et al. *ass. nov. hoc loco* (Orig. *Rorippo kernerii-Alopecuretum pratensis* Purger 1993 nom. inval.) [Art. 1, 5]
Typus: Purger 1993, Tab. 2, rel. 1 – holotypus hoc loco

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

The association *Rorippo kernerii-Alopecuretum pratensis* is a secondary grassland developed on slightly salinized soil on loess.

Holotype: *Alopecurus pratensis* 4, *Carex melanostachya* +, *Carex pallescens* +, *Carex vulpina* +, *Gratiola officinalis* 2, *Lysimachia nummularia* 1, *Oenanthe silaifolia* +, *Polygonum lapathifolium* +, *Poa pratensis* 1, *Potentilla reptans* +, *Ranunculus polyanthemus* 1, *Rorippa austriaca* +, *Rorippa kernerii* 1, *Taraxacum officinale* +.

Locality: Vojvodina, western Bačka, Doroslov, altitude 88 m, relevé area 25 m², total cover 80%, slightly salinized soil on loess.

71. *Trifolio angulati-Alopecuretum pratensis* Parabućski ex Aćić et al. *ass. nov. hoc loco* (Orig. *Trifolio angulati-Alopecuretum pratensis* Parabućski 1985 nom. inval.) [Art. 1, 5]
Typus: Purger 1993, Tab. 3, rel. 2 – holotypus hoc loco

Note: The name of this association was taken from the reports for vegetation mapping of Yugoslavia and Prodrum of vegetation of Vojvodina. In her master thesis Purger (1993) described this association without the nomenclatural type, so we selected a representative relevé and described the habitat of this association.

The association *Trifolio angulati-Alopecuretum pratensis* is a salinized pannonian meadow developed on loess.

Holotype: *Alopecurus pratensis* 1, *Carex divisa* +, *Gratiola officinalis* +, *Lotus corniculatus* +, *Lysimachia nummularia* +, *Oenanthe silaifolia* 3, *Potentilla reptans* +, *Ranunculus polyanthemus* +, *Rorippa kernerii* +, *Rumex crispus* +, *Trifolium angulatum* 1, *Trifolium dubium* +, *Trifolium striatum* +, *Vicia tetrasperma* +, *Scorzonera cana* +, *Myosotis ramosissima* +.

Locality: Vojvodina, western Bačka, Doroslov, altitude 88 m, relevé area 25 m², total cover 90%, slightly saline loess.

72. *Poo pratensis-Alopecuretum pratensis* R. Vučković ex Aćić et al. *ass. nov. hoc loco* (Orig. *Poeto-Alopecuretum pratensis halophyticum* Vučković 1982 nom. inval.) [Art. 5, 34a]
Typus: Vučković R. 1982, Tab. 1, rel. 3 – holotypus hoc loco

73. *Peucedano officinalis-Asteretum sedifolii* Soó 1947
(syn. *Peucedano-Asteretum punctati* Soó 1947, *Peucedano-Galatellatum punctati* Máthé, Tallós et Zólyomi 1967)

Note: The association was described for Serbia in Parabućski & Stojanović (1978), Parabućski (1979) and Vučković R. (1985).

74. *Ranunculetum pedati* Slavnić 1948
(Orig. *Ranunculetum pedati* Slavnić 1942)

Note: Only a synoptic table was published (Slavnić 1948). No single relevé is available as the nomenclatural type. Although the author states the year 1942, the year of printing was 1948.

75. *Trifolietum subterranei* Slavnić 1948
(Orig. *Trifolietum subterranei* Slavnić 1942)
Typus: Parabućski 1979, Tab. 2, rel. 11 – neotypus hoc loco

Note: According to Article 21 (ICPN), when the original diagnosis of an association contains only a synoptic table but no single relevé, then a neotype must be established. The first effectively published establishment of a neotype must be followed and the neotype should be taken from the same geographical area as the relevés of the synoptic table. We selected a relevé from the same geographical area as the neotype from Parabućski (1979).

Although the author states the year 1942 the year of printing was 1948.

The association *Trifolietum subterranei* is a steppic grassland developed on saline solonetz soil type.

Neotype: *Achillea collina* 1, *Alopecurus pratensis* +, *Bromus hordeaceus* 2, *Cerastium semidecandrum* 1, *Festuca pseudovina* 1, *Poa angustifolia* 1, *Ranunculus pedatus* 1, *Trifolium subterraneum* 4, *Vicia tetrasperma* 1, *Taraxacum officinale* +, *Poa bulbosa* f. *vivipara* 1, *Cardaria draba* 1.

Locality: Vojvodina, Bačka, Đurđevo, altitude 80 m, total cover 80 %, solonetz.

1.4 *Potentillo-Polygonetalia avicularis* Tx. 1947 (syn. *Agrostetalia stoloniferae* Oberd. 1967)

1.4.1 *Potentillion anserinae* Tx. 1947

(syn. *Agropyro-Rumicion crispi* Nordh. 1940, *Agrostion albae (stoloniferae)* Soo (1933) 1971)

76. *Oenanthe silaifoliae-Agrostietum stoloniferae* R. Vučković ex Ačić et al. *ass. nov. hoc loco* (Orig. *Agrostetum albae* (Ujv. 1941) *pannonicum* R. Vučković 1985 nom. inval.) [Art. 1, 5, 34a] Typus: Vučković R. 1985, Tab. 21, rel. 3 – holotypus hoc loco

The association *Oenanthe silaifoliae-Agrostietum stoloniferae* is a Pannonian mesic grassland developed on salinized soils.

Holotype: *Agrostis stolonifera* 4, *Alopecurus pratensis* 1, *Beckmannia eruciformis* 1, *Eleocharis palustris* +, *Elymus repens* +, *Myosotis laxa* ssp. *caespitosa* +, *Oenanthe silaifolia* 1, *Ranunculus lateriflorus* +, *Rorippa kernerii* +, *Rumex crispus* +

Locality: Vojvodina, valley of the river Tamiš, between Sečanj and Jarkovac, relevé area 25 m², total cover 100%.

Note: This association was published in doctoral thesis, so we selected a representative relevé and described the habitat of this association. The name is illegitimate and must be rejected because it contains an epithet in the nominative case that indicates a geographical property. We selected the species *Oenanthe silaifolia* because it is a character species of the association.

77. *Hordeo histricis-Agrostietum stoloniferae* R. Vučković ex Ačić et al. *ass. nov. hoc loco* (Orig. *Halo-Agrostietum albae* R. Vučković 1985 nom. inval.) [Art. 1, 5, 34a] Typus: Vučković R. 1985, Tab. 22, rel. 5 – holotypus hoc loco

The association *Hordeo histricis-Agrostietum stoloniferae* is a Pannonian halophytic grassland developed on saline solonetz soil type.

Holotype: *Agrostis stolonifera* 4, *Alopecurus pratensis* +, *Eleocharis palustris* 1, *Inula britannica* +, *Limonium gmelinii* +, *Lolium perenne* +, *Polygonum aviculare* +, *Rorippa kernerii* +, *Trifolium angulatum* +, *Scorzonera cana* +, *Hordeum hystrix* 1.

Locality: Vojvodina, valley of the river Tamiš, between Boka and Tomaševac, relevé area 25 m², total cover 100%.

Note: This association was published in doctoral thesis, so we selected a representative relevé and described the habitat of this association. The name is illegitimate and must be rejected because it contains an epithet in the nominative case that indicates an ecological property. We selected the species *Hordeum hystrix* because it occurs with constancy III.

78. *Trifolio fragiferi-Agrostietum stoloniferae* Marković 1978

Note: The association was described for Serbia in Butorac (1989, 1992) and Stojanović et al. (1997).

79. *Rumici crispi-Agrostietum stoloniferae* Moor 1958 (syn. *Rorippo silvestris-Agrostietum stoloniferae* (Moor 1958) Oberdorfer et T. Müller in T. Müller 1961)

Note: The association is mentioned for Serbia in Parabućski et al. (1986) and Stojanović et al. (1997), but without a table or relevé.

80. *Ranunculo repentis-Alopecuretum geniculati* Tüxen 1937 (syn. *Rumici crispi-Alopecuretum geniculati* R. Tx. 1950)

Note: The association was described for Serbia in Rauš et al. (1980) and Parabućski et al. (1986).

81. *Limonio gmelini-Alopecuretum pratensis* R. Vučković ex Ačić et al. *ass. nov. hoc loco* (Orig. *Alopecuretum pratensis* (Reg. 25, Nowin. 28) *panonicum* R. Vučković 1985 nom. inval.) [Art. 1, 5, 34a]
 Typus: Vučković R. 1985, Tab. 23, rel. 3 – holotypus hoc loco

The association *Limonio gmelini-Alopecuretum pratensis* is a Pannonian halophytic grassland developed on salinized soils.

Holotype: *Allium vineale* +, *Alopecurus pratensis* 5, *Cynodon dactylon* +, *Festuca pseudovina* 1, *Limonium gmelinii* 1, *Poa pratensis* +, *Rorippa kernerii* +, *Rumex crispus* +, *Trifolium angulatum* 1, *Taraxacum officinale* +, *Scorzonera cana* +.

Locality: Vojvodina, valley of the river Tamiš, relevé area 25 m², total cover 100%.

Note: This association was published in doctoral thesis, so we selected a representative relevé and describe the habitat of this association. The name is illegitimate and must be rejected because it contains an epithet in the nominative case that indicates a geographical property. We select the species *Limonium gmelinii* because it occurs with constancy IV.

82. *Juncus inflexi-Menthetum longifoliae* Lohmeyer ex Oberdorfer 1957

Note: The association was described for Serbia in Parabućski et al. (1986) and Butorac (1989).

83. *Agropyro repentis-Poetum angustifoliae* Babić 1972
 (Orig. *Agropyro-Poetum angustifoliae* Babić 1971)
 Typus: Babić 1972, Tab. 2, rel. 5 – lectotypus hoc loco

Note: The association was described in doctoral thesis of Babić (1965) and then validly published in his paper (Babić 1972). Although the author states the year 1971, the year of printing was 1972.

84. *Potentilletum anserinae* Rapaics 1927

Note: The association was mentioned for Serbia in Parabućski et al. (1986) and Stojanović et al. (1997), but without a table or relevé.

- 1.5 *Poo alpinae-Trisetetalia* Ellmauer et Mucina 1993

- 1.5.1 *Pancicion serbicae* Lakušić 1966

85. *Pancicio-Centauretum nervosae* prov. Lakušić 1970 *nomen nudum*

Note: The name of the syntaxon is not validly published (Art. 2) as there is no published phytocoenological table or relevé (Lakušić 1970). The association was mentioned for Serbia in Amidžić (2003), but without a phytocoenological table.

86. *Festuco nigrescentis-Pancicium serbicae* Stanković-Tomić 1970
 (Orig. *Festuco-Pančićium* Stanković-Tomić 1970) [Art. 41a]
 Typus: Stanković-Tomić 1970, Tab. 1, rel. 2 – lectotypus hoc loco

87. *Ranunculo-Pancicium serbicae* R. Lakušić 1966
 (Orig. *Ranunculo-Pančićium serbicae* Lakušić 1966)

Note: The association was described for Montenegro (Lakušić 1966) and mentioned for Serbia in Amidžić (2003), but without a phytocoenological table.

CONCLUSIONS

The present work, based on an overview of comprehensive phytosociological literature, considers all associations, alliances and orders that have been included in the class *Molinio-Arrhenatheretea* in Serbia. The list of corrected and typified syntaxa will allow for in-depth vegetation analyses of particular syntaxa, further mapping of grassland vegetation, integration of communities into the system of the EU Habitat Directive, and may serve as the basis for the establishment of The Red list of Habitats in Serbia. This revision could also enable a comparison and validation of plant communities of Serbia in a broader transnational space.

We believe that the present study is a stepping stone towards a consistent classification of plant communities in Serbia and their appropriate positioning within a taxonomical scheme of Europe.

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