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Nomenclature of the Balkan alliance *Romuleion graecae* (*Poetea bulbosae*)

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Running title: THE BALKAN ALLIANCE *ROMULEION GRAECAE*

Abstract – The *Romuleion*, the only alliance of the order *Poetalia bulbosae* (class *Poetea bulbosae*) found on the Balkan Peninsula, represents Mediterranean perennial and ephemeral pastures. It has been found in several Balkan countries, from Greece to the Republic of North Macedonia, Montenegro, Croatia and Bulgaria. However, a revision of its nomenclature according to the fourth edition of the International Code of Phytosociological Nomenclature shows that the name of the alliance was not validly published. In this paper we therefore describe the new alliance *Romuleion graecae*, together with the new association *Plantagini lagopodis-Poetum bulbosae*.

Keywords: Balkan vegetation, ICPN, Mediterranean grassland, nomenclature, phytosociology, *Poetea bulbosae*, syntaxonomy

Introduction

The class *Poetea bulbosae* is accepted in the standard European vegetation classification (EVC), as representing the “Mediterranean and Maghrebini seasonal perennial and ephemeroïd pastures in the thermo- to oro-Mediterranean belts” (Mucina et al. 2016, EVS 2017, FloraVeg.EU 2023, Terzi et al. 2024).

The class includes only one order, *Poetalia bulbosae*, and six alliances, namely *Trifolio-Periballion*, *Plantaginion serrariae*, *Poo bulbosae-Astragalion*, *Ornithogalo corsici-Trifolion subterranei*, *Plantaginion cupanii*, and *Romuleion* (FloraVeg.EU 2023, Fernández-González et al. 2023, Terzi et al. 2024).

The distribution range of most of these alliances is restricted to the western Mediterranean, i.e. the Iberian Peninsula and the Tyrrhenian Islands, and to Italy (i.e. *Plantaginion cupanii*), while only the alliance *Romuleion* has been found on the Balkan Peninsula and its islands (Preislerová et al. 2022). More specifically, the *Romuleion* has been reported in Greece, the Republic of North Macedonia, Croatia, and Montenegro, while its occurrence is considered uncertain in Albania, Bulgaria, and Bosnia and Herzegovina (Oberdorfer 1954, de Bolòs et al. 1996, Čarni et al. 2014, Škvorc et al. 2017, Preislerová et al. 2022, Stanišić-Vujačić et al. 2023, Terzi and Jasprica 2024).

The *Romuleion* was originally placed in the class “*Thero-Brachypodietea*” (Oberdorfer 1954), and then moved to the *Brachypodio-Chrysopogonetea* (Horvat et al. 1974), the *Saginetea maritimae* (Rodwell et al. 2002), and the *Tuberarietea guttatae* (Čarni et al. 2014). Finally, in the EVC, it has been framed within the *Poetea bulbosae* (Mucina et al. 2016).

Although the *Romuleion* is the only alliance of the class *Poetea bulbosae* occurring in the Balkans, with a potentially rather wide distribution, its original description raises some problems from a nomenclatural point of view (see also Čarni et al. 2014). Therefore, the aim of this paper is to revise the nomenclature of the alliance and thus contribute to the stabilisation of the European vegetation system by the use of correct names.

Material and methods

The revision of the nomenclature of the alliance *Romuleion* is based on the fourth edition of the International Code of Phytosociological Nomenclature (ICPN, Theurillat et al. 2021), whose articles (Art.) are quoted in brackets in the text. The names of the syntaxa, which are given exactly as in the mentioned articles, are given in quotation marks (" ").

In order to assess possible synonymy between some of the names of the associations involved in the validation of the alliance name, Jaccard's similarity index (J, Kent 2012) was calculated between the phytosociological synoptic tables of some of the associations.

The taxonomic nomenclature follows Euro+Med (2006-2023), while the syntaxonomic nomenclature follows FloraVeg.EU (2023) and its updates as proposed by Fernández-González et al. (2023) and Terzi et al. (2024).

To facilitate comparison with the EVC, the names of the syntaxa in the syntaxonomic scheme at the end of the discussion have been supplemented with the codes already assigned in the EVC (three digits for classes, five for orders and six for alliances).

Results and discussion

The “*Romulion*” alliance [recte: *Romuleion*] was originally described by Oberdorfer (1954) with a diagnosis comprising two associations. Another, the “*Biareto-Poetum timoleontis*”, is merely mentioned as provisional (Art. 3b) and is moreover invalid as it lacks a sufficient original diagnosis (Art. 2b). The two substantiated associations, “*Tortileto-Poetum timoleontis*” and “*Lagopeto-Poetum timoleontis*”, are represented by a synoptic table derived from 14 and 17 relevés, respectively, from the surroundings of the city of Thessaloniki, Thessaly, Isthmus of Corinth, Attica, Southern Macedonia and Thrace (all in Greece). However, this synoptic table contains neither *Poa timoleontis* Boiss. (Fl. Orient. 5: 607. 1884), nor *Poa bulbosa* subsp. *timoleontis* (Boiss.) Hayek in Repert. Spec. Nov. Regni Veg. Beih. 30(3): 260. 1933), but only *Poa bulbosa*. Consequently, these associations were not validly published because one of the name-giving taxa is missing in their diagnosis (Art. 3f), although mentioned in the text (Oberdorfer 1954: 89, “...von *Poa bulbosa* beherrschten Gesellschaften”). Since all associations assigned to the diagnosis of the alliance in Oberdorfer (1954) are thus invalid, the name *Romuleion* Oberdorfer 1954 is also invalid for lack of a sufficient diagnosis (Art. 2b).

In Horvat et al. (1974: 120-121) the two associations described by Oberdorfer (1954) within the *Romuleion* alliance, namely “*Tortileto-Poetum timoleontis*” and “*Lagopeto-Poetum timoleontis*”,

were united under a single association name, "*Poetum timoleontis*", with two subassociations ("Subass. mit *Stipa tortilis*" and "Subass. mit *Plantago lagopus*"). However, the diagnosis of the *Poetum timoleontis* is still based on the same synoptic relevés published by Oberdorfer (1954), where the name-giving taxon *Poa timoleontis* is missing. Consequently, the names *Poetum timoleontis* Oberdorfer ex Horvat, Glavač et Ellenberg 1974 (Art. 3f) and *Romuleion* Oberdorfer ex Horvat, Glavač et Ellenberg 1974 (Art. 2b) are still invalid names.

Later, Bolòs et al. (1996) renamed the alliance "*Romulion graecae* Oberd. 1954 em. nom. (*Romulion* Oberd.)" and assigned a new association, "*Airo elegantissimae-Trifolietum dalmaticae*", from the Ionian island of Cephalonia (Greece). This association was validly published with a sufficient original diagnosis consisting of seven relevés (Table 12, on page 106). This was not so for the alliance because the name-giving taxon *Romulea linaresii* subsp. *graeca* Bég. (Bot. Jahrb. Syst. 38: 325, 1907) was missing in the only valid element of the diagnosis, namely in the relevés of the new association (the two associations of Oberdorfer (1954), which were also referred to, were invalidly published). The name *Romuleion graecae* Oberdorfer ex de Bolòs, Masalles, Ninot, et Vigo 1996 is therefore invalid under Art. 3f.

Čarni et al. (2014) provided a different interpretation on the validity of the names published by Oberdorfer (1954), considering the alliance *Romuleion* and the two associations "*Tortileto-Poetum timoleontis*" and "*Lagopeto-Poetum timoleontis*" as validly published. They argue that the taxon name "*Poa bulbosa*" given in the table on page 90 ("Liste I") in Oberdorfer (1954) is a printing error for "*Poa bulbosa* coll." as written in the two other tables ("Liste II" and "Liste III") of the work on pages 92 and 94, respectively. In their view, "*Poa bulbosa* coll." would include all subspecies of *Poa bulbosa* (or species of the *Poa bulbosa* aggregate), including *Poa timoleontis* (*Poa bulbosa* subsp. *timoleontis*), and would therefore comply with Art. 3f. The justification of this interpretation would be the statement made by Oberdorfer on page 88 that *Brachypodium ramosum* [recte: *B. retusum*] or *Brachypodium phoenicoides*, which are widespread in the western Mediterranean, are completely receding eastwards where they are replaced by various subspecies ("div. ssp.") of *Poa bulbosa*. To some extent, such an interpretation might have been supported by the content of Art. 3f in the third edition of the ICPN (Weber et al. 2000), which only states that the name-giving taxon should be "indicated in the original diagnosis". This interpretation is no longer valid with the present rules, as they state (Art. 3f Note 1) that the name-giving taxon must be present in the relevés belonging to the "original diagnoses of the associations that have been quoted in the original diagnosis of the alliance". Therefore, the taxon *Poa timoleontis*, which is not explicitly included in the collective species *Poa bulbosa*, is not mentioned in the synoptic table of the two associations. Consequently, the associations *Stipo tortilis-Poetum timoleontis* and *Lagopo-Poetum timoleontis* are not validly published in Oberdorfer (1954). In considering these two association names as validly published, Čarni et al. (2014) also made some corrections. In both names, the first name-giving taxon corresponds to a specific epithet used without the generic name, namely "*Tortileto*" for "*Stipa tortilis*" and "*Lagopeto*" for *Plantago lagopus*. In accordance with Art. 14b, Čarni et al. (2014) corrected the former name to *Stipo tortilis-Poetum timoleontis*. For the latter name, where the specific epithet "*lagopus*" is also a validly published generic name, they retained the association name and corrected the orthographic error ("*Lagopo*" instead of "*Lagopeto*"; Arts. 10a and 41b). Indeed, *Lagopus arvensis* Fourr. (Ann. Soc. Linn. Lyon sér. 2, 17: 140, 1869) is a valid name (International Plant Names Index, <https://www.ipni.org/n/32110-1>, accessed 3 Oct 2023) for *Plantago lagopus* L., and according to the third edition of the ICPN (Weber et al. 2000) this name should be retained as the name-giving taxon. However, as *L. arvensis* Fourr. is an illegitimate name, this would no longer be the case with the current rules (Art. 44). Čarni et al. (2014, p. 124) also corrected the second name giving-taxon of the name *Lagopo-Poetum timoleontis*, namely *Poa timoleontis*, to *Poa bulbosa*, in accordance with Art. 43, because they considered the presence of the taxon *Poa timoleontis* in the research area to be doubtful. On the other hand, they did not make this correction for the name *Stipo tortilis-Poetum timoleontis*, considering that the taxon *Poa timoleontis* could occur where Oberdorfer had originally sampled the association. Čarni et al. (2014) provided a neotype for the *Lagopo-Poetum timoleontis*

Oberdorfer 1954 corr. Čarni et al. 2014, but the latter name was nevertheless not incidentally validated, as it was not reported as new (Art. 3i).

As the name *Lagopo-Poetum* remains invalidly published, we validate it, and correct the name here based on the results of Čarni et al. (2014), namely *Plantagini lagopodis-Poetum bulbosae* Čarni, Matevski, Šilc et Čušterevska ex Terzi, Jasprica, Čarni, Matevski, Bergmeier et Theurillat ass. nov. hoc loco. The original diagnosis of the new association includes relevés 1-12 of Table 1, on page 112, in Čarni et al. (2014), and its holotypus is relevé 5 in this table, which is the same relevé selected as the neotype for the invalid *Lagopo-Poetum bulbosae*.

A second association, *Romuleo graecae-Poetum bulbosae*, was also validly published by Čarni et al. (2014) and classified in the *Romuleion*. However, the name of this alliance was not validated either, as it was not reported as new (Art. 3i). Recently, Stanišić-Vujačić et al. (2023) maintained the same nomenclatural interpretation for the *Romuleion* as Čarni et al. (2014), and they described two new associations to be included in this alliance, the *Romuleo bulbocodii-Poetum bulbosae* and the *Ornithogalo exscapi-Poetum bulbosae*.

Attempts to find a neotype for the “*Tortileto-Poetum timoleontis*” have failed, as no adequate relevé could be found. Two relevés containing *Poa bulbosa* together with *Stipa capensis* (= *S. tortilis*) were published by Čarni et al. (2014) among the relevés of the *Romuleo graecae-Poetum bulbosae* (relevés 14 and 20, Table 1). However, the floristic composition of these two relevés appears to be more similar to the other relevés of the *Romuleo graecae-Poetum bulbosae* than to those in the synoptic table of the “*Tortileto-Poetum timoleontis*” in Oberdorfer (1954). A comparison of the synoptic table of the original diagnosis of the *Plantagini lagopodis-Poetum bulbosae* in Čarni et al. (2014) (relevés 1-12, Table 1) showed that it is also closer to the *Romuleo graecae-Poetum bulbosae* ($J = 0.51$) than to the relevés in Oberdorfer's synoptic table of the “*Lagopo-Poetum timoleontis*” ($J = 0.27$) or the “*Tortileto-Poetum timoleontis*” ($J = 0.27$). Conversely, a comparison between the two synoptic relevés of Oberdorfer (1954) showed that their floristic composition is very similar ($J = 0.78$). Therefore, the syntaxonomic interpretation by Horvat et al. (1974), which considers Oberdorfer's two syntaxa to be two subassociations of the same association seems justified, and the *Lagopo-Poetum timoleontis* Oberdorfer 1954 could correspond to a different association than the *Plantagini lagopodis-Poetum bulbosae*. However, in order to verify this hypothesis, relevés from the regions from which Oberdorfer described his two associations are essential.

In terms of alliance, the *Romuleion* currently contains five associations (see the syntaxonomic scheme below). A sixth association (*Festuco valesiacae-Poetum bulbosae*) has recently been described (Terzi and Jasprica 2024), but questions remain about its inclusion in this alliance. Another undescribed association may occur in Crete, according to unpublished relevés of E. Bergmeier. Those new syntaxa are not considered in the present discussion. The name of the alliance is derived from the genus *Romulea* Maratti (Pl. Romul. Saturn. 13, 1772), which is present with two taxa in the original diagnoses of the five described associations, (1) *Romulea bulbocodium* (L.) Sebast. & Mauri (Fl. Roman. Prodr. 17, 1818) and (2) *Romulea linaresii* subsp. *graeca*. *Romulea bulbocodium* is a widespread Mediterranean species (Euro+Med 2006-2023) whereas *Romulea linaresii* subsp. *graeca* is a Balkan-Anatolian taxon occurring in Turkey, Greece, including the Aegean islands, and some Balkan countries (e.g. Hadžiablahović and Bulić 2004, Dimopoulos et al. 2013, Raycheva et al. 2021).

Since the alliance is centred in the southern Balkans, we follow the proposal of Bolòs et al. (1996) to consider *Romulea linaresii* subsp. *graeca* as the name-giving taxon, and we validate the name *Romuleion graecae* Oberdorfer ex Terzi, Jasprica, Čarni, Matevski, Bergmeier et Theurillat all. nov. hoc loco. The nomenclatural type (holotypus) of the new alliance is the *Romuleo graecae-Poetum bulbosae* Čarni, Matevski, Šilc et Čušterevska 2014 (Čarni et al. 2014, p. 125) from the southern part of the Balkans (Greece). According to Oberdorfer (1954) and Čarni et al. (2014), the characteristic species of the alliance are: *Allium guttatum*, *Alyssum minutum*, *Alyssum repens*, *Campanula ramosissima*, *Gagea reticulata*, *Hedypnois rhagadioloides*, *Hypochaeris cretensis*, *Lagoecia cuminoides*, *Linaria simplex*, *Lotus angustissimus*, *Ornithogalum collinum*, *Ornithogalum*

armeniacum, *Picris pauciflora*, *Romulea bulbocodium*, *Romulea linaresii* subsp. *graeca*, *Romulea columnnae*, *Sedum aetnense*, *Silene graeca*, *Ziziphora capitata*.

Therefore, we propose the following syntaxonomic scheme (the author citation of the class follows Terzi et al. 2024):

BUL - *Poetea bulbosae* Rivas Goday et Rivas-Martínez ex Navarro Andrés et Valle Gutiérrez 1984

BUL-01 *Poetalia bulbosae* Rivas Goday et Rivas-Martínez in Rivas Goday et Ladero 1970

BUL-01F *Romuleion graecae* Oberdorfer ex Terzi, Jasprica, Čarni, Matevski, Bergmeier et Theurillat all. nov. hoc loco

[holotypus: *Romuleo graecae-Poetum bulbosae* Čarni, Matevski, Šilc et Čušterevska 2014; synonyms: *Romuleion* Oberdorfer 1954 (Art. 2b), *Romuleion* Oberdorfer ex Horvat, Glavač et Ellenberg 1974 (Art. 2b), *Romulion graecae* Oberdorfer ex de Bolòs, Masalles, Ninot et Vigo 1996 (Art. 3f)]

Plantagini lagopodis-Poetum bulbosae Čarni, Matevski, Šilc et Čušterevska ex Terzi, Jasprica, Čarni, Matevski, Bergmeier et Theurillat ass. nov. hoc loco
[syn. *Lagopo-Poetum bulbosae* Oberdorfer 1954 corr. Čarni, Matevski, Šilc et Čušterevska 2014 (corr. superfl.)]

Romuleo graecae-Poetum bulbosae Čarni, Matevski, Šilc et Čušterevska 2014

Airo elegantissimae-Trifolietum dalmatici Bolòs, Masalles, Ninot et Vigo 1996

Romuleo bulbocodii-Poetum bulbosae Stanišić-Vujačić, Stešević, Hadžiablahović et Šilc 2023

Ornithogalo exscapi-Poetum bulbosae Stanišić-Vujačić, Stešević, Hadžiablahović et Šilc 2023

Poetum timoleontis Oberdorfer ex Horvat, Glavač et Ellenberg 1974 (Art. 3f)
(incl. *Lagopo-Poetum timoleontis* Oberdorfer 1954 (Art. 3f), *Tortileto-Poetum timoleontis* Oberdorfer 1954 [recte: *Stipo capensis-Poetum timoleontis*] (Art. 3f))

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Author contribution statement

M.T. and J.-P.T. conceived and wrote the manuscript; all authors critically revised and approved the manuscript.

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