



# Proposal (36) to conserve the name *Philonotidion seriatae* Hinterlang 1992 for the species-poor, bryophyte-dominated, non-calcareous arctic-alpine spring vegetation of Europe

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## Abstract

According to the International Code of Phytosociological Nomenclature, a younger name of a syntaxon may be conserved against its older name to improve the stability of the nomenclature and avoid misunderstandings in scientific communication. Here, we propose conserving the name *Philonotidion seriatae* Hinterlang 1992 for arctic-alpine, bryophyte-dominated, non-calcareous spring vegetation against the names *Cardamino-Montion* Braun-Blanquet 1925, *Cardamino-Montion* Braun-Blanquet 1926, and *Montion* Maas 1959. In current vegetation classification systems, the two name-giving taxa of *Cardamino-Montion* no longer indicate the character of the vegetation corresponding to the nomenclatural type of this alliance and are instead characteristic of other currently distinguished alliances. Maintaining the oldest name *Cardamino-Montion* in strict adherence to the Code would be a source of errors. In the current vegetation classification systems, two similar but counter-intuitive names would then have to be used: *Cardamino-Montion* for arctic-alpine springs (although the name-giving taxa are more indicative of montane springs) and *Epilobio nutantis-Montion* for montane springs (although the name-giving taxon *Epilobium nutans* is indicative of arctic-alpine vegetation). Hence, there is a risk that the name *Cardamino-Montion* may gradually become ambiguous. We also propose conserving the name *Philonotidion seriatae* against *Mniobryo-Epilobion hornemannii* Nordhagen 1943 to prevent confusion in case of a merger of these alliances.

- (36) *Philonotidion seriatae* Hinterlang 1992  
Typus: *Cratoneuro-Philonotidetum* Geissler 1976 (holotypus)
- (=) *Cardamino-Montion* Braun-Blanquet 1925  
Typus: *Bryetum schleicheri* Braun-Blanquet 1925 [≡ *Montio fontanae-Bryetum schleicheri* Braun-Blanquet 1925 nom. corr. et invers. (alternative name)] (holotypus)
- (=) *Cardamino-Montion* Braun-Blanquet 1926 nom. superfl. [≡ *Cardamino-Montion* Braun-Blanquet 1925]
- (=) *Mniobryo-Epilobion hornemannii* Nordhagen 1943  
Typus: *Mniobryo-Epilobietum hornemannii* Nordhagen 1943 (lectotypus selected by Zechmeister & Mucina 1994)
- (=) *Montion* Maas 1959 nom. superfl. [≡ *Cardamino-Montion* Braun-Blanquet 1925]

**Taxonomic reference:** Euro+Med PlantBase (<http://europlusmed.org>; accessed 4 January 2024)

## Keywords

*Cardamino-Montion*, *Montio-Cardaminetea*, *nomen conservandum*, phytosociological nomenclature, springs

The syntaxonomic classification of non-calcareous spring vegetation in Europe has evolved from the concept of a single alliance, *Cardamino-Montion*, to the concept of ecologically and floristically more homogeneous units. This may lead to the misuse of some old names.

*Cardamino-Montion* Braun-Blanquet 1925 is the oldest alliance name for spring vegetation in Europe. The holotype of this name is the association *Bryetum schleicheri*, published on page 128 in Braun-Blanquet (1925), which is the only element published under the alliance name in the table on page 129. In this table, the alternative name “Assoziation von *Bryum Schleicheri* und *Montia rivularis*” (recte: *Montio fontanae-Bryetum schleicheri* Braun-Blanquet 1925 nom. corr. et invers.) is used for the same association. The latter name must be corrected (Art. 44; Theurillat et al. 2021) because *Montia rivularis* is a younger synonym of *M. fontana* (see the Euro+Med PlantBase). Moreover, as *Bryum schleicheri* has a higher cover than *Montia fontana* in 6 out of 7 relevés (and equal cover in the remaining one), the name must also be inverted (Art. 42). The lectotype of the association, selected by Hinterlang (2017), is relevé 2 in Table 1 of the Braun-Blanquet article (1925).

The association *Bryetum schleicheri* Braun-Blanquet 1925 represents the vegetation of open subalpine springs on non-calcareous bedrock. Its relevés were sampled at high elevations (1350–1610 m a.s.l.) in the Massif Central, as specified in a subsequent article (Braun-Blanquet 1926). *Bryum schleicheri* (*Ptychostomum schleicheri* in the Euro+Med PlantBase), the dominant taxon in the original diagnosis (Braun-Blanquet 1925, 1926), is a circumpolar species with an arctic-alpine distribution. *Saxifraga stellaris*, another predominantly arctic-alpine species that only rarely descends to the montane belt, is the second most abundant species listed among the faithful (*treue*) character species.

*Sagina linnaei* (*S. saginoides*) and *Epilobium nutans* are listed as two other faithful character species with optimum distribution in arctic-alpine areas. The arctic-alpine character of the *Bryetum schleicheri* association (Braun-Blanquet 1925, 1926) is further underlined by the firm (*feste*) character species *Philonotis seriata*, which co-dominated the moss layer. *Montia fontana*, reported as a firm (*feste*) character species, occurred in all seven relevés, but with low abundance (+ in five cases; 1 in two cases). In contrast to the other species mentioned, this taxon has its distributional optimum at lower elevations, where it often dominates, whereas it only rarely occurs in vegetation where arctic-alpine taxa prevail. Besides the type association, Braun-Blanquet (1926) included within the alliance the association *Cardaminetum amarae subatlanticum*, which was documented with only one relevé, again from the high elevations of the Massif Central (Mt Puy Mary, 1350 m a.s.l.).

As knowledge of the variability of non-calcareous spring vegetation in Europe increased, new alliances were identified. Nordhagen (1943) described the *Mniobryo-Epilobion hornemannii* alliance, another bryophyte-dominated non-calcareous vegetation with many similarities to *Bryetum schleicheri* (e.g. the dominance of *Philonotis seriata* and *Saxifraga stellaris*).

Maas (1959) divided Braun-Blanquet’s *Cardamino-Montion* into two alliances: *Cardaminio amarae* (shaded springs) and *Montion* (open springs). The latter is a superfluous name (Art. 29c), since its diagnosis contains the *Bryetum schleicheri* Braun-Blanquet “1926” (recte: 1925), which is the nomenclatural type of *Cardamino-Montion* Braun-Blanquet 1925. Shaded forest springs were then distinguished from non-forest springs at the alliance level in most subsequent vegetation surveys. Mucina et al. (2016) classified them as the *Caricion remotae* Käßtner 1941 alliance (the oldest valid name).

**Table 1.** Literature survey showing the variable use of the name *Cardamino-Montion* with regard to shading and elevation.

(Sub)alpine non-calcareous springs	(Sub)alpine non-calcareous springs plus other types of spring vegetation	Low- and mid-elevation non-forest (unshaded) springs	Forest (shaded) springs
Braun-Blanquet (1926)	Bartsch and Bartsch (1940)	Büker (1942)	Tüxen (1937)
Zechmeister and Mucina (1994)	Oberdorfer (1957)	Lebrun et al. (1949)	Lebrun et al. (1949)
Bardat et al. (2004)	Dierßen (1996)	Maas (1959)	Soó (1949)
Tomaselli et al. (2011)	Coldea (1997)	Hadač (1983)	Rațiu et al. (1983)
Mucina et al. (2016)	Diekmann (1997)	Hinterlang (1992)	Siebum et al. (1995)
	Mertz (2000)	Siebum et al. (1995)	Laiviņš (1998)
	Rennwald et al. (2000)	Redžić (2007)	Passarge (1999)
	Oberdorfer (2001)	Randelović and Zlatković (2010)	Lawesson (2004)
	Rivas-Martínez et al. (2001)	Redžić et al. (2011)	Schaminée et al. (2017)
	Dierßen and Dierßen (2005)	Borhidi et al. (2012)	
	Matuszkiewicz (2007)	Schaminée et al. (2017)	
	Ellenberg and Leuschner (2010)		

The separation of spring vegetation with arctic-alpine species, dominated by mosses, from colline to montane spring vegetation, dominated by *Montia fontana* and other vascular plants, was introduced in the synthesis of Czechoslovak spring vegetation by Hadač (1983). He reported the *Cardamino-Montion* alliance from the montane zone in the westernmost part of Czechoslovakia, where the arctic-alpine character species of the type association do not occur. For the alpine zone, he described two new alliances: a productive, herb-dominated one (*Cratoneuro filicini-Calthion laetae* Hadač 1983) and a moss-rich one with low productivity, characterized by *Philonotis seriata* and *Diobelonella palustris* (syn.: *Anisothecium squarrosus*, *Dichodontium palustre*, *Dicranella palustris*). Due to obvious differences compared to the *Cardamino-Montion* (e.g., the presence of *Allium schoenoprasum*, *Bartsia alpina*, *Swertia perennis*, and *Pedicularis sudetica*, and the absence of *Saxifraga stellaris*, *Sagina saginoides*, *Sedum villosum*, and *Montia fontana*), Hadač (1983) described this vegetation as *Swertia perennis-Anisothecion squarrosi* Hadač 1983.

Later, Hinterlang (1992) described another new alliance for bryophyte-dominated arctic-alpine spring vegetation, *Philonotidion seriatae*, which contains *Philonotis seriata*, *Bryum schleicheri* and *Saxifraga stellaris* as in Braun-Blanquet's original description of *Cardamino-Montion*. Nevertheless, he retained the name *Cardamino-Montion* for springs with *Montia fontana* s.l., including Braun-Blanquet's subalpine association.

Consistent differentiation between bryophyte-dominated arctic-alpine spring vegetation and herb-rich montane spring vegetation with *Montia fontana* agg. began with the first Europe-wide synthesis of spring vegetation by Zechmeister and Mucina (1994). In this study, the vegetation of low-elevation (mostly colline and submontane) springs with *Montia fontana* was described as the new alliance *Epilobio nutantis-Montion* Zechmeister in Zechmeister et Mucina 1994. The same solution was adopted in many subsequent studies, and finally also in the European vegetation checklist by Mucina et al. (2016). The name *Philonotidion seriatae* Hinterlang 1992 was placed there, for unspecified reasons, as a synonym of *Swertia perennis-Anisothecion squarrosi* Hadač 1983 instead of *Cardamino-Montion*, with which it shares more diagnostic species.

Recently, Peterka et al. (2023) conducted a new pan-European synthesis of spring vegetation based on original relevé data classified using both unsupervised and supervised methods. This study identified vegetation types that consistently formed distinct clusters in numerical analyses (unsupervised classifications) and were reproducible by formal definitions (supervised classifications). In most cases, these vegetation types corresponded to each the above-mentioned alliances, with one exception: the relevés corresponding to the type associations of *Cardamino-Montion* and *Philonotidion seriatae* fell into one group in all cases, even when a fine classification with many clusters was performed. Peterka et al. (2023) selected the name *Philonotidion seriatae* Hinterlang 1992 for this vegetation, arguing that the name *Cardamino-Montion*

was often used for different vegetation types in the past (herb-dominated colline to montane *Montia* springs and even shaded low-elevation springs), making it a source of misunderstanding among vegetation scientists and thus a *nomen ambiguum*.

Table 1 shows how the name *Cardamino-Montion* has been used for very different vegetation types corresponding to different currently distinguished alliances and even orders. Although it is not possible to prove that most of these uses excluded the type of this alliance, i.e. the open arctic-alpine vegetation of the *Bryo schleicheri-Montietum rivularis* association, it is obvious that different authors understand the name differently. Throughout the history of phytosociology, classification concepts evolved from a single broad alliance *Cardamino-Montion* towards smaller, ecologically and floristically more homogeneous units at the alliance level. The two name-giving taxa of *Cardamino-Montion*, both of which actually involve subordinate taxa with different ecological requirements, do not characterize the vegetation corresponding to the type and are instead characteristic of other currently distinguished alliances: *Cardamine amara* s.l. of *Caricion remotae* and *Cratoneuro-Calthion laetae*, and *Montia fontana* s.l. of *Epilobio nutantis-Montion*. Applying the rules strictly and maintaining the oldest name *Cardamino-Montion* would be a constant source of error. We would then have to use two similar, counter-intuitive names: *Cardamino-Montion* for arctic-alpine springs (although the name-giving taxa occur mainly in montane springs) and *Epilobio nutantis-Montion* for montane springs (although the name-giving taxon, *Epilobium nutans*, occurs mainly in arctic-alpine springs). Therefore, it is likely that the name *Cardamino-Montion* would gradually become ambiguous.

For these reasons, we propose conserving the name *Philonotidion seriatae* Hinterlang 1992 against the names *Cardamino-Montion* Braun-Blanquet 1925, *Cardamino-Montion* Braun-Blanquet 1926, and *Montion* Maas 1959. The latter three alliances share a nomenclatural type which is different from the type of *Philonotidion seriatae*. The type of *Philonotidion seriatae* is *Cratoneuro-Philonotidetum* Geissler 1976. The lectotype of this association, selected by Hinterlang (2017), is relevé 11 in table 10 in Geissler's article (1976).

In addition, we propose conserving the name *Philonotidion seriatae* Hinterlang 1992 against the name *Mniobryo-Epilobion hornemannii* Nordhagen 1943. This will prevent the name *Mniobryo-Epilobion hornemannii* Nordhagen 1943 from being used for a broader alliance containing the nomenclatural types of *Cardamino-Montion*, *Philonotidion seriatae*, and *Mniobryo-Epilobion hornemannii*, since *Epilobium hornemannii* does not occur in most of the distribution range of such a hypothetical alliance.

We acknowledge that classification systems combining associations to alliances differently than was done in the studies by Zechmeister and Mucina (1994), Mucina et al. (2016), and Peterka et al. (2023) may appear in the future. If our proposal is accepted, then the name *Philonotidion seriatae* Hinterlang 1992 should be used for all

species-poor, bryophyte-dominated, non-calcareous spring vegetation types. The name, however, would exclude *Cratoneuro filicini-Calthion laetae* Hadač 1983, which is productive, herb-dominated, and partly transitional to *Cardamino-Chrysosplenietalia* Hinterlang 1992 or even *Mulgedio-Aconitetea*. It would also exclude *Swertio perennis-Anisothecion squarrosi* Hadač 1983, which is also rich in herbs and partly transitional to *Scheuchzerio-Caricetea nigrae*. Any hypothetical alliance comprising the latter two herb-rich alliances should therefore be named either *Cratoneuro filicini-Calthion laetae* Hadač 1983 or *Swertio perennis-Anisothecion squarrosi* Hadač 1983, depending on its content. We consider these names more suitable for such hypothetical alliances than *Philonotidion seriatae*, as they both contain taxa from the highest vegetation stratum (herb layer in this case). Finally, a hypothetical alliance combining all non-calcareous springs (regardless of shading and climate, i.e. comprising two currently recognized orders) would be named *Caricion remotae* Kästner 1941.

Should our proposal be accepted, the name *Cardamino-Montion* would remain available for a hypothetical

alliance that excludes the type of *Philonotidion seriatae*; e.g. an alliance comprising non-calcareous springs regardless of elevation, but excluding vegetation extremely poor in vascular plants or without *Montia fontana*.

## Author contributions

M.H. led the writing, while all authors conceived the idea and critically revised the manuscript.

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