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## ***Arrhenatherion elatioris* Koch 1926 *nom. correct.*: demonstration of its validity and syntaxonomic implications of its rejection**

**G. Mercadal, L. Vilar**

*Herbarium of the University of Girona. Department Environmental Science, Montilivi campus, C/M. Aurèlia Campmany 69, E-17003 Girona, Spain.*

### **Abstract**

We demonstrate the validity of the *Arrhenatherion elatioris* Koch 1926 based on the indirect reference Scherrer (1925), and we choose it as the preferential name to its homonym *Arrhenatherion elatioris* Luquet 1926 *nom. illeg.* (art. 31). Our choice is because the nomenclatural type of the *Arrhenatherion* Koch, *Arrhenatheretum elatioris* Scherrer 1925, is a association of the *Arrhenatherion* alliance; while that of *Arrhenatherion* Luquet, *Agrostidetum* Luquet 1926, corresponds to an association of the *Trisetum-Polygonion* Br.-Bl. & Tx. ex Marschall 1947 alliance. Therefore, the prioritisation of Luquet's authorship would include replacing *Trisetum-Polygonion* with *Arrhenatherion* Luquet, because then that name would become the priority, and a new name would have to be found for the traditional concept of the *Arrhenatherion*. Ultimately, and if necessary, to avoid unnecessary nomenclatural changes and creating erroneous interpretations, article 52 (*nomina conservanda*) could also be applied to protect *Arrhenatherion* and *Trisetum-Polygonion*.

Key words: *Arrhenatherion elatioris*, correct name, Europe, nomenclature, syntaxonomy.

### **Introduction**

Recently, Mucina *et al.* (2016) have published a new syntaxonomic conspectus that represents the main European reference for sigmatist phytosociology. This is a very complete work that hierarchically compiles all the syntaxonomic units of the continent at alliance level, with the corresponding synonymy and the pertinent nomenclatural discussions. Similarly, Velev (2018) has prepared an updated checklist of the European *Arrhenatheretalia* order up to the range of association. Regarding the *Arrhenatherion* alliance, both studies follow the Kučera (2007) proposal and opt for the name *Arrhenatherion elatioris* Luquet 1926 instead of the traditional *Arrhenatherion elatioris* Koch 1926. The latter name is always interpreted as a *nomen nudum* (art. 2b). Nevertheless, *Arrhenatherion* Koch 1926 is plainly valid, because it includes an unmistakable indirect bibliographic reference: Scherrer (1925). This fact implies the existence of two homonyms with the same data, and in application of article 33 of the International Code of Phytosociological Nomenclature (Weber *et al.*, 2000), we choose *Arrhenatherion* Koch 1926 as the preferential name to that of Luquet's authorship. Thus, we maintain the traditional phytosociological concept of this alliance and avoid important inappropriate changes.

### **Materials and methods**

From the bibliographic review of pertinent works, we

demonstrate the validity of the *Arrhenatherion* Koch 1926 and we choose it as the preferential name to its homonym *Arrhenatherion* Luquet 1926. Thus, we indicate the main synonym, the nomenclatural type, and the characteristic and differential species.

The abbreviations used are those proposed by Mucina *et al.* (2016) or, if not, by Weber *et al.* (2000): art., article; auct., auctorum; diff., differential specie; ICPN, International Code of Phytosociological Nomenclature; *nom. correct.*, nomen correctum; *nom. illeg.*, nomen illegitimum; *nom. inval.*, nomen invalidum; *nom. nud.*, nomen nudum; non, no; orig. form, original form; syntax. syn., syntaxonomic synonym.

### **Results**

**Correct name:** *Arrhenatherion elatioris* Koch 1926. Name chosen in this publication.

**Homonym:** *Arrhenatherion elatioris* Luquet 1926 *nom. illeg.* (art. 31) [= *Arrhenatherion* Luquet 1926 (orig. form)]. Name rejected in this publication.

**Synonyms:** *Arrhenatherion* Br.-Bl. 1925 *nom. nud.* (art. 2b); *Arrhenatherion* Pawlowski 1928 *nom. nud.* (art. 2b); *Arrhenatherion* Br.-Bl. 1931 *nom. nud.* (art. 2b); *Arrhenatherion elatioris* Tx. 1931 *nom. illeg.* (art. 31); *Anthriscum-Heracleion* Passarge 1975 (syntax. syn.); *Hyperico-Vicion angustifoliae* Passarge 1975 (syntax. syn.); *Festucion pratensis* Sipailova *et al.* 1985 (syntax. syn.); *Agrostio-Festucion rubrae* Passarge 1969 (syntax. syn.); *Polygalo-Festucion rubrae* Passarge 1969 *nom. inval.* (art. 3b); *Dauco-*

*Arrhenatherion* Passarge 1969 *nom. inval.* (art. 3b); *Phyteumato-Festucion rubrae* Passarge 1969 *nom. inval.* (art. 3b); *Trisetto-Arrhenatherion* Passarge 1969 (syntax. syn.).

**Pseudonym:** *Arrhenatherion* auct. non Luquet 1926.

**Holotypus:** *Arrhenatheretum elatioris* Scherrer 1925 *nom. illeg.* (art. 31) [= *Arrhenatheretum elatioris* Braun 1915].

**Characteristic and differential species:** *Knautia arvensis*, *Heracleum sphondylium* s.l., *Carum carvi*, *Crepis biennis* s.l., *Myosotis arvensis*, *Anthriscus sylvestris* subsp. *sylvestris*, *Geranium pratense*, *Campanula patula* (diff.), *Pimpinella major* (diff.).

## Discussion

### **Demonstration of the validity of the *Arrhenatherion elatioris* Koch 1926**

The first mention we know about the *Arrhenatherion* alliance is thanks to Braun-Blanquet (1925: 218) when identifying the location where *Rumex montanus* Desf. grows in Grisons (Switzerland). However, this name is not valid because it is not accompanied by an original diagnosis or by any bibliographic reference (*nom. nud.*, art. 2b). One year later, Koch (1926: 124) and Luquet (1926: 62), advised by Braun-Blanquet, also named *Arrhenatherion* in their respective publications. Both works include association inventories or different indirect bibliographic references and, therefore, correspond to homonyms of the same data, because they do not indicate the month of publication either. Article 33 of the ICNP (Weber *et al.*, 2000) indicates that the first author to choose one homonym must be followed and the other rejected. Traditionally, the authorship has been attributed to Koch (Oberdorfer, 1983; Ellmauer & Mucina, 1993; Ellmauer, 1994; Dierschke, 1997, 1999; Borhidi *et al.*, 1999; Géhu, 1999; Stunder-Ehrensberger, 2000; Bolòs, 2001; Rivas-Martínez *et al.*, 2001; Bardat *et al.*, 2004; Biondi *et al.*, 2014; Foucault, 2016; Rodríguez-Rojo *et al.*, 2017), but we have not found any study that also rejects the *Arrhenatherion* Luquet 1926. On the other hand, Kučera (2007) and other authors (Velev *et al.*, 2011; Šilc *et al.*, 2014; Mucina *et al.*, 2016; Zalac *et al.*, 2016; Škvorc *et al.*, 2017; Velev, 2018) have recently rejected the *Arrhenatherion* Koch 1926, considering that it does not present sufficient original diagnosis, or a clear indirect reference (*nom. nud.*, art. 2b). They propose the only correct name *Arrhenatherion* Luquet 1926, although the Koch authorship is fully valid. Walo Koch published his doctoral thesis about the vegetation of Linthebene (northeastern Switzerland) in 1926. He added only one association to the *Arrhenatherion* alliance, that of the *Arrhenatheretum elatioris*, but he did not publish any inventory, neither did he directly remit the *Arrhenatheretum elatioris* to Braun (1915), where

the association is validly described. Nevertheless, he did give four bibliographic references, one of which (Scherrer, 1925) is useful for validating the alliance (Fig. 1). On page 124, Koch mentioned that Dutoit and Scherrer had widely studied *Arrhenatheretum*, and that their Linthebene inventories were not very different to those of Scherrer (Limmattal Valley, Switzerland), but he did not mention the year of publication of the bibliographic references. However, two works by Scherrer (1923, 1925) and one by Dutoit (1924) appear in the bibliography. Scherrer (1923) must be dismissed because it does not deal with *Arrhenatherion*. But, Scherrer (1925: 88-92) published two tables of association (one for the spring composition and the other for the summer) that were assigned to the *Arrhenatheretum* and that clearly are ascribable to the traditional concept of the *Arrhenatherion* alliance. Scherrer (1925) did not indicate the authorship of the association, but he did compare the Limmattal Valley meadows with those of the Cévennes (France) by Braun (1915), referring to their great floristic similarity. In any case, Scherrer (1925) also compared the meadows of his area of study with other meadows of different European locations, which could be understood as a confusing reference. Therefore, to avoid discrepancies, we must consider *Arrhenatheretum* Scherrer 1925 an illegitimate homonym (art. 31) of the *Arrhenatheretum* Braun 1915, a fact that likewise validates (art. 17) the *Arrhenatherion* Koch 1926 alliance. Dutoit (1924: 45) should also be dismissed because it does not mention *Arrhenatheretum* and, in fact, it does not serve to validate the *Arrhenatherion* alliance as we currently understand it. This study about the Subalpine vegetation of Vevey (Switzerland) names the “Groupe d’associations des prairies mésophiles, type *Arrhenatheretum*” and provides a table with 15 inventories of the *Agrostidetum capillaris*. It discusses an association of the alliance *Trisetto flavescentis-Polygonion bistortae* Br.-Bl. & Tx. ex Marschall 1947 and not of the *Arrhenatherion*. Dutoit (1924) refers to the “Groupe” of “type *Arrhenatheretum*” meadows, and not to the *Arrhenatheretum* Braun 1915 association as such. We must consider that Braun (1915) did include the *Agrostis vulgaris* (*Agrostidetum*) association, typical of the *Trisetto-Polygonion* alliance, and the *Arrhenatheretum* association, typical of the *Arrhenatherion* alliance, in the same “Groupe d’associations des prairies mésophiles, type *Arrhenatheretum*”, an embryonic form that later would become the *Arrhenatheretalia* order. Furthermore, on page 125, Koch gives a fourth reference. In this case, the Swiss botanist commented that amongst the Linthebene fruit trees a variation of the *Arrhenatheretum* was developed that was characterized by different geophytes, which was previously mentioned by Braun-Blanquet (1924) in Chur (Switzerland) (Fig. 1). Certainly, Braun-Blanquet (1924:

## XI. Assoziationsverband *Arrhenatherion elatioris*.

Das *Mesobrometum brachypodietosum* und bei geeigneten Bodenverhältnissen schon das *Molinietum caricetosum tomentosae* lassen sich durch intensive Düngung in Fettwiesen überführen. Im untern Teil der montanen Stufe ist es das **Arrhenatheretum elatioris**, eine Gesellschaft von recht konstanter Zusammensetzung, welche als einzige Assoziation des Verbandes auftritt. In letzter Zeit ist es von Scherrer und Dutoit eingehend geschildert worden. In der Linthebene weichen im allgemeinen weder floristische Zusammensetzung noch die ökologischen Verhältnisse von Scherrers Daten ab, einzig dass stellenweise durch reichlicheres Auftreten von *Trisetum flavescens* und *Agrostis vulgaris* ein leicht subalpiner Anstrich zustande kommt. Als rein anthropogene Gesellschaft gedeiht die Assoziation

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nur in den bestmeliorierten Teilen des Gebietes, besonders am Rande der Ebene in der Nähe der menschlichen Siedelungen, wo sie auch den Standort für die zahlreich kultivierten Obstbäume liefert. In diesen Obstbaumhainen tritt auch etwa eine interessante Geophyten-Variante auf, deren Frühlingsaspekt durch *Gagea lutea*, *Leucoium vernum*, *Ranunculus Ficaria* und *Corydalis cava* ausgezeichnet ist. Braun-Blanquet (Schedae VII [1924] S. 191 sub *Ranunculus Ficaria*) hat diese Gesellschaft als Erster aus dem Churer Rheintal erwähnt.

Fig. 1 - Fragment of Koch (1926: 124-125) that validates the *Arrhenatherion elatioris* alliance for the first time based on the indirect bibliographic reference (Scherrer, 1925).

111) named *Arrhenatheretum*, but this reference cannot be admitted as valid, because the association, although mentioned by Braun-Blanquet, does not have a diagnosis or any reference.

Kučera's (2007) proposal to take *Arrhenatherion* Luquet 1926 as the correct name, because the work has a clearer nomenclatural type, presents the same problem as Dutoit (1924). In 1926, Aimé Luquet, friend and disciple of Braun-Blanquet, published his thesis about the vegetation of the Monts Doré, in the Massif Central (France), a work that, in comparison to that of Koch, has been far more unnoticed. Luquet (1926: 62) also named the *Arrhenatherion* alliance and only assigned the *Agrostis capillaris* L. association. He discovered the association by means of a synthetic table based on 18 inventories from his area of study. But Luquet, as Dutoit (1924) had done earlier, also referred to *Agrostidetum* Braun 1915 (Association à *Agrostis vulgaris* Braun 1915) and does not mention *Arrhenatheretum* Braun 1915. The *Agrostidetum* Braun 1915 (= *Campanulo rectae-Agrostietum capillaris* (Braun) Hundt 1964) is an association of the *Trisetum-Polygonion* alliance, just like *Agrostidetum* Luquet 1926 (= *Viola luteae-Trisetetum flavescens* Luquet ex B. Foucault 1986) and not the *Arrhenatherion* alliance. The *Agros-*

*tidetum* Luquet 1926 is characterised by the frequency of taxa typical of *Trisetum-Polygonion*: *Colchicum autumnale*, *Narcissus poeticus*, *Trollius europaeus*, *Polygonum bistorta*, *Astrantia major*, *Alchemilla gr. vulgaris*, *Phyteuma spicatum*, etc. Because of this, we choose the homonym *Arrhenatherion* Koch 1926 as the correct name, and reject the *Arrhenatherion* Luquet 1926 nom. illeg. (art. 31), because this latter name does not correspond to the traditional concept of the *Arrhenatherion*. Rather it is a synonym of the *Trisetum-Polygonion*, of which it is not the preferred name because it is also an illegitimate homonym of the *Arrhenatherion* Koch 1926.

Later, Pawlowski (1928) named the *Arrhenatheretalia* order, the *Arrhenatherion* alliance and two associations, but did not publish any inventory or give any bibliographic reference. Therefore, *Arrhenatherion* Pawlowski 1928 is a *nomen nudum* (art. 2b). In 1931, Braun-Blanquet (1931) once again named *Arrhenatherion* without giving any inventory or any reference, so this, once again, is a *nomen nudum* (art. 2b). On the other hand, Tüxen (1931), although not giving any reference, did publish several inventories of typical associations that ascribed the *Arrhenatherion* alliance and the *Arrhenatheretalia* order. Nevertheless, in

this case, by considering the *Arrhenatherion elatioris* Koch 1926 valid, the Tüxen name is illegitimate (art. 31), although it does validate the *Arrhenatheretalia* Tx. 1931 order (art. 17). For the rest of the XX century, different authors typified different regional alliances of Western Europe, which we have previously listed in the synonyms section by considering them syntaxonomic synonyms. Please consult Velev (2018) to complete the synonyms.

#### **Negative implications of accepting *Arrhenatherion* Luquet 1926**

Rejecting our proposal and accepting *Arrhenatherion* Luquet 1926 as the correct name would involve harmful implications for European phytosociology. The *Arrhenatherion* Luquet 1926 could not include the associations traditionally ascribed to the *Arrhenatherion* alliance, because, it would be, as we have said, a preferential synonym of the *Trisetum-Polygonum* alliance. Therefore, a new name should be found for the traditional concept of *Arrhenatherion* based on syntaxonomic synonyms after Koch (1926), because the *Trisetum-Polygonum* alliance would then be named *Arrhenatherion* Luquet 1926. For this reason, ultimately, article 52 (*nomina conservanda*) could also be applied, despite it being especially designed for classes and orders, to protect *Arrhenatherion* and *Trisetum-Polygonum* and avoid unnecessary changes and future erroneous interpretations.

#### **The nomenclatural type**

The *Arrhenatheretum* Scherrer 1925 corresponds to the nomenclatural type (*typus nominis*) of the alliance being studied, but its hierarchy and nomenclature has two opposite versions. On one hand, Oberdorfer (1983), Dierschke (1997, 1999) and, later, Rodríguez-Rojo *et al.* (2017) and Velev (2018) consider that the Central European *Arrhenatheretum* is the same association as *Arrhenatheretum* Braun 1915 of the Cévennes, and that the existing small floristic differences can be resolved with the creation of geographic or ecologic sub-associations. However, Velev (2018) considers that the *Arrhenatheretum* Braun 1915 is a *nomen ambiguum* (art. 36) and therefore we choose

the *Pastinaco-Arrhenatheretum* Passarge 1964 as the correct name. His opinion is greatly influenced by understanding the *Gaudinio-Arrhenatheretum* Br.-Bl. in Br.-Bl. *et al.* 1952 em. Kleszczewski 2000 as a syntaxonomic synonym of the *Arrhenatheretum* Braun 1915, despite the separation of both associations clearly demonstrated by Kleszczewski (2000). On the other hand, Ellmauer & Mucina (1993) and Ellmauer (1994), among other Central European phytosociologists, tend to consider the *Arrhenatheretum* Scherrer of Central Europe as a different association of the Cévennes *Arrhenatheretum*. In this case, they accept different associations, among which the *Pastinaco-Arrhenatheretum* is considered the valid synonym of the *Arrhenatheretum* Scherrer 1925. This opinion is once again influenced by erroneously considering the *Gaudinio-Arrhenatheretum* a synonym of *Arrhenatheretum* Braun 1915. Nevertheless, it is evident that the inventories of the Cévennes have a specific floristic composition (*Festuca arundinacea*, *Gaudinia fragilis*, *Viola odorata* and *Centaurea nigra*) that differentiates them from Swiss meadows and from the rest of Central Europe. But the characteristic composition of the *Pastinaco-Arrhenatheretum* (*Arrhenatheretum* Scherrer 1925) is not very different from *Arrhenatheretum* Braun 1915 either. According to Ellmauer & Mucina (1993), the *Pastinaco-Arrhenatheretum* is different because of the abundance of *Pastinaca sativa* and is characterised by: *Arrhenatherum elatius*, *Geranium pratense*, *Campanula patula*, *Dactylis glomerata*, *Festuca pratensis*, *Holcus lanatus*, *Leontodon hispidus*, *Leucanthemum vulgare* agg., *Plantago lanceolata*, *Poa pratensis*, *Ranunculus acris*, *Rumex acetosa*, *Trifolium pratense* and *Trisetum flavescens*. Therefore, based on the *taxa* typical of the French *Arrhenatheretum* (Braun, 1915; Kleszczewski, 2000), the Central European *Pastinaco-Arrhenatheretum* is basically different because of the presence of *Campanula patula* and because of the greater abundance of *Pastinaca sativa* and *Pimpinella major*. Therefore, while we wait for an exhaustive revision of the Central European meadows, we currently are inclined for Oberdorfer's proposal and we consider the *Arrhenatheretum* Scherrer 1925 an illegitimate synonym of the *Arrhenatheretum* Braun 1915.

#### **Syntaxonomic scheme**

MOLINIO CAERULEAE-ARRHENATHERETEA ELATIORIS Tx. 1937 em. 1970

*ARRHENATHERETALIA ELATIORIS* Tx. 1931

*Arrhenatherion elatioris* Koch 1926

*Arrhenatheretum elatioris* Braun 1915

#### **Other syntaxa quoted in the text**

*Agrostidetum* Braun 1915 (association à *Agrostis vulgaris* Braun 1915); *Agrostidetum* Luquet 1926; *Agrostio-Festucion rubrae* Passarge 1969; *Anthriscio-Heracleion* Passarge 1975; *Arrhenatheretum* Scherrer 1925 (*Arrhenatheretum*

*elatioris* Scherrer 1925); *Arrhenatherion* Br.-Bl. 1925; *Arrhenatherion* Luquet 1926 (*Arrhenatherion elatioris* Luquet 1926); *Arrhenatherion* Pawlowski 1928; *Arrhenatherion* Br.-Bl. 1931; *Arrhenatherion elatioris* Tx. 1931; *Campanulo rectae-Agrostietum capillaris* (Braun) Hundt 1964; *Dauco-Arrhenatherion* Passarge 1969; *Festucion pratensis* Sipailova et al. 1985; *Gaudinio-Arrhenatheretum* Br.-Bl. in Br.-Bl. et al. 1952 em. Kleszczewski 2000; *Hyperico-Vicion angustifoliae* Passarge 1975; *Pastinaco-Arrhenatheretum* Passarge 1964; *Phyteumato-Festucion rubrae* Passarge 1969; *Polygalo-Festucion rubrae* Passarge 1969; *Trisetum-Polygonion* Br.-Bl. & Tx. ex Marschall 1947 (*Trisetum flavescens-Polygonion bistortae* Br.-Bl. & Tx. ex Marschall 1947); *Trisetum-Arrhenatherion* Passarge 1969; *Violo luteae-Trisetum flavescens* (Luquet) ex B. Foucault 1986.

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