

Resolving some nomenclatural issues on *Isoeto-Nanojuncetea* and four new communities of the Iberian Peninsula

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Received: 25 February 2019 / Accepted: 14 December 2020 / Published online: 25 January 2021

Abstract. We describe four new vegetation units and propose 17 new typifications and 24 altered names of syntaxa belonging to *Isoeto-Nanojuncetea*. Information is also provided on the publication dates of the alliances *Isoetion* and *Preslion*.

Keywords: Azores; ICPN; Isoetalia; Mediterranean; nomenclature; phytosociology; syntaxonomy; temporary ponds.

How to cite: Silva, V., Ribeiro, S., Molina J.A., Pinto-Cruz, C., Costa, J.C. & Espírito-Santo, D. 2021. Resolving some nomenclatural issues on *Isoeto-Nanojuncetea* and four new communities of the Iberian Peninsula. *Mediterr. Bot.* 42, e63383. <https://dx.doi.org/10.5209/mbot.63383>

Introduction and Methods

We have been working on *Isoeto-Nanojuncetea* Br.-Bl. & Tüxen in Br.-Bl. et al. 1952, mainly in the Iberian Peninsula and northern Morocco, over the past 20 years (Molina & Casado, 1997; Espírito-Santo & Arsénio, 2005; Molina, 2005; Molina et al., 2009; Pinto-Cruz et al., 2009; Silva et al., 2009a, 2009b). Some new communities were described and others confirmed for the Iberian territory (Silva et al., 2008, 2009c; Costa et al., 2012). Plant communities of temporary ponds compose a highly specialized vegetation with an extremely patchy distribution that poses challenges for classification (e.g. Silva, 2009). Nevertheless, syntaxa belonging to this class have been described from the beginnings of phytosociology almost a century ago, often using obsolete name-giving taxa that make more complicate the nomenclatural interpretations of the units (e.g. Braun-Blanquet, 1922, 1936a).

Here we describe three new associations and one new subassociation, designate 17 type relevés and propose the correction, completion or mutation of 24 names following the rules of the 4th edition of the International Code of Phytosociological Nomenclature (ICPN; Theurillat et al., 2020). The nomenclature of vascular plants follows *Flora iberica* (Castroviejo, 1986–2019), and for families not yet published in this flora we followed Euro+Med (2006–), except for *Isoetes delilei*, which agrees with Greuter & Troia (2015), and *Isoetes longissima* with Troia & Greuter (2014).

Syntaxonomic nomenclature follows Rivas-Martínez et al. (2001, 2002), Costa et al. (2012), Brullo & Minissale (1998), and Mucina et al. (2016) for high-rank syntaxa. Biogeographical units are according to Rivas-Martínez et al. (2017). Coordinates of the type relevés are indicated in the Universal Transverse Mercator coordinate system (UTM) using WGS84 Datum, and were mostly retrieved from <http://www.anthos.es/>.

Results and Discussion

Publication dates of the alliances *Isoetion* and *Preslion cervinae*

The name *Isoetion* was invalidly published by Braun-Blanquet (1931: 39) because a sufficient original diagnosis was not provided (ICPN, Art. 2b). Thereafter, the author provided a sufficient diagnosis validating the alliance name in the paper *Un joyau floristique et phytosociologique “L’Isoetion” méditerranéen*, that was published in the *Bulletin de la Société d’Étude des Sciences Naturelles de Nîmes* (Braun-Blanquet, 1936a) and also in a *Communication* of the SIGMA (Braun-Blanquet, 1936b). Text and page makeup are identical in both publications, except for the page numbering. The *Communication* is dated on the cover page in January 1936 and contains a reference to the *Bulletin* on the last page: “Extrait du Bulletin de la Société d’Étude des Sciences Naturelles de Nîmes, t. XLVII, 1930-35”. An

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additional evidence that the *Communication* should be considered as a reprint of the *Bulletin* is that in both publications a reference to the ‘*Communication n° 40*’ is indicated in the first page under the title, but the *Communication* published is the number 42 of the series, suggesting that it was postponed until the *Bulletin* was published. The precise date of publication of volume 47 of the *Bulletin* is unknown, but on page 252 there is a reference to a meeting of the *Société* held on November 29, 1935. Hence, it is highly unlikely that the volume could have been published before 1936 (D. Kania, *pers. comm.*). The author citation should therefore be *Isoetion Braun-Blanquet 1936*, as indicated by Theurillat *et al.* (2020).

The name *Preslion cervinae* was also invalidly published by Braun-Blanquet (1931: 29) according to Art. 2b. An examination of M. Moor’s publications on the order *Isoetetalia* (Braun-Blanquet & Moor, 1935; Moor, 1935, 1936, 1937) showed that the *Preslion cervinae* alliance was not validated until Moor (1937: 22–23) provided a sufficient original diagnosis (Art. 2b). The fact that Moor (1937) indicated ‘*Preslion cervinae* Br.-Bl. 1931 n. n. [*nomen nudum*]’ in the proposal of the name does not invalidate the diagnosis. This has been clarified in the new edition of the ICPN, Art. 3b §2: ‘Names that are indicated as “manuscript” (“Mskr.,” “mscr.”) or “ined.” or “unpublished” are validly published if all the requested conditions for a valid publication are provided’. The author citation should therefore be *Preslion cervinae* Br.-Bl. ex Moor 1937 (Rec. 10C and 46D). Nevertheless, as the genus *Preslia* Opiz is included in *Mentha* L. in most of the recent floras (e.g. Castroviejo, 1986–2019; Euro+Med, 2006–), the name can be mutated according to Art. 45 (see below).

New descriptions of vegetation units

Cypero badii-Menthetum cervinae Rivas Goday in Rivas Goday *et al.* 1956 *mut.* V. Silva *et al.* *nom. mut. nov.* ***ranunculetosum longipedis*** V. Silva, J.A. Molina, J.C. Costa & Espirito-Santo in V. Silva *et al.* *subass. nova*

Holotypus: Silva *et al.*, 2009b: 76–77, Table 1, rel. 11: Escarigo, Figueira de Castelo Rodrigo, 29TPF8323, Portugal.

Syn.: As. *Preslia cervina et Eleocharis palustris agrostietosum salmanticae* Rivas Goday in Rivas Goday *et al.* 1956 *nom. inval.* (Art. 4a); *Agrostio salmanticae-Preslietum cervinae* Rivas Goday in Rivas Goday *et al.* 1956 *nom. inval.* (Art. 3a) (corresp. name).

Meso-supramediterranean temporary pond vegetation rich in annuals from the Carpetan-Leonese subprovince, belonging to the alliance *Menthion cervinae*. The presence of *Ranunculus longipes*, *R. lateriflorus* and *R. nodiflorus*, and the absence of thermophilous species like *Marsilea batardae* and *Eryngium galioides*, differentiate it from the typical subassociation (Rivas-Goday *et al.*, 1956; Silva *et al.*, 2009b), which has its biogeographical optimum in the Luso-Extremadurese

subprovince. The correct location of the type relevé of the new subassociation is in Beira Alta province, not in Baixo Alentejo as it was indicated in Silva *et al.* (2009b: 77).

The subassociation epithet *agrostietosum salmanticae* proposed in Rivas Goday *et al.* (1956) is invalid because it was subordinated to an invalid association name (‘As. *Preslia cervina et Eleocharis palustris* Br.-Bl. 1931’). The name *Agrostio salmanticae-Preslietum cervinae* is also invalid because it was proposed as an alternative rank for the former subassociation, but only the subassociation rank is clearly adopted by the author.

Furthermore, *Preslia cervina* is accepted as *Mentha cervina* in the recent floras (e.g. Castroviejo, 1986–2019; Euro+Med, 2006–) and the name *Cypero badii-Preslietum cervinae* could be mutated (Art. 45) (see below).

Isolepido cernuae-Lythretum baetici Rivas Goday ex V. Silva *et al.* *ass. nova*

Holotypus: Rivas Goday, 1970: 258–260, Table 4, rel. 4: between Carboneras de Guadazaón and Reillo, Cuenca, 30SWK91, Spain.

Syn.: *Isolepido-Lythretum castellani* Rivas Goday 1970 *nom. inval.* (Art. 3l); *Isolepido-Lythretum castiliae* Rivas Goday ex Alcaraz, Sánchez-Gómez, De la Torre, Ríos & Álvarez Rogel 1991 *nom. inval.* (Art. 3g).

Meso-supramediterranean early-summer annual vegetation of temporary ponds from the Mediterranean Central Iberian province. Character species are *Lythrum baeticum*, *L. flexuosum* and *Isolepis cernua*. The *Isolepido-Lythretum castellani* was invalidly published by Rivas Goday (1970: 257–260) because the name-giving taxon *Lythrum castellanum* Gonz.-Albo is an invalid name (Art. 3l). Alcaraz *et al.* (1991: 119) subsequently proposed the name *Isolepido-Lythretum castiliae* for Rivas Goday’s association, giving a reference to the original diagnosis and correcting *L. castellanum* to *L. castiliae* Greuter & Burdet. However, this name is also invalid because the authors do not indicate the name-giving species of *Isolepis*, a genus with two character species (*I. cernua* and *I. supina*) in the original diagnosis (Art. 3g). Here we validate the association name with the same type designated by Rivas Goday (1970) using as name-giving taxa *Isolepis cernua* and *Lythrum baeticum*, the latter being the correct name for *L. castellanum* and *L. castiliae* according to Euro+Med (2006–) and *Flora iberica* (Castroviejo, 1986–2019).

This association was designated the ‘syntypus’ of the alliance *Lythrion tribracteati* by Rivas Goday (1970: 257). Despite the association was invalid at the time, the alliance is however valid because typification is not mandatory before 1979 (Art. 17) and the original diagnosis includes other valid association (*Gnaphalio luteoalbi-Plantaginetum intermediae* Rivas Goday & Ladero in Rivas Goday 1970) that contains *Lythrum tribracteatum* (Art. 3f) and hence becomes the holotype of the alliance (Art. 18).

Junco pygmaei-Elatinetum macropodae V. Silva, Ribeiro, Pinto-Cruz & J.A. Molina in V. Silva et al. *ass. nova*

Holotypus: Table 1, rel. 4.

Thermo-meso-supramediterranean ephemeral vegetation from the Mediterranean West Iberian province dominated by *Elatine macropoda*, belonging to the alliance *Isoetion* Br.-Bl. 1936. *Juncus pygmaeus*, *Lythrum borysthenticum* and *L. hyssopifolia* are also frequent (Table 1). It extends

along the margins of streams and temporary ponds on muddy or sandy substrates with shallow water in early spring. *Junco pygmaei-Elatinetum macropodae* can also occur as a monospecific community of *Elatine macropoda*, as indicated in Silva et al. (2009b). A close association is *Elatinetum macropodae* Br.-Bl. 1936, which has a Valencian-Provencal-Balearic distribution and can be distinguished by the character species *Damasonium polyspermum*, *Pulicaria vulgaris* and *Lythrum tribracteatum* (Braun-Blanquet, 1936a).

Table 1. *Junco pygmaei-Elatinetum macropodae* V. Silva, Ribeiro, Pinto-Cruz & J.A. Molina in Vasco et al. *ass. nova* (*Isoetion*, *Isoetetalia*, *Isoeto-Nanojuncetea*)

Altitude (m asl)	345	175	175	345
Area (m ²)	5	0.5	0.5	0.25
Species N.	4	9	8	4
Relevé N.	1	2	3	4
Characteristics				
<i>Elatine macropoda</i>	2	2	4	4
<i>Juncus pygmaeus</i>	.	3	1	+
<i>Lythrum borysthenticum</i>	.	1	2	.
<i>Lythrum hyssopifolia</i>	.	1	1	.
<i>Marsilea batardae</i>	.	3	.	.
<i>Eryngium corniculatum</i>	3	.	.	.
<i>Isoetes longissima</i>	.	.	2	.
<i>Juncus hybridus</i>	.	.	1	.
<i>Lythrum portula</i>	.	.	.	1
<i>Mentha pulegium</i>	.	+	.	.
Other species				
<i>Polypogon maritimus</i>	.	+	.	+
<i>Glyceria declinata</i>	.	+	1	.
<i>Eleocharis palustris</i> subsp. <i>palustris</i>	+	+	.	.
<i>Ranunculus saniculifolius</i>	1	.	.	.
<i>Callitriche stagnalis</i>	+	.	.	.
<i>Baldellia repens</i> subsp. <i>cavanillesii</i>	.	.	+	.

Localities: 1, 4: Cáceres, Casar de Cáceres, arroyo La Hurona, 29SQD28, Spain; 2, 3: Baixo Alentejo, Castro Verde, São Marcos da Ataboeira, ribeira de Cobres, 29SNB97, Portugal.

Ludwigio palustris-Cyperetum micheliani Rivas-Martínez, Costa, Castroviejo & E. Valdés 1980 ex V. Silva et al. *ass. nova hoc loco*

Holotypus: Rivas-Martínez et al. 1980: 30, Table 13, rel. 2, La Rocina, Doñana, Huelva, 29SQB32, Spain.

Syn.: *Ludwigio palustris-Cyperetum micheliani* Rivas-Martínez, Costa, Castroviejo & E. Valdés 1980 *nom. inval.* (Art. 3b).

Thermomediterranean small summer terophytic vegetation from the Gaditan-Sadense territory dominated by *Cyperus michelianus*, *C. fuscus* and *Ludwigia palustris* belonging to the alliance *Nanocyperion flavescens* Koch 1926. It is a southern and thermophilous vicariant of the *Cypero-Heleochoetum alopecuroidis* and it was provisionally described from Doñana National Park by Rivas-Martínez et al. (1980). Despite this, Brullo & Minissale (1998) accepted the name and positioned it in the alliance *Verbenion supinae*.

New typifications and altered names in the order *Isoetetalia* Br.-Bl. 1936

Chamaemelo nobilis-Menthetum pulegii Lüpnitz 1976 *mut.* V. Silva et al. *nom. mut. nov.*

Original name: '*Anthemido-Menthetum pulegii*' (Lüpnitz, 1976: 216–217).

Lectotypus hoc loco: Lüpnitz, 1976: 217, Table 13, rel. 1: Caldeira, Faial, Azores, 570 m asl, 26SLH57, Portugal.

The syntaxon name must be completed (Rec. 10C) and mutated (Art. 45) with the updated name-giving taxon, namely *Anthemis nobilis* (Lüpnitz, 1976: 216–217), a synonym of *Chamaemelum nobile* (Euro+Med, 2006–; Castroviejo, 1986–2019).

Cypero badii-Menthetum cervinae Rivas Goday in Rivas Goday et al. 1956 *mut.* V. Silva et al. *nom. mut. nov.* subass. *typicum*

Original name: ‘*Cypero badii-Preslietum cervinae* Rivas Goday’ (Rivas Goday *et al.*, 1956: 379).

Lectotypus hoc loco: Rivas Goday *et al.*, 1956: 380, Table 17, rel. 2: Zújar river, Entrerriós, Villanueva de la Serena, Badajoz, 30STJ61, Spain.

Syn.: *Sisymbrello asperae-Preslietum cervinae* Rivas Goday 1970 *nom. superfl.* (Art. 18b, 29c).

The lectotypification proposed by Silva (2009: 26, 44) was not effectively published (Art. 1).

Eryngio corniculati-Isoetetum delilei V. Silva, J.A. Molina, J.C. Costa, Pinto-Cruz & Espirito-Santo 2009 *nom. corr.*

Syn.: *Eryngio corniculati-Isoetetum setacei* V. Silva, J.A. Molina, J.C. Costa, Pinto-Cruz & Espirito-Santo 2009 *nom. inept.* (Art. 44).

The correct name-giving taxon is not *Isoetes setacea* but *Isoetes delilei* Rothm. (Greuter & Troia, 2015). In corrections according to Art. 44 the author and the year of the correction are not indicated.

Hyperico humifusi-Cicendietum filiformis Brullo & Minissale 1998

Syn.: ‘*Cicendietum filiformis* (Allorge 1922) salmantino y onubense’ Rivas Goday 1964 *nom. inval.* (Art. 3d); *Hyperico-Cicendietum filiformis* Rivas Goday 1970 *nom. inept.* (Art. 43).

The association ‘*Hyperico-Cicendietum filiformis* Rivas Goday (1964) 1970’ is based on the previous name ‘*Cicendietum filiformis* (Allorge 1922) salmantino y onubense’ (Rivas Goday, 1964: 222), which must be considered invalid as the rank indicated for it was ‘regional variants’ [‘variantes regionales’] (Art. 3d). The name *Hyperico-Cicendietum filiformis* Rivas Goday 1970 was validly proposed by Rivas Goday (1970: 239), but the name-giving taxon indicated was *Hypericum humifusum* subsp. *australe* (Ten.) Rouy & Fouc., which is an illegitimate synonym of *H. australe* Ten. Although *H. humifusum* was the only species indicated in the original relevés of Rivas Goday (1964: 222), we can conclude that Rivas Goday (1970) subsequently assumed that the taxon they contained corresponded to *H. humifusum* subsp. *australe* (Rivas Goday, 1970: 226, 231, 239). According to *Flora iberica* (Castroviejo, 1986-2019) this taxon is not present in the area from which the association was described, and the name completed according to the original diagnosis and Art. 10a Note 2 (*Hyperico australis-Cicendietum*) is therefore an inadequate name that cannot be used (Art. 43, *nomen ineptum*). Although the name ‘*Hyperico humifusi-Cicendietum filiformis* Rivas Goday 1970’ has been cited in several publications (Rivas-Martínez *et al.*, 2001; Costa *et al.*, 2012; De Foucault, 2013a; Gigante *et al.*, 2013), Rivas Goday’s name has still not been formally corrected. The correction of this name according to Art. 43 would also create an illegitimate later homonym (Art. 31) of the name *Hyperico humifusi-Cicendietum filiformis* Brullo & Minissale 1998 (Brullo & Minissale, 1998: 282). This latter name, based on relevés

from the province of Zamora (Navarro & Valle, 1984), is a syntaxonomic synonym and in fact the name that must be used for the association.

Juncetum perpusilli Rivas-Martínez 1964 *mut.* V. Silva *et al. nom. mut. nov.*

Original name: *Juncetum nani* [‘*nanae*’] (Rivas-Martínez, 1964: 72).

Lectotypus hoc loco: Rivas-Martínez, 1964: 72–80, Table 8, rel. 10: El Gargantón, Gredos, 2200 m asl, 30TTK66, Spain.

This Carpetan-Leonese and Oroiberian syntaxon was originally assigned to *Cicendion* (Rivas Martínez, 1964, 1981), a position also accepted by Jansen & Sequeira (1999) for Serra da Estrela. It was subsequently subordinated to the alliance *Menthion cervinae* (Rivas-Martínez *et al.*, 2001; Costa *et al.*, 2012), which is typical of sites with a higher flooding level. According to the original diagnosis and its Iberian-Atlantic character, it seems more appropriate to reassign it to *Cicendion*.

The name-giving taxon *Juncus tenageia* f. *nanus* Cout. (Coutinho, 1913: 118) is a synonym of *J. tenageia* subsp. *perpusillus* Fern.-Carv. & Navarro, a name accepted in Euro+Med (2006–) and in Fernández-Carvajal (1982: 129). Thereby we consider mutating the association name (Art. 45). The mutation was already proposed by Rivas-Martínez *et al.* (2002: 440).

Junco pygmaei-Isoetetum longissimae Rivas Goday in Rivas Goday *et al.* 1956 *nom. corr.*

Lectotypus hoc loco: Rivas Goday *et al.*, 1956: 380–381, Table III, rel. 4: Santillana dam, Manzanares el Real, Madrid, 900 m asl, 30TVL20, Spain.

Syn.: *Junco pygmaei-Isoetetum velatae* Rivas Goday in Rivas Goday *et al.* 1956 *nom. inept.* (Art. 44).

The correct name-giving taxon for this association is *Isoetes longissima* Bory as *Isoetes velata* A. Braun is an illegitimate name according to Troia & Greuter (2014). Although only *Isoetes velata* subsp. *tenuissima* was indicated in the original table (Rivas Goday *et al.*, 1956: Tab. 3), the two entities *I. velata* and *I. velata* subsp. *tenuissima* are mentioned in the text as being present in the relevés (Rivas Goday *et al.*, 1956: 381). The new ICPN (Art. 10a Note 2) clarifies these cases, ruling that if the author chose the specific epithet (and not the infraspecific epithet) as the name-giving taxon, this decision must be followed. Hence the name ‘*Isoetes tenuissimae-Juncetum pygmaei*’ indicated by Brullo & Minissale (1998: 276) is invalid (Art. 3q).

Loto hispidi-Chaetopogonetum fasciculati Rivas-Martínez & Costa in Rivas-Martínez, Costa, Castroviejo & E. Valdés 1980 *nom. corr.*

Syn.: *Loto subbiflori-Chaetopogonetum fasciculati* Rivas-Martínez & Costa in Rivas-Martínez, Costa, Castroviejo & E. Valdés 1980 *nom. inept.* (Art.44).

The correct name-giving taxon is not *Lotus subbiflorus* but *Lotus hispidus* (Castroviejo, 1986–2019; Euro+Med,

2006–). Rivas-Martínez *et al.* (2002: 268) had proposed this correction as *nom. mut. propos.*

Lythro borysthenici-Agrostietum pourretii Rivas Goday in Rivas Goday *et al.* 1956 *nom. corr. et mut.* V. Silva *et al. nom. mut. nov.*

Original name: *Peplido-Agrostietum salmanticae* Rivas Goday (Rivas Goday *et al.*, 1956: 388).

Lectotypus hoc loco: Rivas Goday *et al.*, 1956: 388–389, Table 21, rel. 2: La Serena, Castuera, Badajoz, 29STH89, Spain.

Syn.: *Peplido-Agrostietum salmanticae* Rivas Goday in Rivas Goday *et al.* 1956 *nom. inept.* (Art. 44).

Agrostis pourretii Willd. is the correct name in the genus *Agrostis* for *Agrostis salmantica* (Lag.) Kunth, and the association name must be corrected according to Art. 44. The other name-giving taxon is *Peplis erecta*, a later synonym of *Peplis borysthenica* Schrank which is modernly included in the genus *Lythrum*: *Lythrum borysthenicum* (Schrank) Litv. (Castroviejo, 1986–2019; Euro+Med, 2006–). According to Rec. 10C and Arts. 44 and 45, the association name should be completed, corrected and mutated.

Peplido borysthenicae-Agrostietum pourretii is the lectotype of the alliance *Agrostion pourretii* Rivas Goday 1958 *nom. corr.* (Rivas-Martínez & Belmonte, 1986). We consider this association a syntaxonomic synonym of the *Pulicario paludosae-Agrostietum salmanticae* Rivas Goday in Rivas Goday *et al.* 1956 (Molina & Casado, 1997).

Lythro borysthenici-Isoetium delilei Br.-Bl. 1936 *nom. invers. et corr. et mut.* V. Silva *et al. nom. mut. nov.* Original name: ‘Association à *Isoetes setacea* et *Peplis hispidula* (*Isoetium setacei*)’ (Braun-Blanquet, 1936a: 157–159).

Lectotypus: Braun-Blanquet, 1936a: 158–159, rel. 2 [designated by De Foucault, 2013a].

Syn.: *Isoeto setaceae-Peplidetum hispidulae* Br.-Bl. 1936 *nom. inept.* (Art. 44).

This association was published by Braun-Blanquet (1936a) from the ‘mares temporaires de Roque-Haute’ in the Occitanian-Provencal biogeographic sector. However, the name-giving taxon *Isoetes setacea* Bosc ex Delile is a later homonym for which the correct name is *I. delilei* Rothm. (Greuter & Troia, 2015), and Theurillat *et al.* (2020) have corrected the association name (Art. 44). As *Peplis hispidula* is a later synonym of *Lythrum borysthenicum* (Castroviejo, 1986–2019; Euro+Med, 2006–) and according to Art. 45, a mutation is performed here. In addition, as *Isoetes delilei* is clearly more abundant than *Lythrum borysthenicum* in the original relevés, the name must be inverted (Art. 10b, 42).

Menthetum cervinae Br.-Bl. ex Moor 1937 *mut.* V. Silva *et al. nom. mut. nov.*

Original name: *Preslietum cervinae* Br.-Bl. ex Moor 1937 (Moor, 1937: 23–24).

Neotypus hoc loco: Molinier & Tallon, 1948: 351, rel. 2: Redessan, Gard, 31TFJ25, France (4 *Preslia cervina*, 2 *Eleocharis palustris*, 2 *Polypogon maritimus*, 1 *Coronopus procumbens*, 1 *Ranunculus sardous*, + *Inula britannica*, + *Alisma ranunculoides*, 2 *Eurynchium circinatum*).

Preslietum cervinae is an invalid name published by Braun-Blanquet (1931, 1936a) as *nomen nudum* (Art. 2b) and finally validated by Moor (1937: 23–24), which provided a sufficient original diagnosis including a synoptic table. For the neotypification of the association (Art. 21) we chose a relevé from the Costières nîmoises (Molinier & Tallon, 1948), an area included in the same biogeographical unit (Occitanian-Provencal) as the relevés in the synoptic table of the original diagnosis from Languedoc (Rec. 21A). The relevé of the *Preslietum cervinae* published by Ocaña García (1959: 37) from Haute Languedoc (La Gardiole) would also serve as the neotype; however, this area belongs biogeographically to the Cevennes-Pyrenean province in the Eurosiberian region.

Menthion cervinae Br.-Bl. ex Moor 1937 *mut.* V. Silva *et al. nom. mut. nov.*

Original name: *Preslion cervinae* Br.-Bl. ex Moor 1937 (Moor, 1937: 22–23).

The mutation of this name according to Art. 45 is appropriate because in most of the recent floras (e.g. Castroviejo, 1986–2019; Euro+Med, 2006–) the genus *Preslia* is included in *Mentha*, and *Preslia cervina* becomes a nomenclatural synonym of *Mentha cervina*. Rivas-Martínez *et al.* (2002: 268) had proposed this name change as *nom. mut. propos.*

Mentho cervinae-Eryngietum corniculati Rivas Goday 1957 *nom. invers. et mut.* V. Silva *et al. nom. mut. nov.*

Original name: ‘As. nova *Eryngium corniculatum* et *Preslia cervina* Rivas Goday (*Eryngieto corniculatate-Preslietum*)’ (Rivas Goday, 1957: 510).

Lectotypus hoc loco: Rivas Goday, 1957: 510, Table 3, rel. 15: Villarín de Campos, Zamora, 30TTM82, Spain.

Since *Mentha cervina* is the accepted name in the recent floras (Castroviejo, 1986–2019; Euro+Med, 2006–), the name of the association is mutated (Art. 45). Likewise, the name must be inverted because *Eryngium corniculatum* is the most abundant of the name-giving taxa in the original relevés (Art. 10b, 42).

Rivas Goday (1970: 249) had already proposed the inversion of the original name.

Molineriello laevis-Illecebreum verticillati Rivas Goday 1954 *mut.* V. Silva *et al. nom. mut. nov.*

Original name: ‘Ass. nova, *Illecebrum verticillatum* L. et *Periballia laevis* (Brot.) Asch. Gr. S. Rivas Goday (= *Periballieto-Illecebreum verticillati* S. Rivas Goday)’ (Rivas Goday, 1954: 460–461).

Lectotypus hoc loco: Rivas Goday, 1954: 460–461, Table 1, rel. 1: Portezuelo, Cáceres, 500 m asl, 29SQE11, Spain.

The name-giving taxon is *Periballia laevis*, which is a homotypic synonym of *Molineriella laevis*, the currently accepted name (Tutin *et al.*, 1980; Euro+Med, 2006–). This mutation was already proposed by Jansen & Sequeira (1999).

Myosuro minimi-Crassuletum vaillantii Br.-Bl. in Br.-Bl., Roussine & Nègre 1952 *corr. et mut.* V. Silva et al. *nom. corr. et mut. nov.*

Original name: ‘*Myosuro-Bulliardetum vaillantii* Br.-Bl.’ (Braun-Blanquet *et al.*, 1952: 85).

Lectotypus hoc loco: Braun-Blanquet, 1936a: 156, rel. 2: Roque-Haute to Agde, Hérault, 31TEH39, France.

Syn.: *Myosuro-Bulliardetum* Braun-Blanquet 1936 *nom. inval.* (Art. 3b); *Myosuro-Bulliardetum vaillantii* Br.-Bl. in Br.-Bl., Roussine & Nègre 1952 *nom. inept.* (Art. 43).

This syntaxon was published as provisional by Braun-Blanquet (1936a: 155) and by Moor (1937: 18). Later on, Braun-Blanquet *et al.* (1952: 85) validly published the association and provided a synoptic table with four relevés that constitutes a sufficient original diagnosis (Art. 21). The name-giving taxon in the valid proposal (Braun-Blanquet *et al.*, 1952) was *Myosurus heldreichii* H. Lév. (= *M. breviscapus* Huth), which is also a synonym of *M. sessilis* S. Watson, according to *Flora iberica* (Castroviejo, 1986–2019) and Euro+Med (2006–). However, the presence of this taxon in France is doubtful (Euro+Med, 2006–), and according to *eFlore* (Tela Botanica, 2020), *Myosurus minimus* L. is the only species that occurs in Hérault, the original locality of the association (Braun-Blanquet, 1936a). Therefore, the name must be corrected (Art. 43). The other name-giving taxon is *Bulliarda vaillantii*, which currently is included in the genus *Crassula* as *Crassula vaillantii* (Castroviejo, 1986–2019; Euro+Med, 2006–). According to Art. 44 and 45, the association name should be corrected and mutated.

De Foucault (2013b: 90) designated a lectotype for the name ‘*Myosuro-Bulliardetum vaillantii* Br.-Bl. 1936’, but this lectotypification is superfluous because the name is invalid (Art. 19c). The original diagnosis (Braun-Blanquet *et al.*, 1952) includes a reference to Braun-Blanquet (1936a) and provides a synoptic table that exactly matches the four relevés published by Braun-Blanquet in 1936. The relevé we selected as type is therefore part of the original diagnosis and must be considered as a lectotype.

Pulicario paludosae-Agrostietum pourretii Rivas Goday in Rivas Goday *et al.* 1956 *nom. corr.*

Lectotypus hoc loco: Rivas Goday *et al.* 1956: 387, Table 20, rel. 1, La Serena, Castuera, Badajoz, 29STH89, Spain.

Syn.: *Pulicario paludosae-Agrostietum salmanticae* Rivas Goday in Rivas Goday *et al.* 1956 *nom. inept.* (Art. 44); *Peplido erectae-Agrostietum pourretii* Rivas Goday in Rivas Goday *et al.* 1956 *nom. corr.* (syntax. syn.).

Agrostis pourretii Willd. is the correct name in the genus *Agrostis* for *Agrostis salmantica* (Lag.) Kunth, hence the

association name must be corrected according to Art. 44 of the ICPN. Rivas-Martínez *et al.* (2002) formerly proposed this correction. The lectotypification proposed by Belmonte (1986: 48) was not effectively published (Art. 1).

Solenopsis laurentiae-Juncetum hybridi Rivas Goday & Borja in Rivas Goday 1968 *corr.* V. Silva & Galán de Mera in V. Silva *et al.* 2008 *mut.* V. Silva *et al. nom. mut. nov.*

Original name: ‘*Laurentio-Juncetum tingitani* Rivas Goday & Borja’ (Rivas-Goday, 1968: 1022).

Neotypus: Pérez Latorre *et al.*, 1999: 158–159, Table 9, rel. 2 [designated by Pérez Latorre *et al.*, l.c.].

Syn.: *Laurentio-Juncetum tingitani* Rivas Goday & Borja in Rivas Goday 1968 *nom. inept.* (Art. 43).

This association was firstly published in Rivas Goday (1968: 1022–1023) with a sufficient original diagnosis including a synoptic table. Thereafter, Pérez Latorre *et al.* (1999) designated the neotype indicating that the taxon present in the association corresponds to *Juncus hybridus* Brot., but do not corrected the association name. Indeed, the name-giving taxon *Juncus tingitanus* Maire & Weiller is absent from the area (Cádiz province) where the association was described (Castroviejo, 1986–2019; Romero Zarco, 2010). Silva *et al.* (2008) formerly proposed the correction of this name to *Laurentio michelii-Juncetum hybridi* (Art. 43).

The other name-giving taxon is *Laurentia michelii* A. DC. that currently is included in the genus *Solenopsis* as *S. laurentia* (L.) C. Presl (Euro+Med, 2006–; Castroviejo, 1986–2019). Hence the association name should be completed (Rec. 10C) and may be also mutated (Art. 45). Silva *et al.* (2008) already proposed the mutation.

Solenopsis laurentiae-Phymatocerotetum bulbiculosi Br.-Bl. 1936 *mut.* V. Silva *et al. nom. mut. nov.*

Original name: ‘*Laurentieto-Anthocerotetum*’ (Braun-Blanquet, 1936a: 149–151).

Lectotypus: Braun-Blanquet, 1936: 150, rel. 1 [designated by Silva *et al.*, 2008].

This association was published from near Tanger (Morocco) by Braun-Blanquet using as name-giving taxa *Laurentia michelii* and *Anthoceros dichotomus* (Braun-Blanquet, 1936a: 149–151). Thereafter, Silva *et al.* (2008) designated the lectotype and formerly proposed the mutation of the association name with a reference to Braun-Blanquet (1936b).

Anthoceros dichotomus Raddi is the entity that occurs in the same geographical area as the relevés (Maire & Werner, 1934: 45), which, in turn, is a synonym of *Anthoceros bulbiculosus* Brot. that has been moved to the genus *Phymatoceros* as *P. bulbiculosus* (Brot.) Stotler, W.T. Doyle & Crand.-Stotl, and this is the accepted name in recent authoritative taxonomic treatments (Ros *et al.*, 2007; Casas *et al.*, 2009; Hodgetts *et al.*, 2020). *Laurentia michelii* is currently included in the genus *Solenopsis* as *S. laurentia* (L.) C. Presl (Castroviejo,

1986–2019; Euro+Med, 2006–). Thus, the name should be completed and doubly mutated according to Rec. 10C and Art. 45.

New typifications and altered names in the order *Nanocyperetalia* Klika 1935

Crypsio schoenoidis-Fimbristyletum bisumbellatae Br.-Bl. & Rivas Goday in Rivas Goday et al. 1956 *nom. corr. et mut.* V. Silva et al. *nom. mut. nov.*

Original name: ‘As. *Heleochloeto-Fimbristyletum* Br. Bl. et Rivas Goday, nova (as. *Heleochloa schoenoides et Fimbristylis dichotoma*)’ (Rivas Goday et al., 1956: 366).

Lectotypus hoc loco: Rivas Goday in Rivas Goday et al. 1956: 367, Table 11, rel. 2, Rivilla river, Badajoz, 29SPD70, Spain.

Syn.: *Heleochlooschoenoidis-Fimbristyletum dichotomae* Br.-Bl. & Rivas Goday in Rivas Goday et al. 1956 *nom. inept.* (Art. 44); *Fimbristylis dichotomae-Heleochloetum alopecuroidis* Br.-Bl. 1967 (syntax. syn.).

The first name-giving taxon of this association is *Heleochloa schoenoides*, currently a synonym of *Crypsis schoenoides* (Tutin et al., 1980; Euro+Med, 2006–), and the name needs to be mutated (Art. 45). Rivas-Martínez et al. (2002: 256) already proposed the mutation. The second name-giving taxon, *Fimbristylis dichotoma* (L.) Vahl, was historically interpreted as present in the southern Iberian Peninsula (e.g. Willkomm & Lange, 1861), but the only species recorded in this area is in fact *F. bisumbellata* (Forssk.) Bubani (Castroviejo, 1986–2019). Brullo & Minissale (1998) formerly proposed the correction of this association name, but under the new edition of the ICPN this is a case of misapplication of a name-giving taxon (Art. 44) rather than a misidentification (Art. 43).

Cypero micheliani-Crypsietum alopecuroidis Rivas Goday & E. Valdés in Rivas Goday 1970 *mut.* V. Silva et al. *nom. mut. nov.*

Original name: ‘*Cypero-Heleochloetum alopecuroidis* Rivas Goday & E. Valdés’ (Rivas Goday, 1970: 267).

Since *Heleochloa alopecuroides* is currently included in the genus *Crypsis* as *Crypsis alopecuroides* (Tutin et al., 1980; Euro+Med, 2006–), the name of the association may be mutated (Art. 45). Rivas-Martínez et al. (2002: 256) already proposed the mutation. Although several *Cyperus* species are indicated in the original diagnosis, only *C. michelianus* (the more frequent and abundant) is considered as character species of the association by the authors.

Digitario debilis-Fimbristyletum bisumbellatae Rivas Goday in Rivas Goday et al. 1956 *nom. corr. et mut.* V. Silva et al. *nom. mut. nov.*

Original name: ‘As. *Panicum debile et Fimbristylis dichotoma* Rivas Goday, nova, (*Paniceto debile-Fimbristyletum dichotomae*)’ (Rivas Goday et al., 1956: 368).

Lectotypus hoc loco: Rivas Goday in Rivas Goday et al., 1956: 369, Table 12, rel. 1, Zújar river, Entrerríos, Villanueva de la Serena, Badajoz, 30STJ61, Spain.

Syn.: *Panicum debilis-Fimbristyletum dichotomae* Rivas Goday in Rivas Goday et al. 1956 *nom. inept.* (Art. 44).

The original name-giving taxon is *Fimbristylis dichotoma*, a misapplied name for *F. bisumbellata* in southern Spain (Castroviejo, 1986–2019). Brullo & Minissale (1998) formerly proposed the correction of this association name, which corresponds to Art. 44.

The first name-giving taxon *Panicum debile* is currently treated as a synonym of *Digitaria debilis* (Tutin et al., 1980; Euro+Med, 2006–), and the name needs to be mutated (Art. 45).

Glinio lotoidis-Verbenetum supinae Rivas Goday 1964 *Lectotypus hoc loco*: Rivas Goday, 1964: 188, rel. 1: Montijo dam, Badajoz, 29SQD11, Spain.

Gnaphalio uliginosi-Isolepidetum pseudosetaceae Rivas Goday 1970

Original name: ‘*Gnaphalio-Isolepidetum pseudosetacei*’ (Rivas Goday, 1970: 242).

Lectotypus hoc loco: Rivas Goday, 1970: 244, Table 2, rel. 6, Guadarrama river, Batres, Madrid, 30TVK15, Spain.

Though Rivas Goday (1970: 242) did not indicate which of the two *Gnaphalium* species (*G. uliginosum* and *G. luteoalbum* [= *Pseudognaphalium luteoalbum*]) present in the original relevés and considered as character species is the name-giving taxon, *G. uliginosum* is clearly the most frequent and abundant in the table. Thereby we propose the completion of the name according to Rec. 10C and Art. 40b.

Gnaphalio uliginosi-Lythretum portulae O. Bolòs 1979 *mut.* V. Silva et al. *nom. mut. nov.*

Original name: ‘*Gnaphalio (uliginosi)-Peplidetum portulae*’ (Bolòs, 1979: 202).

The name-giving taxon *Peplis portula* is a synonym of *Lythrum portula* (Castroviejo, 1986–2019; Euro+Med, 2006–). Therefore, we formulate the mutation of the name (Art. 45).

Gnaphalio uliginosi-Veronicetum peregrinae Molero Brion. & Romo 1988 *mut.* V. Silva et al. *nom. mut. nov.*

Original name: ‘*Filaginello uliginosae-Veronicetum peregrinae*’ (Molero & Romo, 1988: 282).

Gnaphalium uliginosum is the type of the genus *Gnaphalium*, thereby *Filaginella uliginosa* is a later synonym (Euro+Med, 2006–; Castroviejo, 1986–2019). For this reason we propose this mutation (Art. 45).

Heliotropio supini-Crypsietum schoenoidis Rivas Goday in Rivas Goday et al. 1956 *mut.* V. Silva et al. *nom. mut. nov.*

Original name: ‘As. *Heliotropium supinum et Heleochloa schoenoides* nova, Rivas Goday (*Heliotropieto supini-*

Heleochloetum schoenoidis)' (Rivas Goday *et al.*, 1956: 371).

Lectotypus hoc loco: Rivas Goday *et al.*, 1956: 372, Table 14, rel. 6: Laguna de Ontígola, Aranjuez, Madrid, 30TVK43, Spain.

Since the name-giving taxon *Heleochloa schoenoides* is currently considered a synonym of *Crypsis schoenoides* (Tutin *et al.*, 1980; Euro+Med, 2006–), a mutation is performed according to Art. 45. Rivas-Martínez *et al.* (2002: 262) already proposed this mutation.

Isolepido cernuae-Cyperetum flavescens Roselló 1994 *mut.* V. Silva *et al. nom. mut. nov.*

Original name: '*Scirpo cernui-Cyperetum flavescens*' (Roselló, 1994: 378, 459).

The name-giving taxon *Scirpus cernuus* is a synonym of *Isolepis cernua* (Castroviejo, 1986–2019; Euro+Med, 2006–). Therefore, a mutation is performed (Art. 45).

This association belonging to the alliance *Nanocyperion* was originally described for the Valencian-Provencal and Balearic province (Rivas-Martínez *et al.*, 2001). It is a vicariant of the *Junco compressi-Parvocyperetum* Br.-Bl. 1922 (= *Cyperetum flavescens* Koch 1926) from the Swiss Alps, Central European Province (Braun-Blanquet, 1922; Mucina *et al.*, 2016).

Lythro flexuosi-Crypsietum schoenoidis Rivas-Martínez 1966 *mut.* V. Silva *et al. nom. mut. nov.*

Original name: '*Lythro-Heleochloetum*' (Rivas-Martínez, 1966: 363).

Lectotypus hoc loco: Rivas-Martínez, 1966: 364, Table 1, rel. 2: Portazgo de Albacete, 30SWJ91, Spain.

The name-giving taxa are *Lythrum flexuosum* and *Heleochloa schoenoides*, thereby the name is completed according to Rec. 10C. As the name currently accepted for *H. schoenoides* is *Crypsis schoenoides* (Tutin *et al.*, 1980; Euro+Med, 2006–), a mutation is also performed (Art. 45). Rivas-Martínez *et al.* (2002: 268) already proposed this mutation.

Verbeno supinae-Gnaphalietum Rivas Goday 1970

Lectotypus hoc loco: Rivas Goday, 1970: 270–271, Table 8, rel. 1: Burguillos dam, El Tiemblo, Ávila, 30TUK77, Spain.

Acknowledgements

We greatly appreciate Prof. Federico Fernández-González (University of Castilla-La Mancha, Spain) for their valuable comments and help on the application of the ICPN, which significantly improved the manuscript. We thank Daniel Kania, President of the Société d'Étude des Sciences Naturelles de Nîmes et du Gard (France), and Jean-Paul Theurillat (University of Geneva, Switzerland) for information on the publication

date of the *Bulletin de la Société d'Étude des Sciences Naturelles de Nîmes*. Cecília Sérgio (University of Lisbon, Portugal) is thanked for information on the bryophyte floras.

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