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Sagino procumbentis-Sibthorpietum europaeae, a new association within *Montio fontanae-Cardaminetea amarae* from Northwestern Portugal

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Abstract: Honrado, J., Alves, P. & Barreto Caldas, F. *Sagino procumbentis-Sibthorpietum europaeae, a new association within Montio fontanae-Cardaminetea amarae from Northwestern Portugal. Lazaroa 24: 33-36 (2003).*

A new association *(Sagino procumbentis-Sibthorpietum europaeae)* of spring vegetation (class *Montio fontanae-Cardaminetea amarae*) is described from temperate submediterranean areas of Northwestern Portugal in order to include perennial herbaceous formations predominated by *Sagina procumbens* and *Sibthorpia europaea.*

In this paper, we present floristic, synecological and biogeographical evidence to support our proposal of this new syntaxon.

Resumen: Honrado, J., Alves, P. & Barreto Caldas, F. *Sagino procumbentis-Sibthorpietum europaeae, una nueva asociación de la clase Montio fontanae-Cardaminetea amarae del noroeste de Portugal. Lazaroa 24: 33-36 (2003).*

Se describe una nueva asociación *(Sagino procumbentis-Sibthorpietum europaeae)* de vegetación fontinal (clase *Montio fontanae-Cardaminetea amarae*) de los territorios templados submediterráneos del noroeste de Portugal, para incluir a las comunidades herbáceas perennes dominadas por *Sagina procumbens* y *Sibthorpia europaea.*

En este trabajo, se presentan los datos florísticos, sinecológicos y biogeográficos que apoyan a la propuesta de este nuevo sintaxon.

INTRODUCTIÓN

Hygrophilic communities of class *Montio fontanae-Cardaminetea amarae* are remarkably developed in Northwestern Portugal, as high annual rainfall (generally over 2000 mm and sometimes over 3000 mm) provides water for the occurrence of numerous springs, rivulets and humid walls with oligotrophic waters. Very frequent in mountain areas, these formations tend to become rarer in lower territories, as oligotrophic running waters and climactic vegetation become scarce due to human activities.

In Northwestern Portugal, at least three *Montio-Cardaminetea* associations occur (VIEIRA *& al.*, 2001): *Saxifragetum lepismigenae* (*Saxifraga lepismigena*-dominated formations on vertical humid walls), *Cardamino flexuosae-Chrysosplenietum oppositifolii* (*Chrysosplenium oppositifolium* vegetation of oligotrophic springs) and *Ranunculetum omiophylli* (vegetation of small ponds with *Ranunculus omiophyllus* and *Montia fontana* subsp. *amporitana*).

In this paper, we describe a new association within the class in order to include semi-nitrophilic formations predominated by *Sagina procumbens* and *Sibthorpia europaea.* We believe that this new syntaxon is both ecologically and floristically distinct from all other *Montio-Cardaminetea* associations.

MATERIAL AND METHODS

The study of hygrophilic vegetation was conducted according to the concepts and methods of Integrated Phytosociology, abundantly described in literature (BRAUN-BLANQUET, 1932; RIVAS-MARTÍNEZ, 1976; GÉHU & RIVAS-MARTÍNEZ, 1981; ALCARAZ, 1996) and recently revised by AGUIAR & HONRADO (2001).

Phytosociological classes, orders and alliances are organised according to RIVAS-MARTÍNEZ *& al.* (2001). Nomenclature of vascular plants is according to CASTROVIEJO *& al.* (1986-2001), as far as issued, and TUTIN *& al.* (1968-1980, 1993) for other groups. Designation of bioclimates was done according to

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RIVAS-MARTÍNEZ & LOIDI (1999). Names of biogeographical territories are those of COSTA & *al.* (1998).

RESULTS AND DISCUSSION

In Table 1, we present 10 phytosociological relevés from which we propose a new association —*Sagino procumbentis-Sibthorpietum europaeae*— within the class *Montio-Cardaminetea* (*Holosyntypus hoc loc*: rel. 3, Table 1).

These remarkable formations are predominated by the perennials *Sibthorpia europaea*, *Epilobium obscurum* and *Sagina procumbens*. Other character species of *Montio-Cardaminetea* are *Stellaria alsine*, *Montia fontana* subsp. *amporitana*, *Saxifraga lepismigena* and *Cardamine flexuosa*. The most frequent companion species are *Athyrium filix-femina*, *Wahlenbergia hederacea* and *Galium palustre* subsp. *palustre*. Bryophyte cover and diversity are usually high (unpublished data),

Table 1

Sagino procumbentis-Sibthorpietum europaeae J. Honrado, P. Alves & F.B. Caldas *ass. nova* (*Caricion remotae*, *Montio-Cardaminetalia*, *Montio-Cardaminetea*)

Relevé number	1	2	3	4	5	6	7	8	9	10
Altitude (m)	500	360	580	980	810	110	550	800	270	250
Number of species / relevé	4	8	8	8	8	9	9	9	10	12
Characteristic species:										
Sagina procumbens	3	2	4	1	4	1	2	4	2	1
Epilobium obscurum	2	+	1	1	1	.	.	2	1	1
Sibthorpia europaea	.	.	2	2	2	2	4	1	4	3
Stellaria alsine	.	1	+	.	1	.	.	.	+	.
Montia fontana subsp. *amporitana*	.	2	.	.	1	.	.	.	+	.
Saxifraga lepismigena	.	+	+	.	.	.	1	.	.	.
Cardamine flexuosa	.	.	.	+	.	2	.	.	.	.
Blechnum spicant subsp. *spicant* var. *homophyllum*	.	.	.	.	.	.	.	.	.	1
Cystopteris viridula	.	.	.	.	.	.	.	.	.	1
Companion species:										
Athyrium filix-femina	.	.	+	.	.	+	+	.	+	.
Galium palustre subsp. *palustre*	.	+	.	.	.	.	+	.	1	1
Wahlenbergia hederacea	.	+	.	.	1	.	.	.	1	1
Hypericum humifusum	+	.	+	.	.	.	.	1	.	.
Lotus pedunculatus	.	.	1	.	1	.	+	.	.	.
Digitalis purpurea subsp. *purpurea*	.	.	.	.	.	.	.	1	.	+
Oxalis corniculata	.	.	.	.	.	+	.	.	.	+
Agrostis x *fouilladei*	.	.	.	.	.	.	.	.	.	+
Asplenium billotii	.	.	.	1	.	.	.	.	.	.
Blechnum spicant subsp. *spicant* var. *spicant*	.	.	.	.	.	.	.	+	.	.
Cardamine hirsuta	.	.	.	+	.	.	.	.	.	.
Cirsium palustre	.	.	.	.	+	.	.	.	.	.
Dactylis glomerata s.l.	.	.	.	.	.	.	+	.	.	.
Gamochaeta spicata	.	.	.	.	.	1	.	.	.	.
Geranium lucidum	.	.	.	.	.	+	.	.	.	.
Geranium purpureum	+	.	.	.	.	.	.	.	.	.
Lamium maculatum	.	.	.	+	.	.	.	.	.	.
Mentha aquatica	.	.	.	.	.	1	.	.	.	.
Molineriella laevis	.	.	.	.	.	.	1	.	.	.
Myosotis laxa subsp. *caespitosa*	.	.	.	.	.	.	.	+	.	.
Poa annua	.	.	.	.	.	.	1	.	.	.
Poa supina	.	.	.	2	.	.	.	.	.	.
Poa trivialis s.l.	.	+	.	.	.	.	.	.	.	.
Potentilla erecta	.	.	.	.	.	.	.	.	.	1
Prunella vulgaris	.	.	.	.	.	.	.	+	.	.
Rumex acetosa subsp. *acetosa*	.	.	.	.	.	.	.	.	.	+
Saxifraga spathularis	.	.	.	.	.	.	.	.	+	.
Sedum anglicum	.	.	.	.	.	.	.	1	.	.
Stellaria media	.	.	.	.	.	+	.	.	.	.
Viola riviniana	.	.	.	.	.	.	.	.	+	.

Localities: 1: Montalegre: Fafião, 29TNG7517; 2: Ponte da Barca: Parada, 29TNG6535; 3: Arcos de Valdevez: Avelar, 29TNG5142; 4: Montalegre: Sezelhe, 29TNG9329; 5: Arcos de Valdevez: between Adrão and Tibo, 29TNG6242; 6: Ponte da Barca: Britelo, 29TNG5831; 7: Arcos de Valdevez: Avelar, 29TNG5142; 8: Arcos de Valdevez: between Tibo and Adrão, 29TNG6242; 9: Ponte da Barca: Paradamonte, 29TNG6133; 10: Arcos de Valdevez: Soajo, 29TNG6136.

although lower than in other associations of the class.

The most typical biotope of *Sagino procumbentis-Sibthorpietum europaeae* is the lowest part of natural or artificial granite walls with slow percolation or splashed by nearby running and moderately nitrified water in urban or rural environments. Contacts with other *Montio-Cardaminetea* associations (mostly *Cardamino flexuosae-Chrysosplenietum oppositifolii*) are not uncommon in poorly nitrified sites. Compared with *Cardamino-Chrysosplenietum*, *Sagino-Sibthorpietum* is less hygrophilic and shows a higher tolerance for human disturbance. These synecological characteristics are reflected on the absence of *Chrysosplenium oppositifolium* and on the occurrence of *Sagina procumbens* in *Sagino-Sibthorpietum*, as well as on bryophyte abundance and diversity, which are significantly larger in *Cardamino-Chrysosplenietum* formations. The absence of *Chrysosplenium oppositifolium* and the presence of *Sagina procumbens* (co-dominant) and *Epilobium obscurum* differentiate *Sagino-Sibthorpietum* from the French association *Chrysosplenio oppositifolii-Sibthorpietum europaeae* (De Foucault, 1981).

From a syntaxonomic point of view, both bioclimatic (thermo - lower supratemperate) and floristic (presence of *Cardamine flexuosa* and *Saxifraga lepismigena*) reasons seem to justify the inclusion of *Sagino-Sibthorpietum* in the alliance *Caricion remotae* (cf. Loidi & al., 1997). In agreement with Aguiar (2001), we consider *Sagina procumbens* a territorial character species of *Montio-Cardaminetea* in Northern Portugal, as it clearly prefers wet vertical positions rather than horizontal trampled environments (class *Polygono-Poetea annuae*) in the territory. We also believe that *Blechnum spicant* subsp. *spicant* var. *homophyllum*, a rather uncommon fern, should be considered a character species of *Caricion remotae*.

Until now, *Sagino-Sibthorpietum europaeae* has only been detected in thermo - lower supratemperate (submediterranean) Portuguese areas of the Miniense and Geresiano-Queixense subsectors (Galaico-Português sector, Eurosiberian region), but it likely occurs in Spanish territories (Galicia) of the same biogeographic sector and in neighbouring Mediterranean areas of both countries.

SYNTAXONOMIC SCHEME

MONTIO-CARDAMINETEA Br.-Bl. & Tüxen ex Br.-Bl. 1948
- *Montio-Cardaminetalia* Pawlowski in Pawlowski, Sokolowski & Wallisch 1928
  - *Caricion remotae* Kästner 1941
    - *Cardamino flexuosae-Chrysosplenietum oppositifolii* O. Bolòs 1979
      - *Chrysosplenio oppositifolii-Sibthorpietum europaeae* De Foucault 1981
        - *Ranunculetum omiophylli* Br.-Bl. & Tüxen ex Pizarro 1995
          - *Sagino procumbentis-Sibthorpietum europaeae* J. Honrado, P. Alves & F.B. Caldas *ass. nova*
            - *Saxifragetum lepismigenae* Rivas-Martínez, T.E. Díaz, F. Prieto, Loidi & Penas 1984

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