

Syntaxonomical checklist and vegetation series of Sierra de Guadarrama National Park (Spain)

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Abstract. The review and updating of plant communities and vegetation series of the Sierra de Guadarrama National Park and its peripheral protection area is presented. 132 associations belonging to 40 phytosociological classes, distributed in 9 vegetations groups are recognized: floating or rooted submerged aquatic vegetation; amphibious vegetation of fresh waters, springs and fens; perennial grassy lacustrine vegetation; chasmophytic, epiphytic and scree vegetation; anthropogenic, fringe and megaphorbic vegetation; supratimberline climatical zonal vegetation on cryophilous geliturbated soils; grassland and meadow vegetation; heathland, dwarf scrub and scrub vegetation; forest and woodland potential natural vegetation. 6 new associations are described, three of them in the Orotemperate High Guadarrama Country, corresponding to mire, fen and bog communities of small sedges and bryophytes and to a floating *Utricularia* community on small boggy pools; and the others with wider distribution in the Guadarrama Sierran District. The recognition of plant communities and their taxonomy is an essential tool for the management of this national Park.

Keywords: Syntaxonomy, Phytosociology, Vegetation Series, Permaseries, Sierra de Guadarrama, Madrid, Segovia.

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Introduction

Sierra de Guadarrama was declared National Park on June 25th 7/2013 law (BOE-A-2013-6900). Then, a team of geobotanists led by Professor Rivas-Martínez started to improve the research on the dynamic of vegetation in Sierra de Guadarrama National Park, updating the bioclimatology, biogeography and syntaxonomy of the area. The first results of these works were presented at IAVS 2018 in Bozeman, Montana: Indicators in the Orotemperate High Guadarrama Country. More recently, in 2021, at the Symposium ad Honorem Professor Rivas-Martínez, we presented the biogeography of this National Park and the bioindicators of each biogeographic country, as well as some new concepts in geobotany. These advances have already been published (Rivas-Martínez *et al.*, 2021).

The Sierra de Guadarrama (in Central System) is a mountain range in the center of the Iberian Peninsula. The total extent of the National Park is 96,847 ha, divided into the Strict Protection Area, 33,960 ha, and the Peripheral Area, 62,887 ha. The difference in altitude in the Park ranges from 950 m (La Pedriza) to 2428 m asl (Peñalara summit).

The most important bibliographical sources are Rivas-Martínez, 1964 and Fernández González, 1991. Other previous related studies are Rivas-Martínez & Costa, 1973; Rivas-Martínez 1975, 1982; Rivas-

Martínez & Cantó, 1987; Fernández González, 1988; Rivas-Martínez *et al.*, 1990, 1999; Cantó, 2007; Izco & Pulgar, 2009; Gavilán *et al.*, 2011, 2012; Fuente & Sánchez-Mata, 2014; Sánchez-Mata *et al.*, 2017; Rivas-Martínez *et al.*, 2021.

Our main goal was to review and update plant communities, syntaxonomical checklist and vegetation series of Sierra de Guadarrama National Park and the Peripheral Area of Protection. Recognizing plant communities and their taxonomy is an essential tool for managing this national Park.

Material and Methods

The vegetation was studied following phytosociological and synphytosociological methods (Braun-Blanquet & Pavillard, 1928; Westhoff & van der Maarel, 1978; Braun-Blanquet, 1979; Géhu & Rivas-Martínez, 1981; Rivas-Martínez, 2005a, b).

The list of syntaxa accepted here has been made through numerous field studies in the last 10 years, in which all the plant communities cited in the most important bibliographical sources mentioned above were checked. Most of these syntaxa have already been cited as bioindicators of the biogeographic units of the recently published maps (Rivas-Martínez *et al.*, 2021). The collected specimens in these field works have been

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registered in the Herbarium of the Faculty of Pharmacy of the Complutense University (MAF).

To confirm the consistency of the new associations, some phytosociological relevés have been recorded outside the Park boundaries. For the description of the new associations and the corrected names we have followed the rules of the current international code of phytosociological nomenclature (Theurillat *et al.*, 2021). Basic phytosociological, taxonomic nomenclature and syntaxonomic numerical references for this contribution are Rivas-Martínez *et al.*, 2001, 2002 and 2011. For the nomenclatural citation of some syntaxa, remarks by FloraVeg.EU portal, based on EuroVegchecklist (Mucina *et al.*, 2016), have also been considered. (Mucina *et al.*, 2016), have also been considered. (Mucina *et al.*, 2016), the EU portal has also been considered. We have followed Flora iberica (Castroviejo *et al.*, 1986–2021) for plant nomenclature, except for those not referenced as characteristic species in Rivas-Martínez *et al.* (2002: 560–696). For the nomenclature of bryophytes we have followed Flora briofítica iberica (Guerra *et al.*, 2006–2014), and Rivas-Martínez *et al.* (2017, 2021) for biogeographical typology.

Results

We recognize 132 associations, six of them described as new, belonging to 40 phytosociological classes, distributed in the following groups:

1. Floating or rooted submerged aquatic vegetation, 4 associations;
2. Amphibious vegetation of fresh waters, springs and fens (pioneer ephemeral vegetation), 5 associations;
3. Perennial grassy lacustrine vegetation, 17 associations;
4. Chasmophytic, epiphytic and scree vegetation, 9 associations;
5. Anthropogenic, fringe and megaphorbic vegetation, 30 associations;
6. Supratimberline climatical zonal vegetation on cryophilous geliturbated soils, 4 associations;
7. Grassland and meadow vegetation, 32 associations;
8. Heathland, dwarf scrub and scrub vegetation, 13 associations;
9. Forest and woodland potential natural vegetation, 18 associations.



Figure 1. Groups of vegetation in Sierra de Guadarrama National Park. 1, floating or rooted submerged aquatic; 2, amphibious vegetation of fresh waters, springs and fens; 3, perennial grassy lacustrine; 4, chasmophytic, epiphytic and scree; 5, Anthropogenic, fringe and megaphorbic; 6, supratimberline climatical zonal on cryophilous geliturbated soils; 7, grassland and meadow; 8, heathland, dwarf scrub and scrub; 9, forest and woodlands.

We also present the list of the National Park vegetation series. The results have been organized into three parts. In the first part, the syntaxonomic checklist of all plant communities is presented, from the class rank to that of association. Secondly, the new associations are described

following Rivas-Martínez *et al.*, 2002. Finally, the third part includes the list of recognized vegetation series (Rivas-Martínez & *al.*, 2011), the new series *Salici salvifolio-fragilis* geosigmetum, the permaseries and special habitats present in the Park. By bordering territories (*), we refer to

certain areas that have been excluded from the peripheral protection area, but due to their proximity to the Park and to the special interest of its vegetation, they have been taken into account in this study.

1. Syntaxonomical checklist to association level

The syntaxa listed below is updated from the original syntaxonomic system of Spain and Portugal plant communities by Rivas-Martínez & al., 2011.

1. Floating or rooted submerged aquatic vegetation. Fresh-water vegetation

LEMNETEA Tüxen ex O. Bolòs & Masclans 1955

Lemnetalia minoris Tüxen ex O. Bolòs & Masclans 1955

Lemnion minoris Tüxen ex O. Bolòs & Masclans 1955

Lemnetum gibbae Miyawaki & J. Tüxen 1960

Lemnetum minoris Oberdorfer ex Müller & Görs 1960

POTAMOGETONETEA Klika in Klika & V. Novák 1941

Potamogetonetalia Koch 1926 ex Theurillat in Theurillat & al. 2015

Ranunculion aquatilis Passarge 1964

Callitricho brutiae-Ranunculetum peltati Pizarro & Rivas-Martínez 2002

Batrachion fluitantis Neuhäusl 1959

Callitricho brutiae-Ranunculetum pseudofluitantis Pizarro & Rivas-Martínez 2002

2. Amphibious vegetation of fresh waters, springs and fens. Pioneer ephemeral vegetation

BIDENTETEA Tüxen, Lohmeyer & Preising ex von Rochow 1951

Bidentetalia Br.-Bl. & Tüxen ex Klika & Hadac 1944

Bidention tripartitae Nordhagen 1940 ex Klika & Hadac 1944

Bidenti tripartitae-Polygonetum lapathifolii Rivas-Martínez, Belmonte, Fernández-González & Sánchez-Mata in Sánchez-Mata 1989

ISOËTO-NANOJUNCETEA Br.-Bl. & Tüxen in Br.-Bl. & al. 1952

Isoëtetalia Br.-Bl. 1936

Preslion cervinae Br.-Bl. ex Moor 1937

Juncetum perpusilli Rivas-Martínez nom. mut. propos. Rivas-Martínez & al. 2002

Junco pygmaei-Isoetetum velati Rivas Goday 1956

Cicendion (Rivas Goday in Rivas Goday & Borja 1961) Br.-Bl. 1967

Sedetum lagascae Rivas-Martínez, Fernández-González, Sánchez-Mata & Sardinero 2002

Nanocyperetalia Klika 1935

Verbenion supinae Slavnic 1951

Verbeno supinae-Gnaphalietum uliginosi Rivas Goday 1970

3. Perennial grassy lacustrine vegetation of fresh water springs, fens and bogs

MONTIO-CARDAMINETEA Br.-Bl. & Tüxen ex Klika & Hadac 1944

Montio-Cardaminetalia Pawlowski in Pawlowski, Sokolowski & Wallisch 1928

Myosotidion stoloniferae Rivas-Martínez, T.E. Díaz, F. Prieto, Loidi & Penas 1984

Myosotidetum stoloniferae Br.-Bl., P. Silva, Rozeira & Fontes 1952

Ranunculion omiophyllo-hederacei Rivas-Martínez, Fernández-González, Pizarro, Sánchez-Mata & Sardinero 2002

Montio amporitanae-Ranunculetum hederacei

Rivas-Martínez, Fernández-González, Pizarro, Sánchez-Mata & Sardinero 2002

MAGNOCARICI ELATAE-PHRAGMITETEA AUSTRALIS Klika in Klika & Novák 1941 nom. inv. Rivas-Martínez & al. 2011

Phragmitetalia Koch 1926

Phragmition australis Koch 1926 nom. corr.

Typho angustifoliae-Phragmitetum australis (Tüxen & Preising 1942) Rivas-Martínez, Báscones, T.E. Díaz, Fernández-González & Loidi 1991

Nasturtio-Glycerietalia Pignatti 1953

Glycerio-Sparganion Br.-Bl. & Sissingh in Boer 1942

Glycerienion fluitantis (Géhu & Géhu-Franck 1987)

J.A. Molina 1996

Glycerio declinatae-Alopecuretum aequalis Rivas-Martínez, Fernández-González, Sánchez-Mata & Sardinero 2002

Glycerio declinatae-Eleocharitetum palustris Rivas-Martínez & Costa in Rivas-Martínez, Costa, Castroviejo & E. Valdés 1980

Phalaridenion arundinaceae (Kopecký 1961) J.A. Molina 1996

Glycerio declinatae-Oenanthetum crocatae Rivas-Martínez, Belmonte, Fernández-González & Sánchez-Mata in Sánchez-Mata 1989

Oenantho crocatae-Phalaridetum arundinaceae J.A. Molina 1996

Rorippion nasturtii-aquatici Géhu & Géhu-Franck 1987 nom. mut. propos. Rivas-Martínez & al.

Glycerio declinatae-Apietum nodiflori J.A. Molina 1996

Glycerio declinatae-Catabrosetum aquaticae Loidi 1983 corr. Loidi, Biurrún & Herrera 1997

Magnocaricetalia Pignatti 1954

Caricion reuterianae (Rivas-Martínez, Fernández-González & Sánchez-Mata 1986) J.A. Molina 1996 nom. corr.

Galio broteriani-Caricetum reuterianae Rivas-Martínez ex Fuente 1986 corr.

Galio palustris-Caricetum lusitanicae Rivas-Martínez, Belmonte & Sánchez-Mata in Sánchez-Mata 1989

Holco reuteri-Caricetum acutiformis Rivas-Martínez, Fernández-González, Sánchez-Mata & Pizarro 1990

SCHEUCHZERIO PALUSTRIS-CARICETEA NIGRAE Tüxen 1937 nom. corr.

Scheuchzerietalia palustris Nordhagen ex Tüxen 1937

Rhynchosporion albae Koch 1926

Drosero rotundifoliae-Lycopodiellatum inundatae Rivas-Martínez, Izquierdo & Cantó ass. nova

Caricetalia nigrae Koch 1926 em. Br.-Bl. 1948 nom. corr.

Caricion nigrae Koch 1926 em. Klika 1934 nom. corr.

Caricetum echinato-nigrae Rivas-Martínez (1964) 2002

Sedo lagascae-Eriophoretum latifolii Rivas-Martínez in Rivas-Martínez, Fernández-González & Sánchez-Mata 1986

Violo juresii-Eleocharitetum quinqueflorae Rivas-Martínez, Izquierdo & Cantó ass. nova

UTRICULARIETEA INTERMEDIO-MINORIS Pietsch 1965

Utricularietalia intermedio-minoris Pietsch 1965

Sphagno-Utricularion Müller & Görs 1960

Sphagno denticulati-Utricularietum minoris Rivas-Martínez, Izquierdo & Cantó ass. nova

4. Chasmophytic, epiphytic and scree vegetation

Chasmophytic vegetation

ASPENIETEA TRICHOMANIS (Br.-Bl. in Meier & Br.-Bl. 1934) Oberdorfer 1977

Potentilletalia caulescentis Br.-Bl. in Br.-Bl. & Jenny 1926

Asplenio celtiberici-Saxifragion cuneatae Rivas-Martínez 1986

Erodietum paularense Fernández González & Izco inéd.

Androsacetalia vandellii Br.-Bl. In Maier & Br.-Bl. 1934 nom. corr. Rivas-Martínez & al. 2011

Cheilanthion hispanicae Rivas Goday 1956

Asplenio billotii-Cheilanthes tinaei Rivas-Martínez & Costa 1973 corr. Sáenz & Rivas-Martínez 1979

Saxifragion willkommiana Rivas-Martínez 1964

Saxifragetum willkommiana Rivas-Martínez 1964

PARIETARIETEA JUDAICAE Rivas-Martínez 1964

Parietarietalia judaicae Rivas-Martínez 1960

Parietario judaicae-Centranthion rubri Rivas-Martínez 1960

Oxalido corniculatae-Parietarietum judaicae Br.-Bl. in Br.-Bl., Roussine & Nègre 1952

PETROCOPTIDO PYRENAICAE-SARCOCAPNETEA ENNEAPHYLLAE Rivas-Martínez, Cantó & Izco 2002

Sarcocapnetalia enneaphyllae F. Casas 1972

Sarcocapnion enneaphyllae F. Casas 1972

Chasmocomphytic, epiphytic and scree vegetation

PHAGNALO SAXATILIS-RUMICETEA INDURATI (Rivas Goday & Esteve 1972) Rivas-Martínez, Izco & Costa 1973

Phagnalo saxatilis-Rumicetalia indurati Rivas Goday & Esteve 1972

Rumici indurati-Dianthion lusitani Rivas-Martínez, Izco & Costa ex Rivas-Martínez, Fernández-González & Sánchez-Mata 1986

Digitali thapsi-Dianthetum lusitani Rivas-Martínez ex Fuente 1986

Saxifragion fragosoi Rivas-Martínez in Rivas-Martínez, Fernández-González & Sánchez-Mata 1986 nom. corr.

Sedo hirsuti-Saxifragetum fragosoi Rivas-Martínez 1964 nom. corr.

THLASPIETEA ROTUNDIFOLII Br.-Bl. 1948

Androsacetalia alpinae Br.-Bl. in Br.-Bl. & Jenny 1926

Linario saxatilis-Senecionion carpetani Rivas-Martínez 1964

Digitali carpetanae-Senecietum carpetani Rivas-Martínez 1964

Rumicetum suffruticosi Rivas-Martínez 1964

Dryopteridion oreadis Rivas-Martínez 1977 corr. Rivas-Martínez, T.E. Díaz, F. Prieto, Loidi & Penas 1984

Cryptogrammo crispae-Dryopteridetum oreadis Rivas-Martínez in Rivas-Martínez & Costa 1970 corr. Rivas-Martínez, Bascónes, T.E. Díaz, F. Prieto, Loidi & Penas 1984

5. Anthropogenic, fringe and megaphorbic vegetation

Anthropogenic vegetation

ARTEMISIETEA VULGARIS Lohmeyer, Preising & Tüxen ex von Rochow 1951

Artemisienea vulgaris Rivas-Martínez, T.E. Díaz, Fernández González, Izco, Loidi, Lousa & Penas 2002

Artemisietalia vulgaris Lohmeyer in Tüxen 1947

Arction lappae Tüxen 1937

Chenopodio boni-henrici-Senecionetum duriae Rivas-Martínez 1964

Onopordenea acanthii Rivas-Martínez, Bascónes, T.E. Díaz, Fernández-González & Loidi 2002

Onopordetalia acanthii Br.-Bl. & Tüxen ex Klika & Hadač 1944

Carduo carpetani-Cirsion odontolepidis Rivas-Martínez, Penas & T.E. Díaz 1986

Carduo carpetani-Onopordetum acanthii Rivas-Martínez, Penas & T.E. Díaz 1986

Urtico piluliferae-Silybion mariani Sissingh ex Br.-Bl. & O. Bolòs 1958 nom. inv. Rivas-Martínez & al. 2011

Carduo bourgeani-Silybetum mariani Rivas-Martínez ex Rivas-Martínez, Costa & Loidi 1992

EPILOBIETEA ANGUSTIFOLII Tüxen & Preising ex von Rochow 1951

Atropetalia belladonae Vlieger 1937

Linarion niveae Rivas-Martínez 1964

Linarietum niveae Rivas-Martínez 1964

PEGANO HARMALAE-SALSOLETEA VERMICULATAE Br.-Bl. & O. Bolòs 1958

Helichryso stoechadis-Santolinetalia squarrosae Peinado & Martínez-Parras 4

Artemisio glutinosae-Santolinion rosmarinifoliae Costa 1975

Artemisio glutinosae-Santolinetum rosmarinifoliae
Costa 1975

POLYGONO-POETEA ANNUAE Rivas-Martínez 1975

Polygono arenastri-Poetalia annuae Tüxen in Géhu,
Richard & Tüxen 1972 corr. Rivas-Martínez, Bascónes,
T.E. Díaz, Fernández-González & Loidi 1991

Saginion procumbentis Tüxen & Ohba in Géhu,
Richard & Tüxen 1972

Bryo argentei-Saginetum procumbentis Diemont,
Sissingh & Westhoff 1940 nom. inv.

Matricario-Polygonion arenastri Rivas-Martínez
1975 corr. Rivas-Martínez, Bascónes, T.E. Díaz,
Fernández-González & Loidi 1991

Matricario-Polygonetum arenastri Müller ex
Oberdorfer 1971 corr. Passarge 1996

Sclerochloa durae-Coronopodium squamati Rivas-
Martínez 1975

Coronopodo procumbentis-Sclerochloetum durae
Br.-Bl. in Br.-Bl., Gajewski, Wraber & Walas 1936

Polycarpion tetraphylli Rivas-Martínez 1975

Crassulo tillaeae-Saginetum apetalae Rivas-Martínez
1975

STELLARIETEA MEDIAE Tüxen, Lohmeyer & Preising ex
von Rochow 1951

Stellarienea mediae

Aperetalia spicae-venti J. Tüxen & Tüxen in Malato-
Beliz, J. Tüxen & Tüxen 1960

Scleranthion annui (Kruseman & Vlieger 1939)
Sissingh in Westhoff, Dijk & Passchier 1946

Scleranthion annui Kruseman & Vlieger 1939

Miboro minimae-Arabidopsietum thalianae
Rivas-Martínez & C. Rivas-Martínez 1970

Arnoserenion minimae (Malato-Beliz, J. Tüxen
& Tüxen 1960) Oberdorfer 1983

Spergulario purpureae-Arnoseridetum minimae
Rivas-Martínez & C. Rivas-Martínez 1970

Solano nigri-Polygonetalia convolvuli (Sissingh in
Westhoff, Dijk & Passchier 1946) O. Bolòs 1962

Polygono-Chenopodium polyspermi Koch 1926

Setario verticillatae-Echinochloetum cruris-galli
Peinado, Bartolomé & Martínez-Parras 1985

Chenopodio-Stellarienea Rivas Goday 1956

Chenopodietalia muralis Br.-Bl. in Br.-Bl., Gajewski,
Wraber & Walas 1936

Chenopodium muralis Br.-Bl. in Br.-Bl., Gajewski,
Wraber & Walas 1936

Chenopodienion muralis

Chenopodio-Descurainietum densiflorae Rivas-
Martínez 1964

Malvenion neglectae Gutte 1966

Urtico urentis-Malvetum neglectae (Knapp 1945)
Lohmeyer in Tüxen 1950

Thero-Brometalia (Rivas Goday & Rivas-Martínez ex
Esteve 1973) O. Bolòs 1975

Taeniathero-Aegilopion geniculatae Rivas-Martínez
& Izco 1977

Medicagini rigidulae-Aegilopetum geniculatae
Rivas-Martínez & Izco 1977

Trifolio cherleri-Taeniatheretum capitis-medusae
Rivas-Martínez & Izco 1977

Alyso granatensis-Brassicion barrelieri Rivas-
Martínez & Izco 1977

Coincyo setigeriae-Brassicetum barrelieri Rivas-
Martínez, Ladero, Belmonte & Sánchez-Mata
in Sánchez-Mata 1989

Papaveri argemones-Sisymbrietum contorti
Rivas-Martínez & Izco 1977

Sisymbrietalia officinalis J. Tüxen in Lohmeyer &
al. 1962 em. Rivas-Martínez, Bascónes, T.E. Díaz,
Fernández-González & Loidi 1991

Hordeion leporini Br.-Bl. in Br.-Bl., Gajewski,
Wraber & Walas 1936 corr. O. Bolòs 1962

Bromo scoparii-Hordeetum leporini Rivas-
Martínez 1978

Rapistro rugosi-Sisymbrietum crassifolii Rivas-
Martínez 1978

Sisymbriion officinalis Tüxen, Lohmeyer & Preising
in Tüxen 1950

Sisymbrio officinalis-Hordeetum murini Br.-Bl. 1967

Fringe and megaphorbic vegetation

GALIO APARINES-URTICETEA MAIORIS Passarge ex Kopecký
1969

Galio aparines-Alliarietalia petiolatae Görs & Müller 1969

Galio aparines-Alliarion petiolatae Oberdorfer
& Lohmeyer in Oberdorfer, Görs, Korneck,
Lohmeyer, Müller, Philippi & Seibert 1967

Alliarienion petiolatae Rivas Goday ex Rivas-
Martínez, Fernández-González & Loidi 1999

Myrrhoidi nodosae-Alliarietum petiolatae Rivas-
Martínez & Mayor ex Fuente 1986

*Pentaglottido sempervirentis-Scrophularietum
reuteri* Rivas-Martínez 1981 corr. Rivas-
Martínez, Fernández-González & Sánchez-
Mata 1986

Balloto foetidae-Conion maculati Brullo in Brullo &
Marcenó 1985

Galio aparines-Conietum maculati Rivas-Martínez
ex G. López 1978

Urtico dioicae-Sambucetum ebuli (Br.-Bl. in Br.-
Bl., Gajewski, Wraber & Walas 1936) Br.-Bl. in
Br.-Bl., Roussine & Nègre 1952

Calystegietalia sepium Tüxen 1950 nom. mut. propos.
Rivas-Martínez & al. 2002: 252

Filipendulion ulmariae Segal ex Westhoff & Den
Held 1969

Angelico sylvestris-Filipenduletum ulmariae
Sánchez-Mata & Fernández-González in Sánchez-
Mata 1989

CARDAMINO HIRSUTAE- GERANIETEA PURPUREI (Rivas-
Martínez, Fernández-González & Loidi 1999) Rivas-
Martínez, Fernández González & Loidi 2002

Cardamino hirsutae-Geranietalia purpurei Brullo in
Brullo & Marcenò 1985 nom. inv. Rivas-Martínez
& al. 2002

Geranio pusilli-Anthriscion caucalidis Rivas-Martínez
1978

Galio aparinellae-Anthriscetum caucalidis Rivas-
Martínez 1978

Milio montiani-Cynosuretum obliquati Rivas-Martínez & Cantó ass. nova

TRIFOLIO-GERANIETEA SANGUINEI Müller 1962

Origanetalia vulgaris Müller 1962

Linarion triornithophorae Rivas-Martínez, T.E. Díaz, F. Prieto, Loidi & Penas 1984

Trifolio medii-Lathyretum nigri Mayor in Mayor, T.E. Díaz, F. Navarro, G. Martínez & J. Andrés 1975

Vicio sepium-Centaureetum carpetanae Fernández-González & Sánchez-Mata in Sánchez-Mata 1989

6. Supratimberline climatical zonal vegetation on cryophilous geliturbated soils

Circumartic and Eurosiberian vegetation

SALICETEA HERBACEAE Br.-Bl. 1948

Salicetalia herbaceae Br.-Bl. in Br.-Bl. & Jenny 1926

Sedion candollei Rivas-Martínez, Fernández-González & Loidi ex Rivas-Martínez & al. 2011

Sedo candollei-Omalothecetum pusillae Rivas-Martínez ex Rivas-Martínez & al. 2011

West mediterranean high orophilous silicolous vegetation

FESTUCETEA INDIGESTAE Rivas Goday & Rivas-Martínez 1971

Festucetalia carpetanae Rivas Goday & Rivas-Martínez ex Rivas-Martínez 1964 nom. corr.

[*Festucetalia indigestae* Rivas Goday & Rivas-Martínez 1963 (art. 2b), *Arenario-Festucetalia indigestae* Rivas Goday & Rivas-Martínez 1963 (art. 3b), *Festucetalia indigestae* Rivas Goday & Rivas-Martínez 1964 nom. inept. (art. 44), *Festucetalia curvifoliae* Rivas Goday & Rivas-Martínez ex Rivas-Martínez 1964 corr. Izco & Pulgar 2009 nom. inept. (art. 44): *Festuca indigesta* auct. non Boiss. and *F. curvifolia* auct. non Lag. must be *Festuca carpetana* Fuente, Sánchez-Mata & Rivas-Mart.]

Minuartio-Festucion carpetanae Rivas-Martínez 1964 nom. corr.

Hieracio myriadeni-Festucetum carpetanae Rivas-Martínez 1964 nom. corr.

[*Hieracio myriadeni-Festucetum indigestae* Rivas-Martínez 1964 nom. inept. (art. 44), *Hieracio myriadeni-Festucetum curvifoliae* Rivas-Martínez 1964 corr. Rivas-Martínez, Cantó, Fernández González, J.A. Molina, Pizarro & Sánchez-Mata 1999 nom. inept. (art. 44): *Festuca indigesta* auct. non Boiss. and *F. curvifolia* auct. non Lag. must be *Festuca carpetana* Fuente, Sánchez-Mata & Rivas-Mart.]

Jasiono sessiliflorae-Koelerietalia crassipedis Rivas-Martínez & Cantó 1987

Hieracio castellani-Plantaginion radicatae Rivas-Martínez & Cantó 1987

Hieracio castellani-Festucetum carpetanae Rivas-Martínez & Cantó 1987 nom. corr.

[*Hieracio castellani-Festucetum indigestae* Rivas-Martínez & Cantó 1987 nom. inept. (art. 44), *Hieracio castellani-Festucetum curvifoliae* Rivas-Martínez & Cantó 1987 corr. Rivas-Martínez, Cantó, Fernández González, J.A. Molina, Pizarro & Sánchez-Mata 1999 nom. inept.(art. 44): *Festuca indigesta* auct. non Boiss. and *F. curvifolia* auct. non Lag. must be *Festuca carpetana* Fuente, Sánchez-Mata & Rivas-Mart.]

Thymo zygidis-Plantaginietum radicatae Rivas-Martínez & Cantó 1987 corr. Rivas-Martínez, Fernández-González, Sánchez-Mata & Pizarro 1990

7. Grassland and meadow vegetation

Therophytic grasslands

HELIANTHEMETEA GUTTATI Rivas Goday & Rivas-Martínez 1963

Helianthemetalia guttati Br.-Bl. in Br.-Bl., Molinier & Wagner 1940

Helianthemion guttati Br.-Bl., in Br.-Bl., Molinier & Wagner 1940

Sedion caespitosi Rivas-Martínez 1978

Sedo caespitosi-Tillaeetum muscosae Rivas Goday 1958

Molinerion laevis Br.-Bl., P. Silva, Rozeira & Fontes 1952

Hispidello hispanicae-Tuberietum guttatae Rivas-Martínez, Fernández-González, Sánchez-Mata & Pizarro 1990

Trisetum ovati-Agrostietum truncatulae Rivas Goday 1958

Sedion pedicellato-andegavensis Rivas-Martínez, Fernández-González & Sánchez-Mata 1986

Evaco carpetanae-Sedetum andegavensis Rivas-Martínez, Fernández-González & Sánchez-Mata 1986

Polytricho piliferi-Sedetum pedicellati Rivas-Martínez in Rivas-Martínez, Fernández-González & Sánchez-Mata 1986

Brachypodietalia distachyi Rivas-Martínez 1978

Brachynion distachyi Rivas-Martínez 1978 nom. mut. Rivas-Martínez & al. 2002

Bupleuro baldensis-Arenarietum ciliaris Izco, A. Molina & Fernández-González 1986

Perennial xerophytic, mesophytic and mesohigrophytic grasslands

FESTUCO VALESIAEAE-BROMETEA ERECTI Br.-Bl. & Tüxen ex Klika & Hadáč 1944

Brachypodietalia phoenicoidis Br.-Bl. ex Molinier 1934

Brachypodion phoenicoidis Br.-Bl. ex Molinier 1934

Festuco andresmolinae-Brachypodietum phoenicoidis Rivas Goday & Borja 1961 corr. Rivas-Martínez & al. 2002

- FESTUCO HYSTRICIS-ONONIDETEA STRIATAE Rivas-Martínez, T.E. Díaz, F. Prieto, Loidi & Penas 2002
Festuco hystricis-Poetalia ligulatae Rivas Goday & Rivas-Martínez 1963
Sideritido fontquerianae-Arenarion microphyllae Rivas Goday & Borja 1961 nom. corr.
Festuco carpetanae-Astragaletum mutici Gavilán, Díez-Monsalve, Izquierdo, Gutierrez-Girón, Fernández-González & Sánchez-Mata 2012 nom. corr.
 [Festuco curvifoliae-Astragaletum mutici Gavilán & al. 2012 nom. inept. (art. 44): Festuca curvifolia auct. non Lag. must be Festuca carpetana Fuente, Sánchez-Mata & Rivas-Mart.]
- POETEA BULBOSAE Rivas Goday & Rivas-Martínez in Rivas-Martínez 1978
Poetalia bulbosae Rivas Goday & Rivas-Martínez in Rivas Goday & Ladero 1970
Molineriello minutae-Trifolion subterranei Rivas Goday 1964 nom. inv. et nom. mut. Rivas-Martínez & al. 2011
Festuco amplae-Poetum bulbosae Rivas-Martínez & Fernández-González in Rivas-Martínez, Fernández-González & Sánchez-Mata 1986
Ranunculo alpini-Poetum bulbosae Rivas-Martínez in Rivas-Martínez & al. 2011
- SEDO-SCLERANTHETEA Br.-Bl. 1955
Sedo-Scleranthetalia Br.-Bl. 1955
Sedion pyrenaici Tüxen ex Rivas-Martínez & al. 2011
Sedetum brevifolio-pyrenaici Rivas-Martínez & Sánchez-Mata in Sánchez-Mata 1989
- STIPIO GIGANTEAE-AGROSTIETEA CASTELLANAE Rivas-Martínez, Fernández-González & Loidi 1999
Agrostietalia castellanae Rivas Goday in Rivas-Martínez, Costa, Castroviejo & E. Valdés 1980
Agrostion castellanae Rivas Goday ex Rivas-Martínez, Costa, Castroviejo & E. Valdés 1980
Festuco amplae-Agrostietum castellanae Rivas-Martínez & Belmonte 1986
Agrostio castellanae-Stipion giganteae Rivas Goday ex Rivas-Martínez & Fernández-González 1991
Arrhenathero baetici-Stipetum giganteae Rivas-Martínez, Fernández-González & Sánchez-Mata 1986
- MOLINIO CAERULEAE-ARRHENATHERETEA ELATORIS Tüxen 1937
Molinetalia caeruleae Koch 1926
Calthion palustris Tüxen 1937
Bromo commutati-Polygonetum bistortae Rivas-Martínez ex Mayor in Mayor, T.E. Díaz, F. Navarro, Martínez & Andrés 1975
Juncion acutiflori Br.-Bl. in Br.-Bl. & Tüxen 1952
Deschampsio hispanicae-Juncetum effusi Rivas-Martínez ex R. García in Llamas 1984
Hyperico undulati-Juncetum acutiflori Teles 1970
Arrhenatheretalia elatioris Tüxen 1931
- Arrhenatherion elatioris* Koch 1926
Agrostio castellanae-Arrhenatheretum bulbosi Teles 1970
Cynosurion cristati Tüxen 1947
Festuco amplae-Cynosuretum cristati Rivas-Martínez ex Fuente 1986
Holoschoenetalia Br.-Bl. ex Tchou 1948
Molinio-Holoschoenion Br.-Bl. ex Tchou 1948
Brizo minoris-Holoschoenion vulgaris (Rivas Goday 1964) Rivas-Martínez 1975
Trifolio resupinati-Holoschoenetum vulgaris Rivas Goday 1964
Deschampsion mediae Br.-Bl., Roussine & Nègre 1952
Sanguisorbo lateriflorae-Deschampsietum hispanicae Rivas-Martínez & G. López in G. López 1978 corr. Rivas-Martínez, Fernández-González, Sánchez-Mata & Pizarro 1990
Plantaginetalia majoris Tüxen & Preising in Tüxen 1950
Lolio perennis-Plantaginion majoris Sissingh 1969
Lolietum perennis Gams 1927
Trifolio fragiferi-Cynodontion dactyli Br.-Bl. & O. Bolòs 1958
Trifolio fragiferi-Cynodontetum dactyli Br.-Bl. & O. Bolòs 1958
Trifolio resupinati-Caricetum chaetophyllae Rivas-Martínez & Costa in Rivas-Martínez, Costa, Castroviejo & E. Valdés 1980
Potentillion anserinae Tüxen 1947
Mentho suaveolentis-Juncetum inflexi Rivas-Martínez in Sánchez-Mata 1989
Carici hirtae-Juncetum compressi Rivas-Martínez & Cantó ass. nova
- NARDETEA STRICTAE Rivas Goday in Rivas Goday & Rivas-Martínez 1963
Nardetalia strictae Oberdorfer ex Preising 1950
Campanulo herminii-Nardion strictae Rivas-Martínez 1964
Allietum latiorifolii Rivas-Martínez, Fernández-González, Sánchez-Mata & Pizarro 1990
Campanulo herminii-Festucetum ibericae Rivas-Martínez 1964
Campanulo herminii-Festucetum rivularis Rivas-Martínez, Fernández-González, Sánchez-Mata & Sardinero 2002
Carici pallescentis-Luzuletum multiflorae Mayor 1969
Festuco rothmaleri-Juncetum squarrosi Rivas-Martínez, Fernández-González, Sánchez-Mata & Pizarro 1990
Luzulo carpetanae-Pedicularietum sylvaticae Tüxen & Oberdorfer 1958 corr. Izco & Ortiz 1989

8. Heathland, dwarf scrub and scrub vegetation

Heathland and dwarf scrub vegetation

- CALLUNO-ULICETEA Br.-Bl. & Tüxen ex Klika & Hadač 1944

Calluno-Ulicetalia minoris Quantin ex Tüxen 1937
Ericion umbellatae Br.-Bl. in Br.-Bl., P. Silva,
 Rozeira & Fontes 1952

Ericenion aragonensis Rivas-Martínez 1979
Halimio ocymoidis-Ericetum aragonensis Rivas-
 Martínez 1979 (*Somosierra)

CISTO-LAVANDULETEA STOECHADIS Br.-Bl. in Br.-Bl.,
 Molinier & Wagner 1940

Lavanduletalia stoechadis Br.-Bl. in Br.-Bl., Molinier
 & Wagner 1940

Cistion laurifolii Rivas Goday in Rivas Goday, Borja,
 Monasterio, Galiano & Rivas-Martínez 1956

Erico arboreae-Arctostaphyletum crassifoliae
 Rivas-Martínez 1968

Halimio ocymoidis-Cistetum laurifolii Rivas-
 Martínez 1968

Rosmarino-Cistetum ladaniferi Rivas-Martínez
 1968

Santolino rosmarinifoliae-Cistetum laurifolii
 Rivas Goday in Rivas Goday, Borja, Monasterio,
 Galiano & Rivas-Martínez 1956

ROSMARINETEA OFFICINALIS Rivas-Martínez, T.E. Díaz, F.
 Prieto, Loidi & Penas 2002

Rosmarinetalia officinalis Br.-Bl. ex Molinier 1934
Sideritido incanae-Salvion lavandulifoliae (Rivas
 Goday & Rivas-Martínez 1969) Izco & A. Molina
 1989

Xero-Aphyllanthenion monspeliensis Rivas Goday
 & Rivas-Martínez 1969

Lino differentis-Salvietum lavandulifoliae Rivas
 Goday & Rivas-Martínez 1969

Seral and mantle shrublands vegetation

CYTISETEA SCOPARIO-STRIATI Rivas-Martínez 1974

Cytisetalia scopario-striati Rivas-Martínez 1974

Genistion floridae Rivas-Martínez 1974

Cytiso oromediterranei-Genistetum cinerascens
 Rivas-Martínez 1970 corr. Rivas-Martínez &
 Cantó 1987

Genisto floridae-Adenocarpetum hispanici
 Rivas-Martínez 1974

Genisto floridae-Cytisetum scoparii Rivas-
 Martínez & Cantó 1987

Pteridio aquilini-Cytisetum oromediterranei
 Gavilán, Cantó, Fernández-González, Rivas-
 Martínez & Sánchez-Mata 2002

Retamion sphaerocarphae Rivas-Martínez 1981

Cytiso scoparii-Retametum sphaerocarphae Rivas-
 Martínez ex Fuente 1986

RHAMNO CATHARTICII-PRUNETEA SPINOSAE Rivas Goday &
 Borja ex Tüxen 1962

Prunetalia spinosae Tüxen 1952

Pruno spinosae-Rubion ulmifolii O. Bolòs 1954

Rosenion carioti-pouzinii Arnáiz ex Loidi 1989

Rosetum micrantho-agrestis Rivas-Martínez &
 Arnáiz in Arnáiz 1979

Rubo ulmifolii-Rosetum corymbiferae Rivas-
 Martínez & Arnáiz in Arnáiz 1979

9. Forest and woodland potential natural vegetation

Riparian woodland and shrubland vegetation

SALICI PURPUREAE-POPULETEA NIGRAE (Rivas-Martínez &
 Cantó ex Rivas-Martínez, Báscones, T.E. Díaz, Fernández-
 González & Loidi 1991) Rivas-Martínez & Cantó 2002

Populetalia albae Br.-Bl. ex Tchou 1949

Populion albae Br.-Bl. ex Tchou 1949

Fraxino angustifoliae-Ulmenion minoris Rivas-
 Martínez 1975

Aro cylindracei-Ulmetum minoris T.E. Díaz,
 Andrés, Llamas, L. Herrero & D. Fernández
 1987 corr. Rivas-Martínez & al. 2002

Quercu pyrenaicae-Fraxinetum angustifoliae Rivas
 Goday 1964 corr. Rivas-Martínez, Fernández-
 González & A. Molina in Fernández-González & A.
 Molina 1988

Osmundo-Alnion glutinosae (Br.-Bl., P. Silva &
 Rozeira 1956) Dierschke & Rivas-Martínez in
 Rivas-Martínez 1975

Rubo lainzii-Salicetum atrocinereae Rivas-
 Martínez 1965 corr. Rivas-Martínez & al. 2002

Salicetalia purpureae Moor 1958

Salicion salviifoliae Rivas-Martínez & al. 1984

Salicetum lambertiano-salviifoliae Rivas-
 Martínez 1965 corr. Rivas-Martínez, Fernández-
 González & Sánchez-Mata 1986

Salicetum salviifolio-fragilis Rivas-Martínez &
 Cantó ass. nova

Coniferous winter cold forest and scrublands, climatical natural potential vegetation

JUNIPERO SABINAE-PINETEA IBERICAE Rivas-Martínez 1965
 nom. inv.

Junipero sabiniae-Pinetalia ibericae Rivas-Martínez
 1965 nom. inv.

Juniperion thuriferae Rivas-Martínez 1969

Juniperetum hemisphaerico-thuriferae Rivas-
 Martínez 1969

Avenello ibericae-Pinion ibericae Rivas-Martínez &
 J.A. Molina in Rivas-Martínez, Fernández-González
 & Loidi 1999

Avenello ibericae-Pinetum ibericae (Rivas-
 Martínez 1964) Rivas-Martínez & J.A. Molina
 in Rivas-Martínez, Fernández-González &
 Loidi 1999

Pteridio aquilini-Pinetum ibericae Rivas-
 Martínez & J.A. Molina 2002

Juniperetalia hemisphaericae Rivas-Martínez & J.A.
 Molina in Rivas-Martínez, Fernández-González &
 Loidi 1999

Cytision oromediterranei Tüxen in Tüxen & Oberdorfer
 1958 nom. corr.

Avenello ibericae-Juniperetum alpinae Rivas-
 Martínez, Fernández-González, Sánchez-Mata
 & Sardinero 2002 nom. mut. propos. Rivas-
 Martínez & al. 2011

Senecioni carpetani-Cytisetum oromediterranei
Tüxen & Oberdorfer 1958 corr. Rivas-Martínez
1987

QUERCETEA ILCIS Br.-Bl. ex A. Bolós & O. Bolòs 1950

Quercetalia ilicis Br.-Bl. ex Molinier 1934

Quercion ilicis Br.-Bl. ex Molinier 1934

Quercenion rotundifoliae Rivas Goday in Rivas
Goday, Borja, Esteve, Galiano, Rigual & Rivas-
Martínez 1960

Junipero thuriferae-Quercetum rotundifoliae
Rivas-Martínez 1978

Quercion broteroi Br.-Bl., P. Silva & Rozeira 1956
corr. Rivas-Martínez 1972

Paeonio broteri-Quercenion rotundifoliae Rivas-
Martínez 1987

Junipero lagunae-Quercetum rotundifoliae Rivas
Goday ex Rivas-Martínez 1965 corr. Rivas-
Martínez in Rivas-Martínez & al. 2011

QUERCO-FAGETEA SYLVATICAE Br.-Bl. & Vlieger in Vlieger
1937

Quercetalia roboris Tüxen 1931

Quercion pyrenaicae Rivas Goday ex Rivas-
Martínez 1964

Quercenion pyrenaicae (Rivas Goday ex Rivas-
Martínez 1965) Rivas-Martínez 1975

Luzulo forsteri-Quercetum pyrenaicae Rivas-
Martínez 1963

Avenello ibericae-Quercetum pyrenaicae (Fernández-
González 1991) Rivas-Martínez, Cantó, Pizarro,
Izquierdo, Rivas-Sáenz, Molero, Marfil, Penas,
Herrero, T.E. Díaz, Del Río & Álvarez 2021

Ilici-Fagion sylvaticae Br.-Bl. 1967

Ilici aquifolii-Fagenion sylvaticae (Br.-Bl. 1967)
Rivas-Martínez 1973

Galio rotundifolii-Fagetum sylvaticae Rivas-
Martínez 1963 (*)

Luzulo henriquesii-Quercenion petraeae Rivas-
Martínez & Izco 2002

Galio odorati-Quercetum petraeae (Rivas-
Martínez & G. Navarro in G. Navarro 1989)
Rivas-Martínez & Izco 2002 (*Ayllón)

Quercetalia pubescenti-petraeae Klika 1933

Aceri granatensis-Quercion fagineae (Rivas Goday,
Rigual & Rivas-Martínez in Rivas Goday, Borja,
Esteve, Galiano, Rigual & Rivas-Martínez 1960)
Rivas-Martínez 1987

Cephalanthero rubrae-Quercetum fagineae
Rivas-Martínez in Rivas Goday, Borja, Esteve,
Galiano, Rigual & Rivas-Martínez 1960 corr.
Rivas-Martínez 1972

Betulo pendulae-Populetales tremulae Rivas-Martínez
& Costa 2002

Betulion fontqueri-celtibericae Rivas-Martínez &
Costa 2002

Betulenion fontqueri-celtibericae Rivas-Martínez
& Costa in Rivas-Martínez & al. 2011

Melico uniflorae-Betuletum celtibericae Rivas-
Martínez & Mayor ex G. Moreno & G. López
1978

2. New syntaxa

Drosero rotundifoliae-Lycopodiellatum inundatae
Rivas-Martínez, Izquierdo & Cantó *ass. nova* (Table 1)

Typus *ass.*: Table 1, relevé 7. Madrid, Sierra de
Guadarrama, Hoya de Pepe Hernando, fontinal convex
peat bog, 15.09.2014, 40°50'34"N 3°56'39"W.

Characteristic species: *Lycopodiella inundata*, *Drosera
rotundifolia*.

Diagnosis: Pioneer fen and bog communities in oligo-
dystrophic peat moss. These are spring bogs, soaked in
water, frequently bulging, without competition from other
plant communities. Orotemperate submediterranean and
related mountain climates. It is found in the Orotemperate
High Guadarrama Country (Figures 2 and 3).



Figure 2. Professor Rivas-Martínez. Ponds at the bottom of Risco Los Claveles. Peñalara massif. Orotemperate High Guadarrama Country.

Table 1. *Drosera rotundifolia*-*Lycopodiellum inundatae* Rivas-Martínez, Izquierdo & Cantó *ass. nova*
(*Rhynchosporion albae*, *Scheuchzerietalia palustris*, *Scheuchzerio-Caricetea nigrae*)

Altitude (1=10 m asl)	208	208	198	199	195	195	195	187
Exposure	S	S	S	S	S	S	S	SE
Área (m ²)	4	4	0,5	1	0,2	0,2	0,2	1
N. species	12	10	8	9	5	9	10	12
N. relevé	1	2	3	4	5	6	7	8
Characteristics								
<i>Lycopodiella inundata</i>	3	4	4	4	1	2	4	2
<i>Drosera rotundifolia</i>	3	2	1	2	3	3	3	3
<i>Carex demissa</i>	+	1	1	+	3	2	1	+
<i>Juncus alpestris</i>	2	2	.	2	.	1	2	1
<i>Sphagnum denticulatum</i>	3	.	2	3	.	2	1	2
<i>Sphagnum subsecundum</i>	3	2	.	.	.	.	.	.
<i>Carex echinata</i>	1	+	.	2	.	.	1	1
<i>Parnassia palustris</i>	+	.	.	.	.	2	1	1
<i>Eleocharis quinqueflora</i>	+	.	2	1	.	.	.	.
<i>Carex nigra</i>	.	.	.	.	1	+	+	.
<i>Warnstorfia exannulata</i>	3	2	.	.	.	.	.	+
Other species								
<i>Pedicularis sylvatica</i>	2	2	.	.	.	1	1	1
<i>Scapania undulata</i>	3	2	.	.	.	.	.	.
<i>Agrostis stolonifera</i>	.	1	.	.	.	.	.	.
<i>Erica tetralix</i>	.	.	2	.	.	.	.	.
<i>Juncus squarrosus</i>	.	.	1	.	1	.	.	.
<i>Potentilla erecta</i>	.	.	2	1	.	.	.	1
<i>Nardus stricta</i>	.	.	.	+	.	2	2	+

Localities: 1, 2: Charcas de la Pistola, peatlands, 18.10.2014, 40°50'51" N 3°56'55" W; 3, 4: Puerto Reventón, truncated step with peat, 60% degrees of slope, 20.11.2015, 40°53'46" N 3°56'41" W and 40°53'47" N 3°56'40" W ; 5, 6: Zabala, fontinal convex peat bog, 15.09.2014, 40°50'14" N 3°57'22" W and 40°50'14" N 3°57'20" W; 7: Hoya de Pepe Hernando, fontinal convex peat bog, 15.09.2014, 40°50'34" N 3°56'39" W, *holotypus ass.* 8: Puerto Reventón, Arroyo de Santa María, convex peat bog, 25.08.2022, 40°53'49" N 3°56'13" W.



Figure 3. Pioneer communities in oligo-dystrophic peat moss in Charcas de la Rubia and Pistola.
In the background: dwarf juniper shrubland: *Avenello ibericae*-*Junipero alpinae minorisigmetum*.
Orotemperate High Guadarrama Country.

Violo juressi-Eleocharitetum quinqueflorae Rivas-Martínez, Izquierdo & Cantó *ass. nova* (Table 2)

Typus *ass.*: Table 2, relevé 8. Madrid, Sierra de Guadarrama, Charcas de La Rubia, peatlands, 6.10.2014, 40°50'51" N 3°56'55" W.

Characteristic species: *Eleocharis quinqueflora*, *Viola palustris* subsp. *juressi*.

Diagnosis: Mire, fen and bog communities of small sedges and bryophytes in oligotrophic peats and mineral peaty soils. Orotemperate submediterranean and related mountain climates. It is found in the Orotemperate High Guadarrama Country (Figures 2 and 3).

Table 2. *Violo juressi-Eleocharitetum quinqueflorae* Rivas-Martínez, Izquierdo & Cantó *ass. nova* (*Caricion nigrae*, *Caricetalia nigrae*, *Scheuchzerio palustris-Caricetea nigrae*)

Altitude (1=10 m asl)	195	195	195	208	205	205	205	205	205
Exposure	S	S	S	S	S	S	S	S	S
Area (m ²)	1	1	1	2	1	1	1	1	1
N. species	4	4	5	7	7	5	5	5	8
N. relevé	1	2	3	4	5	6	7	8	9
Characteristics									
<i>Eleocharis quinqueflora</i>	5	4	4	4	3	4	3	4	5
<i>Carex nigra</i>	+	+	1	+	1	+	.	2	1
<i>Juncus alpestris</i>	1	1	+	1	.	.	1	1	.
<i>Carex echinata</i>	.	.	.	+	2	2	1	1	.
<i>Sphagnum denticulatum</i>	.	.	.	3	3	3	3	.	1
<i>Sphagnum subsecundum</i>	.	.	.	.	.	.	.	1	.
<i>Viola juressi</i>	.	.	.	2	1	.	.	.	1
<i>Parnassia palustris</i>	.	.	.	1	.	.	.	.	+
<i>Warnstorfia exannulata</i>	.	.	.	.	3	.	.	.	.
Other species									
<i>Drosera rotundifolia</i>	1	1	1	.	1	+	1	.	+
<i>Utricularia minor</i>	.	.	2	.	.	.	.	.	.
<i>Euphrasia willkommii</i>	.	.	.	.	.	.	.	.	+
<i>Sagina nevadensis</i>	.	.	.	.	.	.	.	.	+

Localities: 1–3: Below Refugio Zabala, snow peat under big rocks, 15.09.2014, 40°50'14" N 3°57'22" W; 4: Charcas de La Pistola, peatlands, 18.10.2014, 40°50'51" N 3°56'55" W; 5, 6: Charcas de La Rubia, peatlands, 6-10-2014, 40°50'43" N 3°56'54" W; 7–9: Charcas de La Rubia, peatlands, 6.10.2014, 40°50'44" N 3°56'58" W, *holotypus ass. rel.* 8.

Sphagno denticulati-Utricularietum minoris Rivas-Martínez, Izquierdo & Cantó *ass. nova* (Table 3)

Typus *ass.*: Table 3, relevé 1. Madrid, Sierra de Guadarrama, below Refugio Zabala, 15.09.2014, 40°50'14" N 3°57'20" W.

Characteristic species: *Utricularia minor*, *Sphagnum denticulatum*, *Sphagnum subsecundum*.

Diagnosis: Dystrophic and oligotrophic floating *Utricularia minor* communities growing on small boggy pools in orotemperate oceanic bioclimate. It is found in the Orotemperate High Guadarrama Country (Figures 2 and 3).

Milio montiani-Cynosuretum obliquati Rivas-Martínez & Cantó *ass. nova* (Table 4)

Typus *ass.*: Table 4, rel. 1. Madrid: Alto del León, in the shade of *Pinus sylvestris* var. *iberica* forest (*Pteridio-Pinetum ibericae*), 1.06.2017, 40°42'12" N 4°08'32" W. Characteristics: *Cynosurus effusus* var. *obliquatus*, *Milium vernale* subsp. *montianum*, *Cynosurus echinatus*. Diagnosis: Annual spring and summer ephemeral, slightly nitrified semi-shaded communities, growing on rich organic nutrient soils in supramediterranean and supratemperate submediterranean. Mediterranean mountains. It is found in

the Guadarrama Sierran Sector. It is probably also on the mountains of the Mediterranean Iberian Peninsula.

Carici hirtae-Juncetum compressi Rivas-Martínez & Cantó *ass. nova* (Table 5)

Typus *ass.*: Table 5, rel. 1. Madrid, Pinilla del Valle, Embalse de Pinilla 40°56'10" N 3°48'48" W (18.11.2015) Characteristic species: *Juncus compressus*, *Carex hirta*, *Rorippa sylvestris*.

Diagnosis: pioneer hygrophilous mesotrophic reed meadows in the first swamped band. They suffer a prolonged flooding period. They grow on paraturbose or histic soils with organic and mineral nutrients. The absence of livestock in recent years has favored the development of these plant communities. Towards the water, they come in contact with Isoeto-Nanojuncetea annual communities, and towards the exterior, with *Salix fragilis*, *S. triandra*, *S. atrocinerea* and *S. salviifolia* forests. They can also come in contact with *Juncus effusus* reed meadows (*Deschampsio hispanicae-Juncetum effusi*) in the river mouths of small streams leading to the swamp and with pioneer nitrophilous communities (*Bidenti tripartitae-Polygonetum lapathifolii*). The position of this new association in the *Potentillion*

anserinae alliance (sensu Tüxen 1947 et Rivas-Martínez & al. 2002, non Mucina & al. 2016) is due to the high presence of nitrophilous species; however, the characteristics of the soil and part of the floristic composition also relate it to

Juncion acutiflori. Supramediterranean and supratemperate submediterranean. It is found in the Guadarrama Sierran Sector. It is probably also in the Centre and northern half of the Iberian Peninsula (Figure 4).

Table 3. *Sphagno denticulati-Utricularietum minoris* Rivas-Martínez, Izquierdo & Cantó *ass. nova* (*Sphagno-Utricularion*, *Utricularietalia*, *Utricularietea intermedio-minoris*)

Altitude (1=10 m asl)	195	195	208	208	205	205	195	195
Exposure	S	S	S	S	S	S	S	S
Area (m ²)	1	1	1	1	2	2	1	2
N. species	3	4	4	4	5	4	4	4
Relevé n.	1	2	3	4	5	6	7	8
Characteristics and territorial								
<i>Utricularia minor</i>	4	4	5	4	3	2	3	4
<i>Sphagnum denticulatum</i>	.	3	.	.	2	2	3	2
<i>Sphagnum subsecundum</i>	.	.	2	.	1	.	.	.
Other species								
<i>Warnstorfia exannulata</i>	2	.	.	.	2	2	1	+
<i>Scapania undulata</i>	2	.	.	.	2	2	.	.
<i>Juncus alpestris</i>	1	+	.	.	.	.	1	1
<i>Glyceria declinata</i>	.	+	.	.	.	.	.	.
<i>Juncus heterophyllus</i>	.	.	1	1	.	.	.	.
<i>Carex nigra</i>	.	.	+	1	.	.	.	.
<i>Agrostis stolonifera</i>	.	.	.	+	.	.	.	.
Localities: 1, 2: Below Refugio Zabala, peatlands, 2-4 cm under water, 15.09.2014, 40°50'14" N 3°57'20" W; 3, 4: Charcas de La Pistola, peatlands, 18.10.2014, 40°50'51" N 3°56'55" W; 5, 6: Charcas de La Rubia, peatlands under water, pond with water served by small spring stream, 6.10.2014, 40°50'43" N 3°56'54" W; 7, 8: Below Refugio Zabala walls, 28.06.2015, 15.09.2014, 40°50'14" N 3°57'20" W.								

Table 4. *Milio montiani-Cynosuretum obliquati* Rivas-Martínez & Cantó *ass. nova*

(*Geranio pusilli-Anthriscion caucalidis*, *Cardamino hirsutae-Geranietaalia purpurei*, *Cardamino hirsutae-Geranietaea purpurei*)

Altitude (1=10 m asl)	151	160	146	149	158	159	159
Exposure	SE	W	S	W	W	SE	SE
Área (m ²)	10	10	6	10	10	10	10
N. species	9	10	12	10	8	13	11
N. relevé	1	2	3	4	5	6	7
Characteristics							
<i>Cynosurus obliquatus</i>	4	3	3	3	3	2	3
<i>Milium montianum</i>	1	2	1	1	1	+	+
<i>Cynosurus echinatus</i>	1	1	1	+	1	2	1
<i>Geranium lucidum</i>	2	.	1	+	.	1	1
<i>Cardamine hirsuta</i>	2	1	2	.	.	.	.
<i>Galium aparinella</i>	+	1	1	1	.	+	.
<i>Myosotis ramosissima</i>	.	.	1	1	+	+	1
<i>Geranium pusillum</i>	.	.	.	.	.	+	1
<i>Geranium columbinum</i>	.	.	.	.	.	1	+
Other species							
<i>Arenaria montana</i>	.	1	1	+	1	+	1
<i>Conopodium pyrenaicum</i>	1	.	1	1	.	+	+
<i>Stellaria media</i>	1	1	1	.	.	1	+
<i>Avenella iberica</i>	.	.	.	+	1	1	.
<i>Bromus sterilis</i>	2	.	1	.	.	.	+

Other species: *Scilla verna* 2 in 2 and + in 3; *Veronica hederifolia* + in 2 and 6. *Pentaglotis sempervirens* + in 4; *Viola hirta* and *Linaria elegans* + in 5. Localities: 1: Madrid: Alto del León, shade of *Pinus sylvestris* var. *iberica* forest (*Pteridio-Pinetum ibericae*), 1.06.2017, 40°42'12" N 4°08'32" W, *holotypus* ass.; 2: Ávila: Casa de la Cueva, Pinares Llanos, shade of *Quercus pyrenaica* (*Luzulo forsteri-Quercetum pyrenaicae*), 1.06.2017, 40°37'45" N 4°11'27" W; 3: Ávila: Peguerinos, Camping Valle de En medio, shade of *Pinus sylvestris* var. *iberica*, 1.06.2017, 40°39'22" N 4°12'07" W; 4: Segovia: Estación del Espinar, La Panera, 1.06.2017, 40°44'23" N 4°09'46" W; 5: Madrid: Puerto de Navafria, shade of *Quercus pyrenaica* forest with *Avenella flexuosa* subsp. *iberica* (*Avenello ibericae-Quercetum pyrenaicae*), 7.06.2016, 40°58'31" N 3°48'36" W; 6, 7: Madrid: Between Alto del León and Collado de La Gasca, shade of *Pinus sylvestris* var. *iberica*, 22.06.2022, 40°41'40" N 4°08'58" W.

Tabla 5. *Carici hirtae-Juncetum compressi* Rivas-Martínez & Cantó *ass. nova*
(*Potentillion anserinae*, *Plantaginetalia majoris*, *Molinio-Arrhenatheretea*)

Altitude (1=10 m asl)	109	109	109	109	109	109	109	109	109	109	100	101	101	83	83	
Area (m ²)	5	5	10	5	5	8	5	10	10	10	5	10	10	10	12	
Number of species	10	8	12	11	11	12	13	12	14	17	13	13	16	17	18	
Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Characteristics																
<i>Juncus compressus</i>	5	5	5	5	5	4	4	5	5	4	5	4	3	5	4	
<i>Rorippa sylvestris</i>	.	.	+	+	+	1	+	1	1	1	1	+	+	1	+	
<i>Spergularia capillacea</i>	+	1	+	.	+	.	.	+	2	1	1	1	.	.	.	
<i>Carex hirta</i>	1	+	.	.	1	+	+	.	+	+	1
<i>Cynodon dactylon</i>	.	.	1	+	+	1	1	.	.	.	.	1	1	+	1
<i>Plantago major</i>	+	+	.	.	.	.	1	+	.	1	.	.	1	1	1
<i>Trifolium repens</i>	+	.	.	.	+	+	.	.	.	.	.	.	.	.	.
<i>Senecio jacobea</i>	+	+	.	.	.	+	.	.	.	.	.	.	.	.	.
Other species																
<i>Mentha pulegium</i>	1	+	+	+	+	1	2	.	1	2	+	1	2	+	1	
<i>Pulicaria paludosa</i>	1	.	2	1	+	1	2	+	1	2	1	.	1	+	+	
<i>Polygonum persicaria</i>	.	.	.	+	+	1	2	1	.	.	1	2	1	1	1	
<i>Elymus repens</i>	.	.	+	1	.	.	+	.	+	+	1
<i>Eleocharis palustris</i>	+	+	.	.	1	+	1	1	1	1	.	.	.	.	.
<i>Bidens tripartita</i>	.	.	+	.	+	+	+	.	.	1	.	.	.	1	1	
<i>Ranunculus trichophyllus</i>	.	.	.	.	+	+	.	1	.	+	1	.	.	.	+
<i>Crypsis alopecuroides</i>	.	.	.	1	.	.	.	.	.	1	1	1	.	2	1
<i>Crypsis schoenoides</i>	.	+	.	1	.	.	.	.	.	+	+	.	.	1	+
<i>Lycopus europaeus</i>	.	.	.	.	.	.	.	+	.	+	+	.	+	1	+
<i>Eragrostis minor</i>	.	.	.	.	.	.	.	.	.	.	1	1	.	1	1
<i>Echinochloa crus-galli</i>	.	.	.	.	.	.	.	.	.	.	1	1	+	1	1

Other species. Characteristics: *Holcus lanatus* + in 3 and 7; *Juncus effusus* 1 in 11 and + in 12; *Scirpoides holoschoenus* + in 12 and 14. Other species: *Glyceria declinata* 1 in 4 and 11, + in 9; *Polygonum lapathifolium* 1 in 8 and + in 10 and 11; *Lysimachia vulgaris* 1 in 3, + in 7 and 8; *Carex vesicaria* 1 in 3, + in 8 and 15; *Lythrum portula* 1 in 9 and 10; *Gnaphalium luteo-album* 1 in 1, + in 6; *Juncus pygmaeus* + in 8 and 10; *Veronica anagalloides* 1 in 9 and 15; *Juncus tenageia* and *Trifolium arvense* + in 10 and 12. *Corrigiola littoralis* + in 11 and 12; *Spergularia rubra* and *Chenopodium botrys* + in 11 and 12; *Verbena supina* 1 in 14 and 15; *Trifolium tomentosum* + in 4 and 14; *Exaculum pusillum*, *Polygogon monspeliensis* and *Mollugo verticillata* + en 9; *Lactuca virosa* + in 3; *Potentilla supina* 1 in 14.

Localities: 1 & 2: Pinilla del Valle, Embalse de Pinilla, 18.11.2015, 40°56'10" N 3°48'48" W; 3 & 4: Lozoya, Embalse de Pinilla, 09.2017, 40°56'24" N 3°48'32" W; 5-7: Lozoya-Pinilla del Valle, Embalse de Pinilla, 25.08.2020, 40°56'38" N 3°48'09" W; 8-10: Pinilla del Valle, Embalse, 10.08.2021, 40°55'18" N 3°48'53" W; 11: Pinilla de Buitrago, Embalse de Riosequillo, mouth of the Arroyo de Pinilla, 11.08.2021, 40°58'31" N 3°40'53" W; 12 & 13: Pinilla de Buitrago, Embalse de Riosequillo, Prados Nuevos, 11.08.2021, 40°58'23" N 3°40'48" W; 14 & 15: Guadalix de la Sierra, Embalse de Pedrezuela-Guadalix, Ermita de la Virgen del Espinar, 17.08.2022, 40°46'44" N 3°40'16" W.



Figure 4. *Carici hirtae-Juncetum compressi*. Lozoya. Embalse de Pinilla. Paular Valley Country.

Salicetum salviifolio-fragilis Rivas-Martínez & Cantó
ass. nova (Table 6)

Typus ass.: Table 6, rel. 3. Lozoya, Arroyo Rubial, 6.09.2017, 40°57'06" N 3°47'08" W.

Characteristic species: *Salix fragilis*, *Salix salviifolia*, *Salix triandra* subsp. *discolor*, *Salix alba* x *S. fragilis*, *Salix purpurea* subsp. *lambertiana*, *Salix atrocinerea*.

Diagnosis: Willow wooded pioneer communities of the lowest zone of river and streambed, usually

flooded, in supramediterranean and supratemperate bioclimatic belts, on sandy soils or sandy soils compacted with silt. Oligotrophic to mesotrophic waters. It differs from the other willows of *Salicion salviifoliae* due to the less oligotrophic or truly mesotrophic waters and, therefore, for the abundance of *Salix fragilis*, *Salix alba* and *Salix triandra* subsp. *discolor*. It is found in the Guadarrama Sierran Sector. It is probably also on the Western and Central Iberian Mediterranean rivers (Figure 5).



Figure 5. *Salicetum salviifolio-fragilis*. Lozoya. Embalse de Pinilla. Paular Valley Country.

3. List of the Series, minoriseries, geoseries, geopermaseries, permaserias and special habitats of the Sierra de Guadarrama National Park and bordering territories

Here, we relate the list of recognized vegetation series (Rivas-Martínez & *al.*, 2011), the new Series *Salici salviifolio-fragilis* geosigmetum, permaserias and special habitats in the Park. By bordering territories, we refer to those areas excluded from the peripheral protection area but close enough to find isolated specimens of plant community's characteristic species.

Series, minoriseries, geoseries, geopermaseries habitats

1. Oroiberian climatophilous series with disjunction in Ayllón district, acidophilous, supratemperate and lower orotemperate oceanic humid-hyperhumid submediterranean, of *Fagus sylvatica* forests with *Galium rotundifolium*, *Festuca braunblanquetii* and *Vaccinium myrtillus*. [*Galio rotundifolii-Fago sylvaticae* sigmetum] (*).

Head of series: *Galio rotundifolii-Fagetum sylvaticae*. [*Ilici aquifolii-Fagion sylvaticae*].

2. Oroiberian climatophilous series with disjunction in Ayllón district, acidophilous supratemperate and orotemperate euoceanic hyperhumid submediterranean, of *Quercus petraea* forests with *Galium odoratum*, *Quercus*

x *trabutii* and *Betula celtiberica*. [*Galio odorati-Quercus petraeae* sigmetum] (*).

Head of series: *Galio odorati-Quercetum petraeae*. [*Ilici aquifolii-Fagion sylvaticae*].

3. Carpetanian and Oroiberian temporihygrophilous series, acidophilous supra-orotemperate euoceanic humid-hyperhumid submediterranean, of *Betula celtiberica* forests with *Melica uniflora*, *Salix atrocinerea* and *Fraxinus excelsior*. [*Melico uniflorae-Betulo celtibericae* sigmetum].

Head of series: *Melico uniflorae-Betuletum celtibericae*. [*Betulion fontqueri-celtibericae*].

4. High Guadarrama geopermaseries, acidophilous, upper orotemperate euoceanic hyperhumid submediterranean, of *Festuca carpetana* grasses with *Minuartia bigerrensis*, *Hieracium myriadenum* and *Jasione crispa* subsp. *centralis*. [*Hieracio myriadeni-Festuco carpetanae* geopermasigmetum].

Reference permaserias: *Hieracio myriadeni-Festucetum carpetanae*. [*Minuartio bigerrensis-Festucion carpetanae*].

5. Carpetanian climatophilous and edaphoxerophilous minoriseries, rupestrian, acidophilous, orotemperate euoceanic humid-hyperhumid submediterranean, of dwarf-juniper scrub (*Juniperus communis* subsp. *alpina*) with *Avenella flexuosa* subsp. *iberica*, *Cytisus oromediterraneus* and *Festuca iberica*. [*Avenello ibericae-Junipero alpinae* minorisigmetum].

Head of minoriseries: *Avenello ibericae-Juniperetum alpinae*. [*Cytision oromediterranei*].

6. Guadarrama Sierran climatophilous series, acidophilous, orotemperate euoceanic and semicontinental humid-hyperhumid submediterranean, of *Pinus sylvestris* var. *iberica* forests with *Avenella flexuosa* subsp. *iberica*,

Juniperus communis subsp. *alpina* and *Festuca carpetana*. [Avenello ibericae-Pino ibericae sigmetum]. Head of series: Avenello ibericae-Pinetum ibericae. [Avenello ibericae-Pinion ibericae]. Figures 6 and 7.

Table 6. *Salicetum salviifolio-fragilis* Rivas-Martínez & Cantó *ass. nova* (*Salicion salviifoliae*, *Salicetalia purpureae*, *Salici purpureae-Populetea nigrae*)

Altitude (1=10 m asl)	109	109	109	109	110	110	110	108
Exposure	SW	SW	S	W	SW	E	E	S
Area (m ²)	60	100	100	100	100	100	100	100
Number of species	18	6	11	10	15	11	10	9
Relevé number	1	2	3	4	5	6	7	8
Characteristics:								
<i>Salix fragilis</i>	4	1	1	4	2	+	2	4
<i>Salix atrocinerea</i>	3	3	1	.	4	.	.	1
<i>Salix salviifolia</i>	.	2	2	.	.	3	3	1
<i>Salix lambertiana</i>	+	.	+	1	.	2	2	.
<i>Salix triandra</i> subsp. <i>discolor</i>	.	+	2	2	.	2	2	.
<i>S. alba</i> x <i>S. fragilis</i>	.	.	2	1	.	+	.	.
<i>Populus nigra</i>	+	+	+	.	.	1	1	.
<i>Fraxinus angustifolia</i>	.	+	.	1	2	.	.	.
Other species:								
<i>Epilobium hirsutum</i>	1	.	.	.	2.	.	.	1
<i>Juncus compressus</i>	.	.	1	.	.	2	1	.
<i>Lysimachia vulgaris</i>	.	.	+	2	.	.	1	.

Other species. Characteristics: *Salix alba* 1 in 3, + in 5; *Salix purpurea* x *S. salviifolia* + in 1, 6; *Salix lambertiana* x *S. fragilis* 1 in 4; *Salix discolor* x *S. lambertiana*, 1 in 6; *Salix triandra* x *S. salviifolia* + in 6; *Salix triandra* x *S. fragilis* + in 7; *Humulus lupulus* and *Brachypodium sylvaticum* 2, *Ulmus minor* + in 1. Other species: *Rubus castellarnau* 2 in 1, 5; *Urtica dioica* 1 in 1, 2 in 5. *Eleocharis palustris* 1 in 6, 7; *Juncus effusus* 2 in 4, + in 8. *Elymus repens* + in 1, 2 in 8; *Rubus ulmifolius* 2 in 1; *Carex reuteriana*, *Rhamnus cathartica*, *Rubia tinctorum* 1, *Prunus spinosa*, *Conium maculatum* + in 1; *Iris pseudacorus* + in 3; *Agrostis castellana* 1, *Holcus lanatus* + in 4; *Oenanthe crocata* 2, *Sambucus nigra* 1 in 5. *Acer pseudoplatanus*, *Betula celtiberica*, *Rumex crispus*, *Galium aparine*, *Cirsium odontolepis* and *Clematis vitalba* + in 5; *Polygonum lapathifolium* 1 in 7. *Agrostis stolonifera* 3, *Typha angustifolia* and *Rumex crispus* + in 8.

Localities: 1, 2: Lozoya village, Arroyo de la Fuensanta, 6.09.2017, 40°56'55" N, 3°47'23" W; 3: Lozoya, Arroyo Rubial, 6.09.2017, 40°57'06" N, 3°47'08" W, *holotypus ass.*; 4: Lozoya, Arroyo del Villar, 6.09.2017, 40°57'09" N, 3°46'33" W; 5: Cecedilla Estación, Las Fuentes river, 10.06.2018, 40°44'10" N 4°03'56" W; 6, 7: Pinilla del Valle, Embalse de Pinilla, 28.09.2015, 40°55'54" N, 3°48'42" W; 8: Lozoya, Embalse de Pinilla, Arroyo del Palancar, 18.11.2015, 40°56'41" N, 3°48'08" W.



Figure 6. Avenello ibericae-Pinetum ibericae. Upper Moros River Country. La Pinareja and Montón de Trigo in the background. Orotemperate High Guadarrama Country.

7. Guadarrama Sierran climatophilous series, acidophilous, supratemperate and supramediterranean euoceanic and semicontinental subhumid-hyperhumid submediterranean, of *Pinus sylvestris* var. *iberica* with *Pteridium aquilinum*, *Avenella iberica* and *Genista florida*. [*Pteridio aquilinae-Pino ibericae* sigmetum].

Head of series: *Pteridio aquilini-Pinetum ibericae*. [*Avenello ibericae-Pinion ibericae*].

8. Castilian and Oroiberian climatophilous series, basophilous and mafic, supramediterranean and supratemperate semicontinental dry-subhumid submediterranean, of *Juniperus thurifera* and *Juniperus hemisphaerica* forests with *Artemisia*

assoana and *Festuca asperifolia*. [*Junipero hemisphaerico-thuriferae* sigmetum].

Head of series: *Juniperetum hemisphaerico-thuriferae*. [*Juniperion thuriferae*].

9. Guadarrama Sierran, Celtiberian-Alcarrian and Oroiberian climatophilous series, acidophilous, supramediterranean euoceanic and semicontinental subhumid-humid, of *Quercus pyrenaica* forests with *Luzula forsteri*, *Melica uniflora* and *Genista florida*. [*Luzulo forsteri-Querco pyrenaicae* sigmetum].

Head of series: *Luzulo forsteri-Quercetum pyrenaicae*. [*Quercion pyrenaicae, Quercenion pyrenaicae*]. Figure 8.



Figure 8. *Luzulo forsteri-Quercetum pyrenaicae*. Miraflores. South High Guadarrama Foothills Country.

10. High Guadarrama climatophilous series, acidophilous, supratemperate euoceanic humid submediterranean, of *Quercus pyrenaica* forests with *Pinus sylvestris* var. *iberica*, *Avenella flexuosa* subsp. *iberica* and *Adenocarpus hispanicus*. [*Avenello ibericae-Querco pyrenaicae* sigmetum]

Head of Series: *Avenello ibericae-Quercetum pyrenaicae*. [*Quercion pyrenaicae (Quercenion pyrenaicae)*]. Figure 9.

11. Castilian climatophilous Series, basophilous, meso-supramediterranean euoceanic upper-dry lower-humid, of *Quercus faginea* forests with *Cephalanthera rubra*, *Lonicera xylostium* and *Bromus erectus*. [*Cephalanthero rubrae-Querco fagineae* sigmetum].

Head of series: *Cephalanthero rubrae-Quercetum fagineae*. [*Aceri granatensis-Quercion fagineae*].

12. Castilian and Iberian-Maestracense climatophilous and edaphoxerophilous series, basophilous, supramediterranean dry-subhumid, of *Quercus rotundifolia* and *Juniperus thurifera* forests. [*Junipero thuriferae-Querco rotundifoliae* sigmetum].

Head of series: *Junipero thuriferae-Quercetum rotundifoliae*. [*Quercion ilicis (Quercenion rotundifoliae)*]

13. Guadarrama Sierran, Northern Castilian and Planileonese climatophilous and edaphoxerophilous series,

acidophilous, meso-supramediterranean semicontinental dry-lower subhumid, of *Quercus rotundifolia* and *Juniperus oxycedrus* subsp. *lagunae* forests with *Carex distachya* and *Lavandula pedunculata*. [*Junipero lagunae-Querco rotundifoliae* sigmetum].

Head of series: *Junipero lagunae-Quercetum rotundifoliae*. [*Paeonio broteri-Quercenion rotundifoliae*].

14. Northern Castilian and Oroiberian riparian geoseries, hard freshwater or slightly hard freshwater, dry lower-humid supramediterranean, of *Ulmus minor* forests with *Arum cylindraceum*, *Ligustrum vulgare* and *Rosa corymbifera*. [*Aro cylindracei-Ulmo minoris* geosigmetum].

Head of series: *Aro cylindracei-Ulmetum minoris*. [*Populion albae (Fraxino angustifoliae-Ulmenion minoris)*].

15. Carpetanian and León hygrophilous geoseries, soft freshwater, supramediterranean euoceanic-semicontinental dry-humid, of *Fraxinus angustifolia* forests with *Quercus pyrenaica* and *Salix salviifolia*. [*Querco pyrenaicae-Fraxino angustifoliae* geosigmetum].

Head of Series: *Querco pyrenaicae-Fraxinetum angustifoliae*. [*Fraxino angustifoliae-Ulmenion minoris*]

16. Carpetanian North Iberian fluvio-alvear and fluvial Series and geoseries, soft freshwater or slightly hard freshwater, supra-oromediterranean and supratemperate euoceanic-

semicontinental subhumid-humid submediterranean, of *Salix atrocinerea* and *Rubus lainzii* forests with *Salix salviifolia* and *Salix x neofragilis*. [*Rubus lainzii*-*Salix atrocinerea* geosigmetum].

Head of series: *Rubus lainzii*-*Salicetum atrocinerea*. [*Osmundo regalis*-*Alnion glutinosae*].

17. Carpetanian and Montes of Toledo fluvio-alvear internal and rivular minoriseries, soft freshwater, meso-supramediterranean and supratemperate euoceanic-semicontinental subhumid-humid submediterranean, of *Salix salviifolia* and *Salix lambertiana* microforests

with *Salix atrocinerea* and *Rubus castellarnaii*. [*Salix lambertiana*-*salviifoliae minorisigmetum*].

Head of series: *Salicetum lambertiano-salviifoliae*. [*Salicion salviifoliae*].

18. High Guadarrama fluvio-alvear geoseries, soft freshwater, supramediterranean and supratemperate euoceanic humid, of *Salix fragilis* and *Salix salviifolia* riparian willow groves with *Salix atrocinerea* and *Salix lambertiana* [*Salix salviifoliae-fragilis geosigmetum*].

Head of series: *Salicetum salviifoliae-fragilis*. [*Salicion salviifoliae*].



Figure 9. *Avenello ibericae*-*Quercetum pyrenaicae*. Lozoya-Puerto de Navafria. Orotemperate High Guadarrama Country.

Permaseries and special habitats

1. Annual aquatic lentic and rheophilic habitats. (Potametea)

Callitriche brutiae-*Ranunculetum peltati*

Callitriche brutiae-*Ranunculetum pseudofluitantis*

2. Subnitrophilous ephemeral amphibian annual habitats. (*Bidentetea tripartitae*)

Bidentis tripartitae-*Polygonetum lapathifolii*

3. Ephemeral amphibian annual habitats. (*Isoeto-Nanojuncetea*)

Juncetum perpusilli

Junco pygmaei-*Isoetetum velati*

Sedetum lagascae

Verbena supinae-*Gnaphalietum uliginosi*

4. Fontinal habitats. (*Montio-Cardaminetea*)

Myosotidetum stoloniferae

Epilobio anagallidifolii-*Festucetum rivularis*

Montio amporitanae-*Ranunculetum hederacei*

5. Riverine and lacustrine habitats. (*Phragmito-Magnocaricetea*)

Glycerio declinatae-*Alopecuretum aequalis*

Glycerio declinatae-*Oenanthetum crocatae*

Galio broterianae-*Caricetum reuterianae*

Holco reuteri-*Caricetum acutiformis*

6. Turbophile and mesohigrophytic habitats. (*Scheuchzerio-Caricetea nigrae*, *Nardetea strictae*)

Drosero rotundifoliae-*Lycopodiellum inundatae*

Caricetum echinato-nigrae

Viola juressi-*Eleocharidetum quinqueflorae*

Allietum latiorifolii

Campanulo herminii-*Festucetum rivularis*

Luzulo carpetanae-*Pedicularietum sylvaticae*

7. Pioneer minilacustrine habitats. (*Utricularietea minoris*)

Sphagno denticulati-*Utricularietum minoris*

8. Rupicolous chasmophytic habitats. (*Asplenietea trichomanis*)

Erodietum paularensis

Asplenio billotii-*Cheillanthetum tinai*

Saxifragetum willkommianae

9. Rupicolous chasmophytic nitrophilous habitats. (*Parietarietea*)

Oxalido corniculatae-*Parietarietum judaicae*

10. Chasmo-comophytic rupestrian habitats of fractured rocks and rocky slopes. (Phagnalo-Rumicetea indurati)

Digitali thapsi-Dianthetum lusitani

Sedo hirsuti-Saxifragetum fragosoi

11. Loose shifting screes and pebbles habitats. (Thlaspietea rotundifolii)

Digitali carpetanae-Senecietum carpetani

Rumicetum suffruticosi

Cryptogrammo crispae-Dryopteridetum oreadis

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Authorship

PC & SRM: Conceptualization, Research, Methodology, Supervision and Writing.

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