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CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE
AND NATURAL HABITATS

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Interpretation manual of the habitats listed in Resolution No. 4 (1996) listing endangered natural habitats requiring specific conservation measures

Fourth draft version 2019

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INTRODUCTION

Resolution No. 4 (1996) listing the habitat types to be protected by the Emerald network of Areas of Special Conservation Interest (ASCI's) under the Bern Convention was adopted in 1996. The 1996 list of habitat types was taken from the Palaearctic classification (Devilliers & Devilliers-Terschuren 1996).

However as the Palaearctic classification is no longer supported, the Standing Committee to the Convention on the conservation of European wildlife and natural habitats agreed in December 2010 to adopt a revised edition of Resolution No. 4 (1996) based on the EUNIS habitats classification developed and supported by the European Environment Agency and its European Topic Centre on Biological Diversity. This change will allow for future revisions of Resolution No. 4 (1996), including the addition of new habitat types.

In most cases habitat types from the Palaearctic classification had an equivalent in the EUNIS system but in some cases one Palaearctic habitat type has become two or more EUNIS classes or two or more Palaearctic classes relate to one EUNIS class. In a small number of cases, the original habitat type now has a slightly wider definition.

Experience from the European Union's Natura 2000 network has shown the value of a guide to interpreting habitat types, many of which can be variable (Evans 2010). A draft manual to help identify the Resolution No. 4 (1996) habitat types was prepared by the PHARE Topic Link on Nature Conservation in 2000 (PTL-NC 2000), largely based on information derived from the PHYSIS database and focused on the central European countries included in the PHARE programme. The present version uses information from the EEA's EUNIS website[1] supplemented with information from a variety of other sources, including the PHARE manual and the European Union's Interpretation Manual of European Union Habitats (European Commission, 2007). The aim is to allow those responsible for site selection for the Emerald Network to identify the Resolution No. 4 (1996) habitat types and to ensure as much coherence in the interpretation of the habitat types between countries as possible.

Second Edition (2013)

Comments have been received from several sources, largely as a result of the first Emerald seminars held in 2011(West Balkans), 2012 (Switzerland) and 2013 (Norway) and the ongoing Emerald pilot projects. The authors particularly thank Raymond Delarze, Elena Belonovskaya and Nikolay Sobolev for their assistance.

For some habitats the text has been revised and various errors have been corrected, particularly in the description and associated plant communities and species. The list of associated plant communities have been revised following Schaminée et al (2012). The layout has been slightly modified to ease use of the manual.

Further comments are welcome and will help to improve future editions of this manual.

Third Edition (2015)

After discussions at meetings of the Group of Expertsd on Protected Areas & Networks, the Standing Committee adopted a revised AnnexI to Resolution No. 4 (1996) on 6 December 2014 (Council of Europe (2015). Most of the changes are additions and modifications to harmonise Resolution No. 4 (1996) with the list of habitats given in Annex I of the EU Habitats Directive and used for the selection of sites for the EU's Natura 2000 network. At the same time two habitats proposed by Switzerland and one by Ukraine were also added. This third edition includes these new habitats; in some cases the changes mean an existing habitat has been replaced with a wider habitat type.

Further comments and corrections are welcome.

[1] http://eunis.eea.europa.eu

Fourth Edition (2019)

Following discussions at meetings of the Group of Experts on Protected Areas & Networks, the Standing Committee adopted a revised Annex I to Resolution No. 4 (1996) on 27-30 November 2018 (Council of Europe (2018). This included four additional habitats, two proposed by Ukraine in 2018 and two proposed earlier by Switzerland. The Standing Committee also asked that two descriptions were modified to clarify that they cover habitats proposed by Ukraine.

Following the same process, in 2019, the Standing Committee adopted a revision as a consequence of Brexit negociations, leading to an enforced harmonisation with annex I of the Habitats Directive, including 2 more additional marine habitats and a revision of the alpine and subalpine heath and scrub section.

Further comments are welcome and will help to improve future editions of this manual.

EXPLANATORY NOTES

Habitat type code and name

Codes and names are taken from the current version of the EUNIS habitats classification which is a hierarchical system. Habitat types listed on Resolution No. 4 (1996) are indicated with an exclamation mark (!) and highlighted in grey, e.g.

A1.22 Mussels and fucoids on moderately exposed shores

other habitat types are listed purely as headings, for example 'A Marine habitats' and 'A1 Littoral rock and other hard substrata'and help place the Emerald habitat types in the EUNIS classification system.

Plant communities

Where appropriate the plant communities associated with the habitat type are given, they are mostly based on the synopsis of European syntaxa published by the European Vegetation Survey (Rodwell et al 2002; Mucina et al 2016). Plant communities are listed as an aid but it should be remembered that often a single plant community may occur in two or more EUNIS habitats and that there is no agreed synsystem for Europe with frequent differences of opinion.

Species

A short list of species characteristic for the habitat type, and in some instances for sub types, is given, generally, species noted in the description are not repeated here. The list is not exhaustive and not all species listed will be found in every example of a habitat type, especially for habitat types with a wide geographical range. The lists are largely based on the EUNIS database and in some cases species lists are only available for some subtypes.

Corresponding class in other classifications

The correspondence to other classification systems, both national and regional, is given for a limited number of classifications.

EU Habitats Directive Annex I

The relationship between the Resolution No. 4 (1996) habitat type and those listed on Annex I of the EU Habitats Directive is indicated. Please note that in many cases the relationship between EUNIS and Annex I is complex and this information is only indicative. This is further complicated by the variation in national intrepretations of the Annex I types (Evans 2010).

Associated Habitat types

In some instances, notes are given to indicate that a given habitat is often found in association with another. For example 'A2.5 Coastal saltmarshes and saline reedbeds often occur as a component of 'X01 Estuaries'.

References

Only bibliographic references other than those given in EUNIS are listed.

Where there is no entry for a given heading, the heading has been omitted

References

Council of Europe (2010) *Revised Annex I of Resolution No. 4 (1996) (1996) of the Bern Convention on endangered natural habitat types using the Eunis Habitat Classification.* T-PVS/PA(2010)10 revE 09. Strasbourg.
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A MARINE HABITATS

A1 Littoral rock and other hard substrata

A1.1 High energy littoral rock

A1.11 Mussel and/or barnacle communities

Description

Communities on very exposed to moderately exposed upper and mid eulittoral bedrock and boulders dominated by the mussel *Mytilus edulis* (A1.111), barnacles *Chthamalus* spp. and/or *Semibalanus balanoides* and limpets *Patella* spp. (A1.112, A1.113). Several variants are identified. Some shores are characterised by dense bands of the barnacle *Semibalanus balanoides* and the limpet *Patella vulgata* (A1.113). The barnacles may be covered by *Porphyra umbilicalis* on the upper shore of exposed sites. Cracks and crevices in the rock provide a refuge for small individuals of the mussel *M. edulis*, winkles *Littorina saxatilis* and the whelk *Nucella lapillus*. Red seaweeds also frequently occupy damp crevices, particularly *Ceramium shuttleworthianum*, *Corallina officinalis*, *Osmundea pinnatifida* and encrusting coralline algae, but the non-vesiculate form of the wrack *Fucus vesiculosus* might be present (A1.1132). Large numbers of the winkle *Littorina littorea* often dominate fields of large boulders or shores with a more mixed substratum (A1.1133). There is much regional variation affecting the zonation of barnacles in the British Isles. In the north-west *C. montagui* and/or *C. stellatus* can form a distinct band above *S. balanoides*. In the south-west *C. montagui* and/or *C. stellatus* can be the dominant barnacles throughout the eulittoral zone (A1.1121). On the east coasts *S. balanoides* is able to extend to the upper shore due to the absence of *Chthamalus* spp. and thereby any competition. The lichen *Lichina pygmaea* may be prominent, especially in the south, where it can form distinct patches or even a separate zone among the *Chthamalus* spp. (A1.1122). In areas of soft rock (e.g. shales), the barnacles may be scarce or absent and the rock dominated by *P. vulgata*.

EU Habitats Directive Annex I

Included in 1170 Reefs

Associated Habitat types

This habitat type is found in the mid to upper eulittoral on very to moderately exposed shores below the lichen dominated biotopes (B3.11) and is typically characterised by patches of mussels *M. edulis* interspersed with barnacles. Below A1.11 is a community dominated by the wrack *Himanthalia elongata* and red seaweeds such as *C. officinalis, Mastocarpus stellatus* and *O. pinnatifida* (A1.12). With decreasing wave exposure *F. vesiculosus* is able to survive, gradually replacing the barnacles and *P. vulgata* biotope (A1.213). On such moderately exposed shores A1.11 may occur on steep and vertical faces, while fucoids dominate the flatter areas (A1.1132, A1.213).

A1.14 Mediterranean and Black Sea communities of lower mediolittoral rock very exposed to wave action

A1.141 Association with *Lithophyllum byssoides*

Description

This association is characterised by the red alga species *Lithophyllum byssoides* (ex *Lithophyllum lichenoides*). This is one of the most important bio-constructors of the Mediterranean "trottoir", particularly important because of its high aesthetic interest and its conservation value.

Species

Lithophyllum byssoides, Lithophyllum lichenoides

EU Habitats Directive Annex I

Included in 1170 Reefs

A1.2 Moderate energy littoral rock

A1.22 Mussels and fucoids on moderately exposed shores

Description

Mid and lower eulittoral exposed to moderately exposed bedrock, often with nearby sediment, may be densely covered by large individuals of the mussel *Mytilus edulis*. Three biotopes have been described: in the mid eulittoral, the mussels may form a band or large patches with scattered bladder wrack *Fucus vesiculosus* (A1.221). In the lower eulittoral a range of red seaweeds including *Mastocarpus stellatus* and *Palmaria palmata* occur amongst the mussels (in higher abundance than the mid eulittoral) (A1.222). Clay outcrops in the mid to lower eulittoral may be bored by a variety of piddocks including *Pholas dactylus*, *Barnea candida* and *Petricola pholadiformis*, while the surface is characterised by small clumps of the mussel *M. edulis*, the barnacle *Elminius modestus* and the winkle *Littorina littorea* (A1.223). Ephemeral green seaweeds such as *Enteromorpha intestinalis* and *Ulva lactuca* commonly occur on the shells of the mussels. Barnacles are common on both the mussel valves and on patches of bare rock, where the limpet *Patella vulgata* is found as well, often at high abundance. The whelk *Nucella lap*illus and a range of littorinids also occur within the mussel bed. A dense *M. edulis* community may be found on more sheltered coasts on mixed substrata (A2.721).

EU Habitats Directive Annex I

Included in 1170 Reefs

Associated Habitat types

Above this habitat type is a *M. edulis* and *S. balanoides* dominated zone or a F. vesiculosus dominated biotope (A1.213). In the lower eulittoral zone below is a zone dominated by the wrack *Fucus serratus*, *M. edulis* and a variety of red seaweeds (A1.21) while kelp dominate the sublittoral fringe.

A1.4 Features of littoral rock

A1.44 Communities of littoral caves and overhangs

Description

Where caves and overhangs occur on rocky shores, the shaded nature of the habitat diminishes the amount of desiccation suffered by biota during periods of low tides which allows certain species to proliferate. In addition, the amount of scour, wave surge, sea spray and penetrating light determines the unique community assemblages found in upper, mid and lower shore caves and overhangs on the lower shore. Biotopes from the surrounding shore such as A1.111, A1.113 or any of the fucoid communities occasionally extend into cave entrances. A1.113 often extends some way into the cave. Other open shore biotopes may also be found within caves, such as the green seaweed *Prasiola stipitata* on cave roofs where birds roost (B3.112), and localised patches of green algae where freshwater seepage influences the rock (A1.451). Rockpools containing encrusting coralline algae (A1.411), fucoids and kelp (A1.412) and hydroids and littorinid molluscs may occur also on the floor of cave entrances. In general, the biomass and diversity of algal species found in upper and mid-shore littoral caves decreases with increasing depth into the cave as the light levels diminish. Fucoids are usually only found at the entrances to caves, but red algae, and filamentous and encrusting green algae are able to penetrate to lower light intensities towards the back of the cave, and mats of the turf forming red seaweed *Audouinella purpurea* and/or patches of the green seaweed *Cladophora rupestris* may occur on the upper walls (A1.444). Brownish velvety growths of the brown algae *Pilinia maritima* occurring in mats with the red alga *A. purpurea* on cave walls and upper littoral levels of cliffs (A1.443) should not be confused with the green (A1.442) or golden brown algal stains often found above this zone on the ceilings of the caves (A1.443; A1.441). Below is a zone of

Verrucaria mucosa and/or *Hildenbrandia rubra* on the inner and outer reaches (A1.445). Fauna usually only occur on the lower and mid walls of the caves and generally comprise barnacles, anemones and tube-forming polychaetes (A1.448; A1.449) depending on the level of boulder scour or wave surge. Where the floors of caves consist of mobile cobbles and small boulders, little algae and fauna occur due to the effects of scouring (A1.44A). Vertical or steeply sloping cave walls and overhangs on the mid and lower shore, subject to wave-surge but without scour, support a rich biota of sponges, hydroids, ascidians and shade-tolerant red algae (A1.447, A1.446 or A1.4461).

Species

Cladophora rupestris, Hildenbrandia rubra, Prasiola stipitata

EU Habitats Directive Annex I

8330 Submerged or partially submerged sea caves

A2 Littoral sediment

A2.2 Littoral sand and muddy sand

Description

Shores comprising clean sands (coarse, medium or fine-grained) and muddy sands with up to 25% silt and clay fraction. Shells and stones may occasionally be present on the surface. The sand may be duned or rippled as a result of wave action or tidal currents. Littoral sands exhibit varying degrees of drying at low tide depending on the steepness of the shore, the sediment grade and the height on the shore. The more mobile sand shores are relatively impoverished (A2.22), with more species-rich communities of amphipods, polychaetes and, on the lower shore, bivalves developing with increasing stability in finer sand habitats (A2.23). Muddy sands (A2.24), the most stable within this habitat complex, contain the highest proportion of bivalves.

Situation: A strandline of talitrid amphipods (A2.211) typically develops at the top of the shore where decaying seaweed accumulates. Fully marine sandy shores occur along stretches of open coast, whilst muddy sands are often present in more sheltered lower estuarine conditions and may be subject to some freshwater influence.

Temporal variation: Littoral sandy shore environments can change markedly over seasonal cycles, with sediment being eroded during winter storms and accreted during calmer summer months. The particle size structure of the sediment may change from finer to coarser during winter months, as finer sediment gets resuspended in seasonal exposed conditions. This may affect the sediment infauna, with some species only present in summer when sediments are more stable. More sheltered muddy sand shores are likely to be more stable throughout the year, but may have a seasonal cover of green seaweeds during the summer period, particularly in nutrient enriched areas or where there is freshwater input.

EU Habitats Directive Annex I

Can occur as part of the following;-

1130 Estuaries

1140 Mudflats and sandflats not covered by seawater at low tide

1150 Coastal lagoons

1160 Large shallow inlets and bays

A2.3 Littoral mud

Description

Shores of fine particulate sediment, mostly in the silt and clay fraction (particle size less than 0.063 mm in diameter), though sandy mud may contain up to 40% sand (mostly very fine and fine sand). Littoral

mud typically forms extensive mudflats, though dry compacted mud can form steep and even vertical structures, particularly at the top of the shore adjacent to saltmarshes. Little oxygen penetrates these cohesive sediments, and an anoxic layer is often present within millimetres of the sediment surface. Littoral mud can support communities characterised by polychaetes, bivalves and oligochaetes. Most muddy shores are subject to some freshwater influence, as most of them occur along the shores of estuaries. Mudflats on sheltered lower estuarine shores can support a rich infauna, whereas muddy shores at the extreme upper end of estuaries and which are subject to very low salinity often support very little infauna.

Situation: Muddy shores are principally found along the shores of estuaries where there is enough shelter from wave action to allow fine sediment to settle. Muddy shores may also be present in sheltered inlets, straits and embayments which are not part of major estuarine systems.

Temporal variation: *Enteromorpha* spp. and *Ulva lactuca* may form mats on the surface of the mud during the summer months, particularly in areas of nutrient enrichment or where there is significant freshwater influence.

Plant communities

Species

Ulva lactuca

EU Habitats Directive Annex I

Can occur as part of the following;-

1130 Estuaries

1140 Mudflats and sandflats not covered by seawater at low tide

1150 Coastal lagoons

1160 Large shallow inlets and bays

A2.4 Littoral mixed sediments

Description

Shores of mixed sediments ranging from muds with gravel and sand components to mixed sediments with pebbles, gravels, sands and mud in more even proportions. By definition, mixed sediments are poorly sorted. Stable large cobbles or boulders may be present which support epibiota such as fucoids and green seaweeds more commonly found on rocky and boulder shores. Mixed sediments which are predominantly muddy tend to support infaunal communities which are similar to those of mud and sandy mud shores.

Situation: It is probable that there are broad transition areas between areas of mudflat or sandy mudflat, and mixed sediment biotopes where the sediment consists principally of mud but has significant proportions of gravel and sand mixed in. Gravelly mud may occur in patches on mudflats. Similarly, there is unlikely to be an easily defined boundary between areas of mixed sediment with stable cobbles and boulders, and boulder fields which fall into the rocky shore category.

Species

Aphelochaeta marioni, Cerastoderma edule, Corophium volutator, Melinna palmate, Scrobicularia plana, Streblospio shrubsolii, Tubificoides benedii, Tubificoides pseudogaster

EU Habitats Directive Annex I

1130 Estuaries

1140 Mudflats and sandflats not covered by seawater at low tide

1150 Coastal lagoons

1160 Large shallow inlets and bays

A2.5 Coastal saltmarshes and saline reedbeds

includes the following subtypes separately listed in or split units from the 1998 version:

A2.521	Atlantic and Baltic brackish saltmarsh communities
A2.531	Atlantic upper shore communities
A2.542	Atlantic lower shore communities
A2.5514	*Salicornia veneta* swards
A2.5515	Black Sea annual *Salicornia, Suaeda* and *Salsola* saltmarshes
A2.553	Atlantic *Sagina maritima* communities

Description

Angiosperm-dominated stands of vegetation, occurring on the extreme upper shore of sheltered coasts and periodically covered by high tides. The vegetation develops on a variety of sandy and muddy sediment types and may have admixtures of coarser material. The character of the saltmarsh communities is affected by height up the shore, resulting in a zonation pattern related to the degree or frequency of immersion in seawater.

Plant communities

Aegopodion podagrariae, Salicornio-Puccinellion, Eleocharition uniglumis, Armerion maritimae, Salicornion patulae, Glauco maritimae-Juncion maritime, Limonion ferulacei, Thero-Atriplicion, Thero-Suaedion, Juncion maritime, Frankenion pulverulentae, Hordeion marini, Suaedion braun-blanqueti, Arthrocnemion glauci, Caricion fuscae, Cypero-Spergularion salinae, Puccinellio-Spergularion salinae, Agropyrion pungentis, Puccinellion phryganodis, Limoniastrion monopetali, Salicornion herbaceae, Puccinellion limosae, Romulion, Atriplicion littoralis, Saginion maritimae, Salicornion fruticosae, Agropyro-Artemision coerulescentis, Thero-Salicornion, Puccinellion maritimae, Plantaginion crassifoliae, Honckenyo-Crambion maritimae, Suaedion verae, Trifolion squamosi, Spartinion maritimae, Saginetea maritimae, Saginetalia maritimae, Salicornietalia fruticosae, Thero-Salicornietea, Glauco-Puccinellietalia, Crypsidetalia aculeatae, Thero-Salicornietalia

Species

*Anthemis glaberrima, Aster sorrentinii, Corophium volutator, Hippuris tetraphylla, Hydrobia ulvae, Kosteletzkya pentacarpos, Ligularia sibirica, Linum maritimum, Manayunkia aestuarina, Primula nutans, Puccinellia fasciculata ssp. pungens, Puccinellia phryganodes, Rumex rupestris, Salicornia veneta, Salsola daghestanica, Suaeda prostrata, Camphorosma songorica, Armeria vulgaris, Blysmus rufus, Carex marina, Carex salina, Gentianopsis detonsa, Glaux maritima, Imperata cylindrica, Limonium caspium, Scirpoides holoschoenus, Spergularia salin*a

EU Habitats Directive Annex I

1130 Estuaries

1150 Coastal lagoons

1160 Large shallow inlets and bays

1310 Salicornia and other annuals colonizing mud and sand

1320 Spartina swards (Spartinion maritimae)

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

1410 Mediterranean salt meadows (Juncetalia maritimi)

1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)

1630 Boreal Baltic coastal meadows

Associated Habitat types

A2.5 Coastal saltmarshes and saline reedbeds often occur as a component of X01 Estuaries

A2.6 Littoral sediments dominated by aquatic angiosperms

A2.61 Seagrass beds on littoral sediments

Description

Beds of submerged marine vascular plants ('seagrasses') growing on coastal sediments in shallow water. Depth varies with water quality but is usually 30m or less.

Mediterranean communities dominated by *Posidonia oceanicae* (*Posidonion oceanicae*) should be considered as A5.535 *Posidonia* beds, a subtype of !A5 Sublittoral sediment.

Plant communities

Zosterion marinae

Species

Zostera sp.

EU Habitats Directive Annex I

1140 Mudflats and sandflats not covered by seawater at low tide

1160 Large shallow inlets and bays

References

Green, E P., & F T. Short. 2003. *World Atlas of Seagrasses*. UNEP World Conservation Monitoring Centre, University of California Press, Berkeley

A2.62 Marine Cyperaceae beds

A2.621 *Eleocharis* beds

Description

Emergent *Eleocharis parvula* or *Eleocharis acicularis* formations of brackish seas, sea inlets, estuaries, permanent pools of mud or sand flats, and coastal lagoons, occurring in the open sea only in the Baltic, limited to coastal waterbodies elsewhere, and very rare.

Plant communities

Scirpion parvuli, Ruppion maritimae

Species

Eleocharis parvula, Eleocharis acicularis

A2.7 Littoral biogenic reefs

A2.72 Littoral mussel beds on sediment

Description

Sediment shores characterised by beds of adult mussels *Mytilus edulis* occur principally on mid and lower eulittoral mixed substrata (mainly cobbles and pebbles on muddy sediments) in a wide range of exposure conditions. In high densities the mussels bind the substratum and provide a habitat for many infaunal and epifaunal species. This biotope is also found in lower shore tide-swept areas, such as in the tidal narrows of Scottish sealochs. A fauna of dense juvenile mussels may be found in sheltered firths, attached to algae on shores of pebbles, gravel, sand, mud and shell debris with a strandline of fucoid algae.

Species

Ascophyllum nodosum, Fucus vesiculosus, Mytilus edulis

EU Habitats Directive Annex I

Included in 1170 Reefs

A3 Infralittoral rock and other hard substrata

includes the following subtypes separately listed in or split units from the 1998 version:

A3.71 Robust faunal cushions and crusts in surge gullies and caves

A3.74 Caves and overhangs in infralittoral rock

Description

Infralittoral rock includes habitats of bedrock, boulders and cobbles which occur in the shallow subtidal zone and typically support seaweed communities. The upper limit is marked by the top of the kelp zone whilst the lower limit is marked by the lower limit of kelp growth or the lower limit of dense seaweed growth. Infralittoral rock typically has an upper zone of dense kelp (forest) and a lower zone of sparse kelp (park), both with an understorey of erect seaweeds. In exposed conditions the kelp is *Laminaria hyperborea* whilst in more sheltered habitats it is usually *Laminaria saccharina* ; other kelp species may dominate under certain conditions. On the extreme lower shore and in the very shallow subtidal (sublittoral fringe) there is usually a narrow band of dabberlocks *Alaria esculenta* (exposed coasts) or the kelps *Laminaria digitata* (moderately exposed) or *L. saccharina* (very sheltered). Areas of mixed ground, lacking stable rock, may lack kelps but support seaweed communities. In estuaries and other turbid-water areas the shallow subtidal may be dominated by animal communities, with only poorly developed seaweed communities.

Species

Alaria esculenta, Laminaria digitata, L. hyperborea, L. saccharina

EU Habitats Directive Annex I

1170 Reefs

8330 Submerged or partially submerged sea caves

A4 Circalittoral rock and other hard substrata

includes the following subtypes separately listed in or split units from the 1998 version:

A4.24 Mussel beds on circalittoral rock

A4.26 Mediterranean coralligenous communities moderately exposed to hydrodynamic action

A4.32 Mediterranean coralligenous communities sheltered from hydrodynamic action

A4.71 Communities of circalittoral caves and overhangs

Description

Circalittoral rock is characterised by animal dominated communities (a departure from the algae dominated communities in the infralittoral zone). The circalittoral zone can itself be split into two sub-zones; upper circalittoral (foliose red algae present but not dominant) and lower circalittoral (foliose red algae absent). The depth at which the circalittoral zone begins is directly dependent on the intensity of light reaching the seabed; in highly turbid conditions, the circalittoral zone may begin just below water level at mean low water springs (MLWS). The biotopes identified in the field can be broadly assigned to one of three energy level categories: high, moderate and low energy circalittoral rock (used to define the habitat complex level). The character of the fauna varies enormously and is affected mainly by wave action, tidal stream strength, salinity, turbidity, the degree of scouring and rock topography. It is typical

for the community not to be dominated by single species, as is common in shore and infralittoral habitats, but rather comprise a mosaic of species. This, coupled with the range of influencing factors, makes circalittoral rock a difficult area to satisfactorily classify; particular care should therefore be taken in matching species and habitat data to the classification.

Species

Pachymatisma johnstonia, Halichondria panacea, Esperiopsis fucorum, Myxilla incrustans, Tubularia indivisa, Balanus crenatus, Alcyonium digitatum, Sabellaria spinulosa, Neocrania anomala, Ciona intestinalis, Ascidia mentula, Alcyonium digitatum, Metridium senile

EU Habitats Directive Annex I

1170 Reefs

8330 Submerged or partially submerged sea caves

A5 Sublittoral sediment

includes the following subtype separately listed in or split units from the 1998 version:
A5.627 Baltic mussel beds in the infralittoral photic zone

Description

Sediments and associated fauna in the sublittoral near shore zone (i.e. covering the infralittoral and circalittoral zones), typically extending from the extreme lower shore down to the edge of the bathyal zone (200 m). Sediment ranges from boulders and cobbles, through pebbles and shingle, coarse sands, sands, fine sands, muds, and mixed sediments. Those communities found in or on sediment are described within this broad habitat type.

Species

Echinocardium cordatum, Cerastoderma glaucum, Amphiura spp, *Virgularia mirabilis Nephrops norvegicus, Laminaria saccharina, Phymatolithon calcareum, Modiolus modiolus, Mytilus edulis, Lophelia pertusa.*

EU Habitats Directive Annex I

1110 Sandbanks which are slightly covered by sea water all the time

1120 *Posidonia* beds (*Posidonion oceanicae*)

1170 Reefs

A6 Deep-sea bed

A6.1 Deep-sea rock and artificial hard substrata (but excluding A6.12 Deep sea artificial hard substrata)

Description

Deep-sea benthic habitats with substrates predominantly of bedrock, immobile boulders or artificial hard substrates.

EU Habitats Directive Annex I

Included in

1170 Reefs

A6.6 Deep-sea bioherms

A6.61 - Communities of deep-sea corals

Description

The only community described is *Lophelia pertusa*, a cold water, reef-forming coral, which has a wide geographic distribution ranging from 55°S to 70°N, where water temperatures typically remain between 4-8°C. These reefs are generally subject to moderate current velocities (0.5 knots). The majority of records occur in the north-east Atlantic. The extent of *L. pertusa* reefs varies, with examples off Norway several km long and more than 20 m high. These reefs occur within a depth range of 200 - >2000 m on the continental slope, and in shallower waters in Norwegian fjords and Swedish west coast. In Norwegian waters, *L. pertusa* reefs occur on the shelf and shelf break off the western and northern parts on local elevations of the sea floor and on the edges of escarpments. The biological diversity of the reef community is approximately three times as high as the surrounding soft sediment (ICES, 2003), suggesting that these cold-water coral reefs may be biodiversity hotspots. Characteristic species include other hard corals, such as *Madrepora oculata* and *Solenosmilia variabilis*, the redfish *Sebastes viviparous* and the squat lobster *Munida sarsi*. *L. pertusa* reefs occur on hard substrata; this may be *Lophelia* rubble from an old colony or on glacial deposits. For this reason, L. pertusa reefs can be associated with iceberg plough-mark zones.

Species

Lophelia pertusa, Madrepora oculate, Munida sarsi, Solenosmilia variabilis

EU Habitats Directive Annex I

Included in

1170 Reefs

A6.9 Vents, seeps, hypoxic and anoxic habitats of the deep sea

A6.91 Deep-sea reducing habitats

A6.911 Seeps in the deep-sea bed

Description

Deep-sea habitats characterised by chemical conditions. These habitats are often indicated by the presence of seeping or bubbling gases or liquids, hypoxic and/or anoxic conditions in the water column above.

B COASTAL HABITATS

B1 Coastal dunes and sandy shores

B1.1 Sand beach driftlines

Description

The lowest level of the supralittoral, just above the normal tide limit, where drift material accumulates and the sand may be rich in nitrogenous organic matter. Vegetation, if present at all, is very open and composed of annuals.

Plant communities

Atriplicion littoralis, Elymo littorei-Rumicion crispi, Cakilion edentulae, Atriplicion nudicaulis, Euphorbion peplidis, Cakilion euxinae, Salsolo kali-Honckenyion peploidis

Species

Atriplex spp., *Cakile* spp., *Salsola kali, Polygonum* spp

EU Habitats Directive Annex I

1210 Annual vegetation of drift lines

1640 Boreal Baltic sandy beaches with perennial vegetation

Associated Habitat types

Often found as a complex with other dune habitats such as B1.3 to B1.8 (all included in Resolution No. 4 (1996)).

B1.3 Shifting coastal dunes

Description

Mobile sands of the coasts of the boreal, nemoral, steppe, Mediterranean and warm-temperate humid zones, unvegetated or occupied by open grasslands; they may form tall dune ridges or, particularly along the Mediterranean and the Black Sea, be limited to a fairly flat upper beach, still subject in part to inundation.

Plant communities

Verbascion pinnatifidii, Ononido ramosissimae-Polycarpion niveae, Agropyrion juncei, Agropyro-Minuartion peploidis, Honckenyo-Elymion arenarii, Traganion moquinii, Elymion gigantei, Ammophilion arundinaceae,

Species

Ammophila arenaria, Anchusa crispa, Elymus farctus, Eryngium maritimum, Honkenya peploides, Mertensia maritime

EU Habitats Directive Annex I

Includes:

1640 Boreal Baltic sandy beaches with perennial vegetation

2110 Embryonic shifting dunes

2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')

Associated Habitat types

Often found as a complex with other dune habitats such as B1.4 to B1.8 (all included in Resolution No. 4 (1996)).

B1.4 Coastal stable dune grassland (grey dunes)

Description

Fixed or semifixed dunes of the coasts of the boreal, nemoral, steppe, mediterranean and warm-temperate humid zones, with the perennial grasslands, chamaephyte-dotted grasslands, forblands, subshrub or succulent communities that stabilise them and the therophyte communities that may occupy the grassland clearings.

Plant communities

Corynephorion canescentis, Bromion erecti, Violion caninae, Euphorbio portlandicae-Helichrysion stoechadis, Potentillion anserinae, Galio littoralis-Geranion sanguinei, Helianthemion guttati, Plantagini-Festucion ovinae, Festucion beckeri, Anthyllido hamosae-Malcolmion lacerate, Traganion moquinii, Linarion pedunculatae, Koelerion arenariae, Thero-Airion, Hyperico perforati-Scleranthion perennis, Crucianellion maritimae, Geranion sanguinei, Scabiosion ucranicae, Juncion squarrosi, Helichrysion picardii, Ammophiletalia, Crucianelletalia maritimae, Artemisio-Koelerietalia

Species

Anchusa crispa, Apium repens, Arnica montana, Artemisia pancicii, Carduus myriacanthus, Colchicum corsicum, Dianthus arenarius ssp. arenarius, Dracocephalum austriacum, Euphrasia marchesettii, Galium litorale, Gentianella anglica, Helianthemum caput-felis, Jasione lusitanica, Kosteletzkya pentacarpos, Linaria ficalhoana, Linaria flava, Muscari gussonei, Narcissus triandrus, Narcissus triandrus ssp. capax, Rouya polygama, Rumex rupestris, Sisymbrium supinum, Stipa bavarica, Thesium ebracteatum, Thymus carnosus

EU Habitats Directive Annex I

Includes:

2130 Fixed coastal dunes with herbaceous vegetation ('grey dunes')

2210 Crucianellion maritimae fixed beach dunes

2220 Dunes with Euphorbia terracina

2230 Malcolmietalia dune grasslands

2240 Brachypodietalia dune grasslands with annuals

Associated Habitat types

Often found as a complex with other dune habitats such as B1.3 to B1.8 (all included in Resolution No. 4 (1996)).

B1.5 Coastal dune heaths

Description

Stable dunes with leached soils and vegetation dominated by ericaceous shrubs including *Calluna vulgaris*, *Empetrum nigrum* and *Erica* spp.

Plant communities

Ulicion minoris, Ericion cinereae, Genisto-Vaccinion, Genistion pilosae, Empetrion nigri, Ericion umbellatae

Species

Calluna vulgaris, Empetrum nigrum, Erica sp.

EU Habitats Directive Annex I

Includes:

2140: Decalcified fixed dunes with *Empetrum nigrum*

2150: Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)

Associated Habitat types

Often found as a complex with other dune habitats such as B1.3 to B1.8 (all included in Resolution No. 4 (1996)).

References

Gorissen, I. 2004. *Dwarf shrub heaths of Europe - from Atlantic to Caucasus and Ural.* Verlag Ingmar Gorissen, Siegburg.

B1.6 Coastal dune scrub

Description

Stable dunes with scrub, e.g. *Hippophae rhamnoides, Salix repens* in the north, or *Juniperus* spp. or sclerophyllous shrubs in the south.

Plant communities

Pruno-Rubion radulae, Pruno-Rubion ulmifolii, Berberidion vulgaris, Oleo-Ceratonion siliquae, Juniperion turbinatae, Salicion arenariae, Ligustro-Hippophaeion, Cisto-Lavanduletea, Rosmarinetea officinalis, Quercetea ilicis, Pyro cordatae-Ulicion europaei

Species

Astragalus maritimus, Centaurea attica ssp. Megarensis, Cytisus aeolicus, Daphne rodriguezii, Dracocephalum austriacum, Gypsophila papillosa, Hippophae rhamnoides, Juniperus sp., Ophrys argolica, Phoenix theophrasti, Ruscus aculeatus, Salix repens

EU Habitats Directive Annex I

Includes:

2160 Dunes with *Hippophaë rhamnoides*

2170 Dunes with *Salix repens* ssp *argentea* (*Salicion arenariae*)

2250 Coastal dunes with *Juniperus* spp

2260 *Cisto-Lavenduletalia* dune sclerophyllous scrubs

Associated Habitat types

Often found as a complex with other dune habitats such as B1.3 to B1.8 (all included in Resolution No. 4 (1996)).

B1.7 Coastal dune woods

Description

Coastal dunes colonised by woodland which are directly influenced by proximity to the sea.

Plant communities

Querco-Fagetea, Quercetea ilicis, Dicrano-Pinion

Species

Betula sp, *Pinus* sp, *Quercus* sp, *Fagus sylvatica, Leucobryum glaucum, Ruscus aculeatus*

EU Habitats Directive Annex I

Includes:

2180 Wooded dunes of the Atlantic, Continental and Boreal region

2270 Wooded dunes with *Pinus pinea* and/or *Pinus pinaster*

Associated Habitat types

Often found as a complex with other dune habitats such as B1.3 to B1.8 (all included in Resolution No. 4 (1996)).

B1.8 Moist and wet dune slacks

Description

Moist or wet depressions in coastal dune systems, sometimes with permanent water but more often only seasonally moist or flooded by fresh water. Dune-slacks are extremely rich and specialised habitats, very threatened by the lowering of water tables.

Plant communities

Hyperico elodis-Sparganion, Preslion cervinae, Caricion davallianae, Caricion canescenti-fuscae, Potentillion anserinae

Species

Apium repens, Armeria helodes, Caropsis verticillatinundata, Colchicum corsicum, Coleanthus subtilis, Eryngium viviparum, Hamatocaulis vernicosus, Kosteletzkya pentacarpos, Ligularia sibirica, Lindernia procumbens, Liparis loeselii, Luronium natans, Marsilea quadrifolia, Petalophyllum ralfsii, Sisymbrium supinum, Spiranthes aestivalis, Thesium ebracteatum

EU Habitats Directive Annex I

2190 Humid dune slacks

Associated Habitat types

Often found as a complex with other dune habitats such as B1.3 to B1.7 (all included in Resolution No. 4 (1996)).

B1.9 Machair

Description

Short-turf grasslands formed on dry and seasonally waterlogged, relatively flat and low-lying sand plains, where windblown calcareous sand overlies peat or impermeable bedrock. Machair grasslands are machair in the strict sense, and form part of the machair complex (X27), characteristic of the Outer Hebrides and western Ireland, with dunes (B1.3, B1.4), shallow lochs (C1) and land cultivated on a strip rotation (I1). They support a flower-rich, and correspondingly insect-rich, dune grassland studded with shallow lochs and cultivated on a strip rotation. The grassland is dominated by *Poa pratensis* and *Festuca rubra*, accompanied by *Thalictrum minus* ssp. *arenarium*, *Thymus praecox* ssp. *arcticus* (*Thymus drucei*), *Bellis perennis*, *Prunella vulgaris*, *Erodium cicutarium*, *Trifolium* spp., *Euphrasia* spp. and many orchids, among which *Dactylorhiza fuchsii* ssp. *hebridensis*, *Dactylorhiza purpurella*, *Gymnadenia conopsea*, *Coeloglossum viride*, *Platanthera chlorantha* and *Orchis mascula* are the most prominent. This grassland harbours a plant community of very restricted distribution comprising vulnerable species; *Cochlearia scotica*, *Euphrasia marshallii* and *Dactylorhiza fuchsii* ssp. *hebridensis* are endemic. As a whole, machair is an essential habitat for breeding waders such as *Haematopus ostralegus, Vanellus*

vanellus, Charadrius hiaticula, Calidris alpina, Tringa totanus and *Gallinago gallinago*; it supports the healthiest western European population of the threatened corncrake *Crex crex*.

Plant communities

Plantagini-Festucion ovinae

EU Habitats Directive Annex I

21A0 Machairs (* in Ireland)

References

Angus, I.S. & Dargie, T.C.D. 2002. The UK Machair Habitat Action Plan: progress and problems. *Botanical. Journal of Scotland* 54*:* 63–74.

Gaynor, K.. 2006. The Vegetation of Irish Machair. *Biology & Environment: Proceedings of the Royal Irish Academy* 106 (3): 311-321.

B2 Coastal shingle

B2.1 Shingle beach driftlines

Description

The lowest level of the supralittoral, just above the normal tide limit, where drift material accumulates and the shingle may be rich in nitrogenous organic matter. Vegetation, if present at all, is very open and composed of annuals or, particularly by the Mediterranean, especially the east Mediterranean, of annuals and perennials, occupying accumulations of drift material and gravels rich in nitrogenous organic matter.

Plant communities

Atriplicion littoralis, Cakilion edentulae, Elymo littorei-Rumicion crispi

Species

Cakile maritima, *Salsola kali*, *Atriplex* spp., *Polygonum* spp., *Euphorbia peplis, Mertensia maritima*, and, particularly in Mediterranean formations, *Glaucium flavum*, *Matthiola sinuata*, *Matthiola tricuspidata*, *Euphorbia paralias*, *Eryngium maritimum*

EU Habitats Directive Annex I

Includes:

1210 Annual vegetation of drift lines

1610 Baltic esker islands with sandy, rocky and shingle beach vegetation and sublittoral vegetation

B2.3 Upper shingle beaches with open vegetation

Description

The upper beach of large shingle bars, with open pioneer communities or perennial vegetation mostly formed by *Crambe maritima*, *Honkenya peploides*, *Lathyrus japonicus* and other specialised species. Mainly in northwest Europe, from the Atlantic to the Baltic.

Plant communities

Honkenyo-Crambion maritimae

Species

Crambe maritima, Honkenya peploides, Lathyrus japonicus

EU Habitats Directive Annex I

1220 Perennial vegetation of stony banks

B3 Rock cliffs, ledges and shores, including the supralittoral

B3.2 Unvegetated rock cliffs, ledges, shores and islets

B3.24 Unvegetated Baltic rocky shores and cliffs

Description

Sea-cliffs, their faces and ledges, rocky shores and isolated seaside rocks of the Baltic Sea.

EU Habitats Directive Annex I

Included in

1620 Boreal Baltic islets and small islands

B3.3 Rock cliffs, ledges and shores, with angiosperms

Description

Sea-cliffs, or parts of sea-cliffs, and rocky shores colonized by disjunct assemblages of salt-tolerant crevice plants (chasmophytes) or by more or less closed salt-tolerant grasslands with associated terrestrial invertebrate and vertebrate faunal communities.

Plant communities

Anthyllidion barbae-jovis, Asplenion marini, Astragalion tragacanthae, Crithmion maritime, Crithmo-Daucion halophili, Crithmo-Limonion gracei, Crithmo-Staticion, Crucianellion rupestris, Dactylido hispanicae-Helichrysion stoechadis, Elytrigio bessarabicae-Lactucion tataricae, Euphorbio azoricae-Festucion petraeae, Euphorbion pithyusae, Frankenio-Astydamion latifoliae, Helichrysion obconico-devium, Kochio prostratae-Limonion meyeri, Launaeion cervicornis, Limonion anfracti-cancellati,

Species

B3.32: *Silene vulgaris ssp. maritima*, *Silene uniflora*, *Ligusticum scoticum*, *Armeria maritima*, *Odontites litoralis ssp. litoralis*, *Odontites litoralis ssp. fennica*, *Matricaria maritima*, *Senecio viscosus* **B3.33:** *Limonium* spp. *Silene sedoides*, *Frankenia hirsuta*, *Frankenia pulverulenta*, *Crithmum maritimum*, *Lotus cytisoides*, *Anthemis rigida*, *Bellium minutum*, *Catapodium marinum*, *Mesembryanthemum nodiflorum*, *Parapholis incurva*, *Phleum crypsoides*, *Phleum exaratum*, *Plantago weldenii*, *Psilurus incurvus*, *Sagina maritima*, *Sedum litoreum*, *Valantia muralis* **B3.34:** *Crithmum maritimum*, *Astydamia latifolia*, *Schizogyne sericea*, *Andryala glutinosa*, *Plantago coronopus*, *Tolpis fruticosa*, *Aizoon canariense*, *Campylanthus salsoloides*, *Limonium pectinatum*, *Frankenia ericifolia*, *Reichardia ligulata*, *Argyranthemum frutescens*, *Lotus* spp., *Asplenium marinum*.

EU Habitats Directive Annex I

Includes:

1230 Vegetated sea cliffs of the Atlantic and Baltic Coasts

1240 Vegetated sea cliffs of the Mediterranean coasts with endemic *Limonium* spp

1250 Vegetated sea cliffs with endemic flora of the Macaronesian coasts

C INLAND SURFACE WATERS

C1 Surface standing waters

C1.1 Permanent oligotrophic lakes, ponds and pools

Description

Waterbodies with a low nutrient (nitrogen and phosphorus) content, mostly acid (pH 4-6). Includes oligotrophic waters of medium or high pH, e.g. calcareous and basic unpolluted nutrient-poor lakes and pools, which are rare in much of Europe and noted as a habitat of charophytes (C1.14). Excludes peaty, dystrophic waters (C1.4). Because of the low nutrient status, beds of vascular plants are often sparse and open.

Plant communities

Charion fragilis, Nitellion flexilis, Nelumboion nuciferae, Scorpidio-Utricularion minoris, Oenanthion aquaticae, Zannichellion pedicellatae, Parvopotamion, Potamion graminei, Nitellion syncarpae-tenuissimae, Sphagno-Utricularion, Ranunculion aquatilis, Hyperico elodis-Sparganion, Charion vulgaris, Potamion,

Species

Callitriche sp. *Chara* sp, *Isoetes* sp, *Nitella* sp, *Potamogeton* sp,*Sparganium* sp, *Eleocharis quinqueflora, Eleocharis ovata*

EU Habitats Directive Annex I

Includes:

2190 Humid dune slacks

3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)

3120 Oligothrophic waters containing very few minerals generally on sandy soils of the West Mediterranean, with *Isoetes* spp

3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp

C1.2 Permanent mesotrophic lakes, ponds and pools

C1.22 Free-floating vegetation of mesotrophic waterbodies

C1.222 Floating *Hydrocharis morsus-ranae* rafts

Description

Free-floating surface communities of Palaearctic waters rich in *Hydrocharis morsus-ranae*.

Plant communities

Hydrocharition: Hydrocharitetum morsus-ranae

Species

Hydrocharis morsus-ranae

EU Habitats Directive Annex I

included in 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation

C1.223 Floating *Stratiotes aloides* rafts

Description

Free-floating communities of Palaearctic waters dominated by *Stratiotes aloides*.

Plant communities

Hydrocharition: Stratiotetum aloidis

Species

Stratiotes aloides

EU Habitats Directive Annex I

included in 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation

C1.224 Floating *Utricularia australis* and *Utricularia vulgaris* colonies

Description

Free-floating communities of more or less nutrient-rich Palaearctic waters dominated by bladderworts (*Utricularia australis*, *Utricularia vulgaris*).

Plant communities

Hydrocharition: Lemno-Utricularietum vulgaris, Utricularietum australis (Utricularietum neglectae)

Species

Utricularia australis, Utricularia vulgaris

EU Habitats Directive Annex I

included in 3150: Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* -type vegetation

C1.225 Floating *Salvinia natans* mats

Description

Free-floating communities of Central and Eastern Europe dominated by the free-floating non-indigenous fern *Salvinia natans*, often forming dense and extensive mats.

Plant communities

Hydrocharition: Spirodelo-Salvinietum natantis

Species

Salvinia natans

EU Habitats Directive Annex I

included in 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation

C1.226 Floating *Aldrovanda vesiculosa* communities

Description

Rare aquatic formations of Central and Eastern Europe, dispersed from southern Brandenburg and Lake Constance east to the Ukraine, with a former outpost in eastern Lithuania, harbouring the carnivorous, free-floating Droseraceae *Aldrovanda vesiculosa* (listed on Resolution 6).

Plant communities

Aldrovandetum vesiculosae, Spirodelo-Aldrovandetum i.a.

Species

Aldrovanda vesiculosa

EU Habitats Directive Annex I

included in 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation

C1.24 Rooted floating vegetation of mesotrophic waterbodies

C1.241 Floating broad-leaved carpets

C1.2416 *Nelumbo nucifera* beds

Description

Formations of *Nelumbo nucifera*, occurring in the Volga delta and from the south Caspian lowlands to the Far East, with a naturalised population in Romania.

Plant communities

Nelumboion nuciferae

Species

Nelumbo nucifera

C1.24113 Transylvanian hot-spring lotus beds

Description

Formations of white lotus (*Nymphaea lotus*) of geothermal waters (unit C2.144) of Petea Lake, western Romania. Hungarian examples (e.g. Budapest) are introductions

Species

Nymphaea lotus, Ceratophyllum demersum, Sparganium erectum ssp neglectum, Butomus umbellatus, Alisma plantago-aquatica, Phragmites australis

EU Habitats Directive Annex I

Same as 31A0 Transylvanian hot-spring lotus beds

References

Doniţă, N., Popescu, A., Paucă-Comănescu, M., Mihăilescu, S., Biriş, I.A. (2005). *Habitatele din România*. Edit. Tehnică Silvică, Bucureşti, 500 p. (ISBN 973-96001-4-X)
Olteanu-Cozma, C. (1959). Biologia si ecologia plantei *Nymphaea lotus* L. var.*thermalis* (DC.)Tusz. de la Baile 1 Mai - Oradea. *Ocr.Nat., 4*

C1.25 Charophyte submerged carpets in mesotrophic waterbodies

Description

Algal carpets dominated by Charophytes of the bottom of unpolluted, mesotrophic lakes and pools of the Palaearctic region.

Plant communities

Charetalia hispidae, Nitelletalia flexilis

Species

Chara sp., *Nitella* sp, *Tolypella* sp.

EU Habitats Directive Annex I

3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara spp*.

Associated Habitat types

This is similar to subtype C1.14 of !C1.1 Permanent oligotrophic lakes, ponds and pools and C1.44 Charophyte submerged carpets in dystrophic waterbodies but differing in the trophic status of the water body.

C1.3 Permanent eutrophic lakes, ponds and pools

C1.32 Free-floating vegetation of eutrophic waterbodies

Description

Free-floating surface communities of more or less nutrient-rich waters.

Plant communities

Lemnion minoris, Hydrocharition morsus-ranae, Utricularion vulgaris

Species

Lemna minor, Spirodela polyrhiza, Wolffia arrhiza, Salvinia natans, Ceratophyllum submersum, Stratiotes aloides.

EU Habitats Directive Annex I

Included in

3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* -type vegetation.

C1.33 Rooted submerged vegetation of eutrophic waterbodies

Description

Formations of water bodies constituted by submerged, rooted, perennial phanerogams with often emerging flower spikes, in particular entirely immersed pondweeds of genus *Potamogeton*.

Plant communities

Potamogetonion

Species

Myriophyllum spicatum, Myriophyllum verticillatum, Najas marina, Najas minor.

EU Habitats Directive Annex I

Includes:

3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* -type vegetation

C1.34 Rooted floating vegetation of eutrophic waterbodies

C1.341 Shallow-water floating communities

C1.3411 *Ranunculus* communities in shallow water

Description

Communities dominated by water crowfoots (aquatic species of *Ranunculus*) with both submerged and floating leaves, characteristic mostly of shallow Palaearctic waters with fluctuating water levels and susceptible to occasional drying.

Plant communities

Ranunculion aquatilis (*Nymphaeion albae p., Ranunculion fluitantis* p.); *Hydrocotylo-Baldellion*

Species

Ranunculus peltatus, Ranunculus aquatilis, Ranunculus baudotii, Ranunculus hederaceus, Ranunculus rionii, Ranunculus ololeucos

C1.3413 *Hottonia palustris* beds in shallow water

Description

Communities of shallow Palaearctic waters dominated by *Hottonia palustris*.

Plant communities

Hottonion palustris, Ranunculion aquatilis p

Species

Hottonia palustris

C1.4 Permanent dystrophic lakes, ponds and pools

includes the following subtype separately listed in the 2010 edition:
C1.44 Charophyte submerged carpets in dystrophic waterbodies

Description

Lakes and pools with acidic waters of high humus content and often brown tinted (pH often 3-5).

Plant communities

Nymphaeion albae, Potamogetonion, Sphagnion cuspidate, Sphagno-Utricularion,.

Species

Plants: *Utricularia* spp, *Rhynchospora alba, R. fusca, Sparganium minimum, Sphagnum* species. In the Boreal region also *Nuphar lutea, N. pumila, Carex lasiocarpa, C. rostrata, Nymphaea candida, Drepanocladus* spp., *Warnstorfia trichophylla, W. procera*.

Animals: Odonata (dragonflies and damselflies)

EU Habitats Directive Annex I

3160 Natural dystrophic lakes and ponds

Associated Habitat types

Often a component of bog landscapes such as X04 Raised bogs and D1.2 Blanket bog

C1.5 Permanent inland saline and brackish lakes, ponds and pools

Description

Non-coastal brackish, saline or hypersaline lakes, ponds or pools and their pelagic vertebrates and plankton.

Plant communities

Charion canescentis, Zannichellion pedicellatae, Ranunculion aquatilis, Ruppion maritimae

Species

Lemna sp, *Wolffia* sp, *Callitriche* sp and *Ranunculus* sect. *Batrachium* sp., *Najas marina, Najas minor, Potamogeton pectinatus*

EU Habitats Directive Annex I

Includes 1150: Coastal lagoons

C1.6 Temporary lakes, ponds and pools

C1.66 Temporary inland saline and brackish waters

Description

Shallow temporary saline and brackish waters, in which communities may develop which often form two layers. The main species are *Ranunculus trichophyllus, Najas minor, Najas marina* and *Ceratophyllum demersum.*

Plant communities

Charion fragilis, Nelumboion nuciferae, Potentillion anserinae, Zannichellion pedicellatae, Parvopotamion, Littorellion uniflorae, Potamion graminei, Isoëtion lacustris, Nymphaeion albae, Ranunculion aquatilis, Hyperico elodis-Sparganion, Ranunculion fluitantis

Species

Ceratophyllum demersum, Najas marina, Najas minor, Ranunculus trichophyllus

C1.67 Turlough and lake-bottom meadows

Description

Terrestrial communities colonizing the bottom of waterbodies that are completely and recurrently emptied of water for part of the time, such as Irish turloughs. Habitats characteristic of each stage of the cycle may be units of C1, C3.41-C3.43, C3.51-C3.52, C3.64-C3.65 and, if appropriate, those of units D2-D5 or E2-E3.

Species

Plants: *Cinclidotus fontinaloides, Fontinalis antipyretica* (Bryophyta).

Animals: *Tanymastix stagnalis* (wet phase) and the beetles *Agonum lugens, A. livens, Badister meridionalis, Blethisa multipunctata* and *Pelophila borealis* (dry phase).

EU Habitats Directive Annex I

3180 Turloughs

References

Proctor, M. 2010. Environmental and vegetational relationships of lakes, fens and turloughs in the Burren. *Biology & Environment: Proceedings of the Royal Irish Academy* 110 (1): 17-34.

C2 Surface running waters

C2.1 Springs, spring brooks and geysers

C2.111 Fennoscandian mineral-rich springs and springfens

Description

Springs and springfens are characterized by continuous flow of groundwater. The water is cold, of even temperature, and rich in oxygen and minerals, due to the rapid percolation. Springs may have a basin where the water wells up and an adjacent outflow with typical vegetation. In springfens the water seeps up through the ground and the accumulated peat, enhancing the growth of specialised vegetation. Since the water originates from deeper layers, these springs often have running water during the winter even if the surrounding areas are frozen and snow-covered. The invertebrate fauna is often very specialised to this habitat and the flora rich in northern species.

Species

Vascular plants include *Cardamine amara, Chrysosplenium spp., Carex appropinquata, C. capillaris, C. paniculata, Epilobium hornemanni, E. davuricum, E. laestadii, E. alsinifolium, Montia fontana, Poa alpigena, P. remota, P. trivialis, Ranunculus lapponicus, R. hyperboreus, Stellaria alsine, S. calycantha, S. nemorum*. Bryophytes- *Brachythecium rivulare, Bryum weigelii, B. pseudotriquetrum, B. schleicheri, Calliergon giganteum, C. sarmentosum, Philonotis spp., Pohlia wahlenbergii, Plagiomnium undulatum, Rhizomnium spp., Scapania spp., Warnstorfia exannulata*

Corresponding classes in other classifications

Nordic Vegetation Classification 1994: 3.5.1.1 *Sphagnum - Drepanocladus* –type

3.5.1.2 *Montia fontana-Epilobiumhornemannii*-type

3.5.1.3 *Saxifraga stellaris-Philonotis fontana*-type

3.5.2.1 *Philonotis*-type

3.5.2.3 *Paludella*-type

3.4.3.2 *Filipendula ulmaria - Carex spp. - Drepanocladus spp. -Paludella squarrosa* -type

EU Habitats Directive Annex I

7160 Fennoscandian mineral-rich springs and springfens

References

Hedenäs, L. & Löfroth, M. (1992). Mossor som indikerar särskilt skyddsvärda våtmarksbiotoper. *Svensk Bot. Tidskrift*, 86.
Eurola, S. & Virtanen, R. (1991). Key to the vegetation of northern Fennoscandian fjelds. *Kilpisjärvi Notes*, 12: 1-28.

C2.12 Hard water springs

Description

Springs rich in calcium, typically due to calcareous tufa formation. Species-rich habitats with high moss cover, a high dominance of the moss *Cratoneuron commutatum* is typical.

Plant communities

Cratoneurion commutati, *Lycopodo-Cratoneurion commutati*

Species

Arabis soyeri, Cochlearia pyrenaica (in sites with heavy metals), *Pinguicula vulgaris, Saxifraga aizoides*. Mosses: *Catoscopium nigritum, Cratoneuron commutatum, C. commutatum* var. *falcatum, C. filicinum, Eucladium verticillatum, Gymnostomum recurvirostrum*. In the Boreal region also *Carex appropinquata, Epilobium davuricum, Juncus triglumis, Drepanocladus vernicosus, Philonotis calcarea, Scorpidium revolvens, S.cossoni, Cratoneuron decipiens, Bryum pseudotriquetum*

Corresponding class in other classifications

Milieux naturels de Suisse 2008 1.3.2 Végétation des sources alcalines

EU Habitats Directive Annex I

Subtype C2.121 Petrifying springs with tufa or travertine formations is 7220: Petrifying springs with tufa formation (*Cratoneurion*).

C2.18 Acid oligotrophic vegetation of spring brooks

Description

Submerged and floating aquatic plant (euhydrophyte) communities of Palaearctic streams poor in nutrients and in lime, with, in particular, *Myriophyllum alterniflorum*, *Potamogeton polygonifolius*, *Callitriche hamulata*, *Littorella uniflora*, *Juncus bulbosus*, *Scirpus fluitans* or acidophilous mosses and algae. In Iceland, *Montia fontana*, *Potamogeton filiformis*, *Ranunculus trichophyllus* (*Ranunculus confervoides*, *Ranunculus aquatilis* var. *diffusus*) and *Fontinalis antipyretica* characterize the community in clear, slowly flowing waters.

Plant communities

Cardamino-Montion

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 1.3.3 Végétation des sources acides

EU Habitats Directive Annex I

Part of

3260 Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

C2.19 Lime rich oligotrophic vegetation of spring brooks

Description

Submerged and floating aquatic plant (euhydrophyte) communities of Palaearctic streams poor in nutrients but rich in lime, characterized in particular by *Potamogeton coloratus* and *Chara hispida* or by tufa-forming mosses and algae.

Plant communities

Ranunculion fluitantis, Cratoneurion commutati

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 1.3.2 Végétation des sources alcalines

EU Habitats Directive Annex I

Part of

3260 Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

C2.1A Mesotrophic vegetation of spring brooks

Description

Submerged and floating aquatic plant (euhydrophyte) communities of Palaearctic streams moderately rich in nutrients.

Species

Berula erecta (*Sium erectum*), *Mentha aquatica f. submersa, Potamogeton perfoliatus, Potamogeton natans, Groenlandia densa, Ranunculus peltatus, Ranunculus penicillatus, Ranunculus trichophyllus, Ranunculus fluitans, Ranunculus aquatilis, Callitriche truncata, Callitriche stagnalis, Nymphaea alba, Myriophyllum spicatum*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 1.3 Sources et suintements

EU Habitats Directive Annex I

Part of

3260 Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

C2.1B Eutrophic vegetation of spring brooks

Description

Submerged and floating aquatic plant (euhydrophyte) communities of Palaearctic streams rich in nutrients.

Species

Ranunculus fluitans, Ranunculus circinatus, Zannichellia palustris f. fluviatilis, Potamogeton nodosus, Potamogeton lucens, Potamogeton pectinatus, Potamogeton crispus, Sparganium emersum, Sagittaria sagittifolia, Callitriche obtusangula, Nuphar lutea and the moss *Fontinalis antipyretica*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 1.3 Sources et suintements

EU Habitats Directive Annex I

Part of

3260 Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

C2.25 Acid oligotrophic vegetation of fast flowing streams

Description

Submerged and floating aquatic plant (euhydrophyte) communities of Palaearctic streams poor in nutrients and in lime, with, in particular, *Myriophyllum alterniflorum*, *Potamogeton polygonifolius, Callitriche hamulata*, *Littorella uniflora*, *Juncus bulbosus*, *Scirpus fluitans* or acidophilous mosses and algae. In Iceland, *Montia fontana*, *Potamogeton filiformis*, *Ranunculus trichophyllus* (*Ranunculus confervoides, Ranunculus aquatilis var. diffusus*) and *Fontinalis antipyretica* characterize the community in clear, slowly flowing waters.

Plant communities

Batrachion fluitantis

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 1.2 Eaux courantes

EU Habitats Directive Annex I

Part of

3260 Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

C2.26 Lime rich oligotrophic vegetation of fast flowing streams

Description

Submerged and floating aquatic plant (euhydrophyte) communities of Palaearctic streams poor in nutrients but rich in lime, characterized in particular by *Potamogeton coloratus* and *Chara hispida* or by tufa-forming mosses and algae.

Plant communities

Batrachion fluitantis (syn *Ranunculion fluitantis, Callitricho-Batrachion*)

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 1.2 Eaux courantes

EU Habitats Directive Annex I

Included in

3260 Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

C2.27 Mesotrophic vegetation of fast flowing streams

Description

Submerged and floating aquatic plant (euhydrophyte) communities of Palaearctic streams moderately rich in nutrients.

Plant communities

Batrachion fluitantis (syn *Ranunculion fluitantis, Callitricho-Batrachion*)

Species

Berula erecta (*Sium erectum*), *Mentha aquatica f. submersa*, *Potamogeton perfoliatus*, *Potamogeton natans*, *Groenlandia densa*, *Ranunculus peltatus*, *Ranunculus penicillatus*, *Ranunculus trichophyllus*, *Ranunculus fluitans*, *Ranunculus aquatilis*, *Callitriche truncata*, *Callitriche stagnalis*, *Nymphaea alba*, *Myriophyllum spicatum*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 1.2 Eaux courantes

EU Habitats Directive Annex I

Included in

3260 Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

C2.28 Eutrophic vegetation of fast flowing streams

Description

Submerged and floating aquatic plant (euhydrophyte) communities of Palaearctic streams rich in nutrients.

Plant communities

Batrachion fluitantis (syn *Ranunculion fluitantis, Callitricho-Batrachion*)

Species

Ranunculus fluitans, Ranunculus circinatus, Zannichellia palustris f. fluviatilis, Potamogeton nodosus, Potamogeton lucens, Potamogeton pectinatus, Potamogeton crispus, Sparganium emersum, Sagittaria sagittifolia, Callitriche obtusangula, Nuphar lutea and the moss *Fontinalis antipyretica*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 1.2 Eaux courantes

EU Habitats Directive Annex I

Included in

3260 Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

C2.33 Mesotrophic vegetation of slow-flowing streams

Description

Submerged and floating aquatic plant (euhydrophyte) communities of Palaearctic streams moderately rich in nutrients.

Plant communities

Batrachion fluitantis (syn *Ranunculion fluitantis, Callitricho-Batrachion*), *Nymphaeion albae, Potamogetonion*

Species

Berula erecta (*Sium erectum*), *Mentha aquatica f. submersa, Potamogeton perfoliatus, Potamogeton natans, Groenlandia densa, Ranunculus peltatus, Ranunculus penicillatus, Ranunculus trichophyllus, Ranunculus fluitans, Ranunculus aquatilis, Callitriche truncata, Callitriche stagnalis, Nymphaea alba, Myriophyllum spicatum*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 1.2.1.1 Grands cours d'eau de plaine

EU Habitats Directive Annex I

Included in

3260 Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

C2.34 Eutrophic vegetation of slow-flowing streams

Description

Submerged and floating aquatic plant communities (euhydrophyte) of Palaearctic streams rich in nutrients.

Plant communities

Batrachion fluitantis (syn *Ranunculion fluitantis, Callitricho-Batrachion*), *Nymphaeion albae, Potamogetonion*

Species

Ranunculus fluitans, *Ranunculus circinatus*, *Zannichellia palustris f. fluviatilis*, *Potamogeton nodosus*, *Potamogeton lucens*, *Potamogeton pectinatus*, *Potamogeton crispus*, *Sparganium emersum*, *Sagittaria sagittifolia*, *Callitriche obtusangula*, *Nuphar lutea* and the moss *Fontinalis antipyretica*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 1.2.1 Zone de la brême et du barbeau (épipotamon)

EU Habitats Directive Annex I

Included in

3260 Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

C3 Littoral zone of inland surface waterbodies

C3.2 Water fringing reedbeds and tall helophytes other than canes

Description

Water-fringing stands of tall vegetation by lakes (including brackish lakes), rivers and brooks, usually species-poor and often dominated by one species. Includes stands of *Carex* spp., *Cladium mariscus*, *Equisetum fluviatile*, *Glyceria maxima*, *Hippuris vulgaris*, *Phragmites australis*, *Sagittaria sagittifolia*, *Schoenoplectus* spp., *Sparganium* spp. and *Typha* spp. Excludes terrestrialized reed and sedge beds which are not at the water's edge (D5.1, D5.2).

Plant communities

Deschampsion argenteae, Magno-Caricion gracilis, Magno-Caricion elatae, Eleocharito palustris-Sagittarion sagittifoliae, Typhion laxmannii, Phalaridion arundinaceae, Scirpion maritimi, Carici-Rumicion hydrolapathi, Phragmition communis

Corresponding class in other classifications

Milieux Naturels de Suisse 2008: 2.1.2.1: Roselière lacustre
2.1.2.2: Roselière terrestre

C3.4 Species-poor beds of low-growing water-fringing or amphibious vegetation

Description

Includes isoetids of the shores of oligotrophic lakes, *Nasturtium aquaticum* by streams, mediterranean dwarf *Scirpus* swards, and other species-poor but dissimilar types of vegetation.

Plant communities

Deschampsion litoralis, Littorellion uniflorae, Lobelion dortmannae, Rorippion islandicae, Subularion aquaticae

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 2.1 Rivages avec végétation

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included in:

1150 Coastal lagoons

3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)

3120 Oligothrophic waters containing very few minerals generally on sandy soils of the West Mediterranean, with *Isoetes* spp

3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea*

3170 Mediterranean temporary ponds

C3.5 Periodically inundated shores with pioneer and ephemeral vegetation

C3.51 Euro-Siberian dwarf annual amphibious swards (but excluding C3.5131 Toad-rush swards)

Includes the following subtypes separately listed in 2010 version

C3.511 Freshwater dwarf *Eleocharis* communities

C3.512 Dune-slack *Centaurium* swards

Description

Dwarf oligo-mesotrophic annual communities of recently emerged muds and sands of the nemoral, boreonemoral and boreal regions. Terrestrial forms of amphibious species and annual species are frequent. A dynamic habitat and several aspects can occur during the vegetation cycle. If the substrate is sufficiently wet, and also in advanced successional stages, the moss layer is abundant. Typical species are *Juncus bufonius*, *Cyperus fuscus*, *Cyperus flavescens* and other species from vegetation of class *Isoeto-Nanojuncetea*.

Communities dominated by *Juncus bufonius* (C3.5131 Toad-rush swards) are not included.

Plant communities

Elatino macropodae-Damasonion alismatis, Eleocharition soloniensis, Nanocyperion, Radiolion linoidis, Verbenion supinae

Species

C3.511: *Eleocharis ovata, Eleocharis carniolica, Carex bohemica, Lindernia procumbens, Scirpus supinus, Limosella aquatica, Cyperus fuscus, Peplis portula, Juncus tenageia, Elatine hexandra, Elatine hydropiper,* and *Coleanthus subtilis* **C3.512:** *Samolus valerandi, Centaurium littorale, Centaurium erythraea, Centaurium pulchellum, Gentianella amarella, Blackstonia perfoliata, Juncus bufonius* **C3.513:** *Juncus bufonius, Scirpus setaceus, Cyperus flavescens, Centunculus minimus, Spergularia segetalis, Centaurium pulchellum, Blackstonia perfoliata, Samolus valerandi, Cicendia filiformis, Radiola linoides* and *Illecebrum verticillatum*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 2.5.1 Végétation de petites annuelles éphémères

EU Habitats Directive Annex I

Included in

3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea*

C3.55 Sparsely vegetated river gravel banks

Description

Vascular plant communities occupying gravel deposits of rivers, including pioneer vegetation and subsequent stages in the colonization sequence. Early-stage communities of Alpine, boreal and

Mediterranean watercourses are specialised, those of nemoral lowlands and hills are related to other formations, in particular those of unit E3.

Plant communities

Calamagrostion neglectae, Calamagrostion pseudophragmitis, Epilobion fleischeri, Euphorbion rigidae, Festucion duriotaganae, Glaucion flavi, Muerbeckiello huetii-Epilobion dodonaei, Scrophularion sciophilae

Species

Myricaria germanica, Glaucium flavum, Oenothera biennis, Salix elaeagnos, Elymus fibrosus, Elymus transbaicalensis, Elymus kronokensis ssp. subalpinus, Cotoneaster cinnabarinus, Papaver lapponicum

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 3.2.1.1 Alluvions avec végétation pionnière herbacée

EU Habitats Directive Annex I

Partially covered by

3220 Alpine rivers and the herbaceous vegetation along their banks

3230 Alpine rivers and their ligneous vegetation with *Myricaria germanica*

3240 Alpine rivers and their ligneous vegetation with *Salix elaeagnos*

3250 Constantly flowing Mediterranean rivers with *Glaucium flavum*

Associated Habitat types

Can occur in a mosaic with !C3.62 Unvegetated river gravel banks

C3.6 Unvegetated or sparsely vegetated shores with soft or mobile sediments

C3.62 Unvegetated river gravel banks

Description

Unvegetated deposit beds of streams formed of pebbles, gravels, boulders or a mixture of gravels and finer sediments, occupying the edges of the stream, forming islands in the channel or supporting the arms and rivulets constituting the stream, together with their associated animal communities. Corresponding habitats with pioneer or ephemeral vascular vegetation are included in unit C3.55 and their succession leads to willow woodland (G1.11).

Associated Habitat types

Can occur in a mosaic with !C3.55 Sparsely vegetated river gravel banks

D MIRES, BOGS AND FENS

D1 Raised and blanket bogs

D1.2 Blanket bogs

Description

The mire surface and underlying peat of ombrotrophic peatlands, formed on flat or gently sloping ground with poor surface drainage, in oceanic climates with high rainfall. The mire surface may on flatter ground be very similar to that of a raised bog, with a complex of small pools and terrestrial hummocks. In the strictest sense, blanket bogs are a habitat endemic to northwestern Europe, characteristic of the western and northern British Isles, the Faeroe Islands and the western seaboard of Scandinavia. They often cover extensive areas with local topographic features supporting distinct communities but *Sphagnum* mosses play an important role in all of them, accompanied by *Narthecium ossifragum, Molinia caerulea, Scirpus cespitosus, Schoenus nigricans, Eriophorum angustifolium, Eriophorum vaginatum* and *Calluna vulgaris*. Blanket bog complexes (X28) include dystrophic pools (C1.4) and acidic flushes (D2.2) as well as the mire surface (D1.2).

Plant communities

Ericion tetralicis, Oxycocco-Ericion tetralicis

Species

Sphagnum papillosum, S. tenellum, S. compactum, S. magellanicum, S. rubellum, S. fuscum, Narthecium ossifragum, Molinia caerulea, Scirpus cespitosus, Schoenus nigricans, Eriophorum angustifolium, Eriophorum vaginatum, Calluna vulgaris

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7130 Blanket bogs (* if active bog)

D2 Valley mires, poor fens and transition mires

D2.2 Poor fens and soft-water spring mires

D2.22 *Carex nigra, Carex canescens, Carex echinata* fens

D2.226 Peri-Danubian black-white-star sedge fens

Description

Acidic fens, with an herbaceous sward formed by *Carex* spp and sometimes *Juncus effusus, Juncus acutiflorus* or *Nardus stricta* of the mountains and hills forming the basin of the middle and lower Danube basin, and of adjacent regions, in particular of the Carpathians, the Dinarides, the mountains of the southeastern Balkan peninsula and the Moravian hills.

Plant communities

Carici dacicae-Plantaginetum gentianoidis, Carici nigrae-Sphagnetum balkanicum, Carici echinatae-Sphagnetum, Junco-Caricetum fuscae, Sphagno-Caricetum rostratae, Carici-Sphagnetum droseretosum

Species

Carex echinata, Carex canescens, Carex dacica (Carex nigra ssp. dacica), Carex rostrata, Juncus effusus, Juncus acutiflorus, Nardus stricta, **D2.2262:** *Carex nigra, Carex echinata, Eriophorum angustifolium, Agrostis canina, Molinia caerulea, Nardus stricta, Drosera rotundifolia*. **D2.2263:** *Carex nigra, C. echinata, Eriophorum latifolium, E. angustifolium, E. vaginatum, Carex panicea, C. pallescens, Dactylorhiza cordigera, Pinguicula vulgaris, Primula farinosa ssp. exigua, Alchemilla bulgarica, Cirsium heterotrichum, Soldanella hungarica, Gymnadenia frivaldii, Juncus spp., Sphagnum spp.* **D2.2265:** *Carex*

nigra, Carex stellulata, Deschampsia cespitosa, Pinguicula vulgaris, Drosera rotundifolia, Sphagnum rubellum, Soldanella alpina, Dactylorhiza cordigera, Leucorchis albida

D2.3 Transition mires and quaking bogs

includes the following subtype separately listed in the 1998 edition of Resolution No. 4 (1996):

D2.3H Wet, open, acid peat and sand, with Rhynchospora alba and Drosera

Description

Incompletely terrestrialized wetlands occupied by peat-forming vegetation with acid groundwater or (for vegetation rafts) acid underlying pool or lake water. Included in this habitat type are rafts of *Sphagnum* and *Eriophorum* sp (D2.38) and quaking rafts of *Molinia caerulea* (D2.3D). Excluded are stands of vegetation fringing water bodies (C3.2) unless the vegetation raft is sufficiently extensive to count as a habitat in its own right.

Plant communities

Caricion canescenti-fuscae, Sphagno-Caricion canescentis, Caricion lasiocarpae, Rhynchosporion albae

Species

Eriophorum gracile, Carex chordorrhiza, C. lasiocarpa, C. diandra, C. rostrata, C. limosa, Scheuchzeria palustris, Hammarbya paludosa, Liparis loeselii, Rhynchospora alba, R. fusca, Menyanthes trifoliata, Epilobium palustre, Pedicularis palustris, Sphagnum sp. (*S. papillosum, S. angustifolium, S. subsecundun, S. fimbriatum, S. riparium, S. cuspidatum), Calliergon giganteum, Drepanocladus revolvens, Scorpidium scorpioides, Campylium stellatum, Aneura pinguis, Dactylorhiza curvifolia, Ophrys insectifera, Orchis palustris, Cladium mariscus*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 2.2.4 Cariçaie de transition

EU Habitats Directive Annex I

Includes:

7140 Transition mires and quaking bogs

7150 Depressions on peat substrates of the *Rhynchosporion*

D3 Aapa, palsa and polygon mires

D3.1 Palsa mires

Description

Mires of the subarctic and northern boreal regions formed by elevated frozen mounds or ridges (palsas), 0.5 to 8 m high and up to 50 m in diameter, interspersed wet hollows of similar area. Palsa mires are distributed in the discontinuous permafrost zone of Iceland, northern Fennoscandia and arctic Russia, in areas experiencing subzero temperatures for at least 200 days per year.

Plant communities

Oxycocco microcarpi-Empetrion hermaphroditi

Species

Eriophorum russeolum, Carex rotundata, C. saxatilis, Empetrum nigrum ssp. *hermaphroditum, Ledum palustre, Betula nana, Vaccinium microcarpum*; Mosses- *Dicranum elongatum*; Lichens: *Ochrolechia* spp., *Cladonia* spp., *Cladina* spp.

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7320 Palsa mires

D3.2 Aapa mires

Description

Mire complexes of the central and northern boreal zones, often extensive, with a concave or flat, gently to very slightly sloping surface patterned by an alternation of slightly to substantially raised ridges and hummocks (strings), with minerotrophic or ombrotrophic characteristics, and of minerotrophic pools and hollows (flarks), arranged perpendicularly to the slope direction. In Europe, the main area of distribution is subatlantic and subcontinental Fennoscandia and subarctic and arctic Russia.

Plant communities

Oxycocco microcarpi-Empetrion hermaphroditi, Sphagnion medii

Species

Plants: *Chamaedaphne calyculata, Empetrum nigrum* (s.lato), *Betula nana, Thricophorum cespitosum, Eriophorum vaginatum, E. russeolum, Carex rostrata, C. lasiocarpa, C. rotundata, C. chordorriza, C. livida, Scheuchzeria palustris, Molinia caerulea, Rubus chamaemorus, Saxifraga hirculus, Dactylorhiza incarnata*; Mosses- *Sphagnum papillosum, S. jensenii, S. lindbergii, S. majus, S. aongstroemii, S. subsecundum, S. subfulvum, S. pulchrum, Warnstorfia exannulata (Drepanocladus exannulatus), Limprichtia revolvens (Drepanocladus revolvens), Drepanocladus* (s.lato) spp., *Scorpidium scorpioides.*

Animals: Butterflies - *Pyrgus centaureae, Erebia disa*; Moths: *Syngrapha diasema, Apamea maillardi, Nola karelica, Hypoxyxtis pluviaria*.

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7310 Aapa mires

D3.3 Polygon mires

Description

Complex mires of the arctic and subarctic patterned by surface microrelief of large, 10 to 30 m in diameter, low-centre or high-centre polygons formed by the juxtaposition of dry, 0.3 to 0.5 m high, ridges covered by shrubs, hypnoid mosses and sphagna, and of wet hollows occupied by grasses, sedges, mosses and sphagna. Polygon mires occur mainly outside Europe, in tundra where the mean annual temperature is below -1°C.

Plant communities

Oxycocco microcarpi-Empetrion hermaphroditi

Species

Salix pulchra, S. reptans, Betula nana, Ledum decumbens, Vaccinium vitis-idaea, Rubus chamaemorus, Dryas punctata, Carex chordorrhiza, C. rariflora, C. rotundata, C. stans, Arctagrostis latifolia, Arctophila fulva, Dupontia fischeri, Aulacomnium palustre, A. turgidum, Homalothecium nitens, Polytrichum strictum, Hylocomium splendens, Sphagnum fimbriatum, S. girgensohnii, S. lenense, S. nemoreum, S. balticum, S. majus

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Not present in EU28

D4 Base-rich fens and calcareous spring mires

D4.1 Rich fens, including eutrophic tall-herb fens and calcareous flushes and soaks

Description

Wetlands and spring-mires, seasonally or permanently waterlogged, with a soligenous or topogenous base-rich, often calcareous water supply. Peat formation, when it occurs, depends on a permanently high watertable. Rich fens may be dominated by small or larger graminoids or tall herbs (e.g.). Where the water is base-rich but nutrient-poor, small sedges usually dominate the mire vegetation, together with a "brown moss" carpet. Hard-water spring mires (D4.1N) often contain tufa cones and other tufa deposits. Excluded is the water body of hard-water springs (C2.1); calcareous flushes of the alpine zone are a separate category (D4.2). Rich fens are exceptionally endowed with spectacular, specialised, strictly restricted species. They are among the habitats that have undergone the most serious decline. They are essentially extinct in several regions and gravely endangered in much of central and western Europe.

Plant communities

Caricion davallianae

Species

Campylium stellatum, *Drepanocladus intermedius*, *D. revolvens*, *Cratoneuron commutatum*, *Acrocladium cuspidatum*, *Ctenidium molluscum*, *Fissidens adianthoides*, *Bryum pseudotriquetrum*, *Schoenus nigricans*, *S. ferrugineus*, *Eriophorum latifolium*, *Carex davalliana*, *C. flava*, *C. lepidocarpa*, *C. hostiana*, *C. panicea*, *Juncus subnodulosus*, *Scirpus cespitosus*, *Eleocharis quinqueflora*, very rich herbaceous flora including *Tofieldia calyculata*, *Dactylorhiza incarnata*, *D. traunsteineri*, *D. traunsteinerioides*, *D. russowii*, *D. majalis* ssp.*brevifolia*, *D. cruenta*, *Eupatorium cannabinum*, *Liparis loeselii*, *Herminium monorchis*, *Epipactis palustris*, *Pinguicula vulgaris*, *Pedicularis sceptrum-carolinum*, *Primula farinosa*, *Swertia perennis*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 2.2.3 Parvocariçaie neutro-basophile

EU Habitats Directive Annex I

7230: Alkaline fens

References

Jiménez-Alfaro, B. et al. (2014). Biogeographic patterns of base-rich fen vegetation across Europe. *Applied vegetation science*, 17(2), 367-380.

D4.2 Basic mountain flushes and streamsides, with a rich arctic-montane flora

Description

Rare Alpine, peri-Alpine, northern British and periarctic pioneer communities colonizing gravelly, sandy, stony, sometimes somewhat argilous or peaty, calcareous sedimentary substrates soaked by cold water, in moraines and on the edge of springs, rivulets, glacial torrents of the alpine or subalpine levels, or on alluvial sands of pure, cold, slow-flowing rivers and calm backwaters. They host many species with a boreoarctic or glacial relict distribution, many of which are redlisted several countries.

Plant communities

Caricion bicoloris-atrofuscae

Species

Carex bicolor, C. microglochin, C. maritima, C. atrofusca, C. vaginata, Kobresia simpliciuscula, Scirpus pumilus, Juncus arcticus, J. alpinoarticulatus, J. castaneus, J. triglumis, Typha minima, T. lugdunensis, T. shuttleworthii, Tofieldia pusilla, often accompanied by Carex davalliana, C. dioica, C. capillaris, C. panicea, C. nigra, Blysmus compressus, Eleocharis quinqueflora, Scirpus cespitosus, Primula farinosa, Equisetum variegatum, Drepanocladus intermedius, Campylium stellatum

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 2.2.5 Groupement pionnier des bords de torrents alpins

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7240: Alpine pioneer formations of the *Caricion bicoloris-atrofuscae*

References

Jiménez-Alfaro, B. et al (2014). Biogeographic patterns of base-rich fen vegetation across Europe. *Applied vegetation science*, 17(2), 367-380.

D5 Sedge and reedbeds, normally without free-standing water

D5.2 Beds of large sedges normally without free-standing water

Description

Terrestrialized stands of tall species of *Carex, Cladium* and *Cyperus*, stands are usually species-poor and often dominated by one species, growing on waterlogged ground. These species also grow as emergents and fringing vegetation beside water bodies (C3.2).

Plant communities

Magno-Caricion elatae, Magno-Caricion gracilis, Carici-Rumicion hydrolapathi, Scrophulario umbrosae-Caricion paniculatae, Caricion broterianae, Caricion microcarpae, Deschampsion argenteae

Species

Angelica palustris, Carex acuta, Carex acutiformis, Carex appropinquata, Carex elata, Carex lasiocarpa, Carex paniculata, Cladium mariscus Cyperus papyrus, Schoenus nigricans, Kostelezkia pentacarpos

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 2.2.1.1 Magnocariçaie

2.2.1.2 Formation à marisque

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7210: Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*

D6 Inland saline and brackish marshes and reedbeds

D6.1 Inland saltmarshes

includes the following subtypes separately listed in or split units from the 1998 version:

D6.15 Interior Iberian *Microcnemum* and *Salicornia* swards

D6.16 Interior central European and Anatolian *Salicornia, Microcnemum, Suaeda* and *Salsola* swards

Description

Salt meadows and swards of *Salicornia* and other Chenopodiaceae of inland salt basins of the nemoral zone. Inland saltmarshes of middle Europe are remarkable, extremely threatened communities occurring

in a few isolated stations of Saxony and Lower Saxony, Schleswig-Holstein, Thuringia, Hesse, Lorraine, Auvergne, the Midlands and southeastern Poland (lower Nida valley).

Plant communities

Scorzonero-Juncion gerardii, Armerion maritimae, Potentillion anserinae, Puccinellio-Spergularion salinae, Puccinellion limosae, Puccinellion maritimae, Halo-Trichophorion pumili, Salicornion patulae, Thero-Salicornion

Species

Apium repens, Kosteletzkya pentacarpos, Primula nutans, Salicornia sp, Sisymbrium supinum

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1340 Inland salt meadows

D6.23 Interior Iberian salt pan meadows

Description

Salt meadows peculiar to the lowest, wettest parts of interior Iberian depressions, dominated by *Puccinellia fasciculata* or *Aeluropus littoralis* in the very lowest areas, or, slightly higher, by *Juncus gerardi*. The higher, drier ground that surrounds them is occupied either by other salt meadow communities that are less differentiated from the coastal communities (units A2.522 and A2.532) or by salt scrubs (unit F6.83).

Plant communities

Lygeo-Lepidion cardaminis, Lygeo sparti-Limonion furfuracei, Limonion catalaunico-viciosoi, Meliloto dentati-Bolboschoenion maritime,

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Included in

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

E GRASSLANDS AND LANDS DOMINATED BY FORBS, MOSSES OR LICHENS

E1 Dry grasslands

E1.1 Inland sand and rock with open vegetation

E1.11 Euro-Siberian rock debris swards

includes the following subtype separately listed in or split units from the 2010 version:

E1.112 *Sempervivum* or *Jovibarba* communities on rock debris

Description

Open lowland and hill rock debris swards of suboceanic, temperate, boreal or sub-Mediterranean, climates of Western Europe and of Central Europe, east, sporadically, to the Baltic countries and the Black Sea, formed mostly by annuals and succulents or semisucculents on decomposed rock surfaces of edges, ledges or knolls, with calcareous or siliceous soils frequently disturbed by erosion or rabbits. Vegetation communities are of *Alysso-Sedion albi* and *Seslerio-Festucion pallentis*. These swards comprise a great variety of distinct and often very local, isolated communities harbouring many characteristic species like *Erophila verna*, *Jovibarba globifera ssp. glabrescens*, *Poa bulbosa*, *Sedum acre*, *Sedum album*, *Sedum sexangulare*, among which are numerous rare forms including both relict and evolutionarily recent taxa. Together with more developed grassland communities of unit E1.29, sometimes E1.21-E1.25, E1.27, or E1.281, very species poor communities of units H3.19 or H3.2B, and lacunar shrub formations of unit F3.1, they constitute the vascular vegetation of middle European inland cliffs and rock outcroppings of unit H3 (namely H3.1B, H3.1C and H3.2E).

Plant communities

Alysso alyssoidis-Sedion albi, Sedo-Scleranthion biennis, Hyperico perforati-Scleranthion perennis, Sedion anglici, Sedo albi-Veronicion dillenii

Species

Alyssum alyssoides, Arabis recta, Cerastium spp., *Hornungia petraea, Jovibarba* spp., *Poa badensis, Saxifraga tridactylites, Sedum* spp., *Sempervivum* spp., *Teucrium botrys*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 4.1.1 Végétation des dalles calcaires de basse altitude

Nordic Vegetation Classification 1994: 5.2.1.1b Dry meadow type on bedrocks, northern variant

5.1.5.1 Bedrock alvar type

5.2.1.1a Dry meadow type on bedrocks, poor variant

5.2.1.1 Dry meadow type on bedrocks

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6110: Rupicolous calcareous or basophilic grasslands of the *Alysso-Sedion albi*

E1.12 Euro-Siberian pioneer calcareous sand swards

Description

Open grasslands of strongly to slightly calcareous inland sands of Western Europe and of middle, western and northern Central Europe, locally to Slovakia, the Baltic States and Belarus, sometimes interspersed with annual formations with *Cerastium semidecandrum*, *Vicia lathyroides*, *Silene conica*, *Phleum arenarium*, *Petrorhagia prolifera*, *Arenaria serpyllifolia*, *Sedum acre*. Dunal equivalent formations are found in unit H5.

Plant communities

Koelerion glaucae, Sileno conicae-Cerastion semidecandri, Sedo-Cerastion

Species

Helichrysum arenarium, Silene otites, Silene chlorantha, Dianthus deltoides, Dianthus arenarius, Bromus tectorum, Cynodon dactylon, Gypsophila fastigiata ssp. arenaria, Astragalus arenarius, Androsace septentrionalis, Onosma arenaria, Jurinea cyanoides, Koeleria glauca, Koeleria macrantha, Festuca psammophila, Festuca polesica, Festuca duvalii, Poa bulbosa, Colchicum arenarium, Stipa borysthenica ssp. germanica

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 4.1.1 Végétation des dalles calcaires de basse altitude

Nordic Vegetation Classification 1994: 5.1.4.1 *Koeleria glauca* type

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Same as

6120 Xeric sand calcareous grasslands

E1.13 Continental dry rocky steppic grasslands and dwarf scrub on chalk outcrops

Description

Communities of chamaephytes on cretaceous outcrops in the steppe and southern forest-steppe zones in the Don and (probably) Volga basins. A mix of the species of continental steppes is typical. The community is usually open, and plant cover varies from 30-70% with several threatened plant species.

Plant communities

Artemisio hololeucae-Hyssopion cretacei, Euphorbio cretophilae-Thymion cretacei

Species

Androsace koso-poljanskii, Artemisia hololeuca, Thymus cretaceus, Helianthemum cretophilum, Jurinea brachycephala, Gypsophila oligosperma, Asperula tephrocarpa, Euphorbia cretophila, Helianthemum cretaceum, Hyssopus cretaceus Astragalus tanaiticus, Daphne Sophia, Erysimum ucrainicum, Genista tanaitica, Hedysarum cretaceum, Hedysarum ucrainicum, Onobrychis vassilczenkoi, Pinus cretacea, Scrophularia cretacea, Silene cretacea

EU Habitats Directive Annex I

Does not occur in the EU

References

Romashchenko R.Yu., Didukh Ya.P., Solomakha V.A. (1996) Syntaxonomy of the class *Helianthemo-Thymetea* cl. nov. of the south-eastern Ukraine chalky grassland. *Ukrainian phytosociological collection, ser. A*: 1 pp49-62.

E1.2 Perennial calcareous grassland and basic steppes

Description

Perennial grasslands, often nutrient-poor and species-rich, on calcareous and other basic soils of the nemoral and steppe zones and of adjacent parts of the subboreal and submediterranean zones. Includes the calcareous grasslands of central and western Europe, alvar grasslands of the Baltic region, and basic grasslands of the steppe zone.

Plant communities

Brachypodietalia phoenicoidis, Brometalia erecti, Festucetalia vaginatae, Festucetalia valesiacae, Helictotricho-Stipetalia, Koelerio-Phleetalia phleoidis, Scorzonero-Chrysopogonetalia, Seslerietalia rigidae, Stipo pulcherrimae-Festucetalia pallentis

Species

Artemisia laciniata, Artemisia oelandica, Artemisia pancicii, Astragalus centralpinus, Biscutella neustriaca, Cypripedium calceolus, Dianthus arenarius ssp. arenarius, Dracocephalum austriacum, Euphrasia marchesettii, Gentianella anglica, Jurinea cyanoides, Lilium pomponium, Pulsatilla patens, Pulsatilla vulgaris ssp. gotlandica, Senecio jacobaea ssp. gotlandicus, Stipa bavarica, Stipa styriaca, Thesium ebracteatum, Allium savranicum, Colchicum laetum, Silene cretacea, Bellevalia sarmatica, Elytrigia stipifolium, Iris rectulata, Iris notha, Stipa dasyphylla, Crocus speciosus, Koeleria sclerophylla, Stipa pulcherrima, Stipa zalesskii, Fritillaria rithenica, Adonis wolgensis, Astragalus cretophilus, Bulbocodium versicolor, Crambe grandiflora, Diplotaxiis cretacea, Paeonia tenuifolia, Tulipa schrenkii, Cotoneastrum alaunicus, Papaver bracteatum, Potentilla eversmanniana, Rosa donetzica

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 4.2 Pelouses sèches thermophiles

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6190 Rupicolous pannonic grasslands (*Stipo-Festucetalia pallentis*)

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)

6240 Sub-Pannonic steppic grasslands

6250 Pannonic loess steppic grasslands

6260 Pannonic sand steppes

6280 Nordic alvar and precambrian calcareous flatrocks

62C0 Ponto-Sarmatic steppes

E1.3 Mediterranean xeric grassland

Description

Meso- and thermo-Mediterranean xerophile, mostly open, short-grass perennial grasslands rich in therophytes; therophyte communities of oligotrophic soils on base-rich, often calcareous substrates e.g. vegetation of the class Thero-Brachypodietea.

Plant communities

Diantho humilis-Velezion rigidae, Cymbopogoni-Brachypodion ramosi, Plantagini-Catapodion marini, Moricandio-Lygeion sparti, Dauco-Catananchion luteae, Sedo-Ctenopsion gypsophilae, Trachynion distachyae, Thero-Brachypodion, Armerion girardii, Omphalodion commutatae, Stipion retortae

Species

Brachypodium distachyum, B. retusum, B. fasciculatus, B. madritensis, B. rubens, B. alopecuros, Aegilops neglecta, A. geniculata, A. triuncialis, Avena sterilis, A. barbata, Lagurus ovatus, Cynosurus echinatus, Stipa capensis, Hyparrhenia hirta, Andropogon distachyos, Cynodon dactylon, Dactylis hispanica, Urginea maritima, Asphodelus microcarpus, Lloydia graeca, Anacamptis pyramidalis

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6220 Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea

E1.55 Eastern sub-Mediterranean dry grassland

Description

Open, xeric grasslands on carbonate rocks or flysh of the sub-Mediterranean zones of Trieste, Istria, the Balkan peninsula and of the *Ostryo-Carpinion* zone of Greece, where they coexist with steppic grasslands of the *Festucetalia valesiacae* (unit E1.21), developing in areas of lesser continentality than the latter, and incorporating a greater Mediterranean element than they do; like the steppic grasslands, however, they are often dominated by *Carex humilis* or *Festuca rupicola*. Maintained by extensive mowing or grazing, they are invaded by tall herbs after abandonment.

Plant communities

Chrysopogono-Saturejion subspicatae, Scorzonerion villosae

Species

Carex humilis, Bromus erectus, Centeurea rupestris, Leucanthemum liburnicum, Plantago argentea, Jurinea mollis, Iris cengialti, Pulsatilla vulgaris ssp. *grandis, Genista holopetala, Hladnikia pastinacifolia, Euphrasia marchesettii, Pedicularis friderici-augusti, Sesleria juncifolii, Gentiana lutea, Gentiana clusii, Trinia glauca, Arctostaphylos uva-ursi, Euphorbia triflora,*

Festuca rupicola

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62A0 Eastern sub-mediteranean dry grasslands (*Scorzoneratalia villosae*)

References

Terzi, Massimo. (2014) Numerical Analysis of the Order *Scorzoneretalia villosae Phytocoenologia*. 44(3-4), 3-4

E1.7 Closed non-Mediterranean dry acid and neutral grassland

E1.71 *Nardus stricta* swards

Description

Mesophile and xerophile *Nardus stricta* dominated or -rich grasslands of Atlantic or sub-Atlantic lowland, collinar and montane regions of northern Europe, middle Europe and western Iberia. Other important species: *Festuca rubra, Agrostis capillaris, Agrostis pyrenaica, Avenula versicolor, Campanula alpine* and *Avenella flexuosa*.

Does not include subalpine and alpine *Nardus stricta* communities (*Nardion strictae*) which are included in E4.3 Acid alpine and subalpine grassland.

Plant communities

Violion caninae

Species

Nardus stricta, Festuca rubra, Agrostis capillaris, Avenella flexuosa, Avenula versicolor, Polygala vulgaris, **E1.711** *Galium saxatile, Potentilla erecta* **E1.712** *Arnica montana, Campanula rotundifolia, Carex panicea, Thymus pulegioides,* **E1.713** *Danthonia decumbens, Calluna vulgaris, Sieglingia decumbens,* **E1.714** *Carex pallescens, Gymnadenia conopsea, Orchis mascula, Dactylorhiza majalis, Platanthera bifolia, Phyteuma nigrum, Lychnis flos-cuculi, Anemone nemorosa*

Corresponding class in other classifications

Nordic Vegetation Classification 1994: 5.1.3.3 Mat grass heath type

Milieux naturels de Suisse 2008: 5.4.1 Lande subatlantique acidophile

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6230 *Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)

E1.722 Boreo-arctic *Agrostis-Festuca* grasslands

Description

Grasslands of subarctic affinities of the northern boreal and middle boreal zones of northern Scandinavia and northwestern Russia, of the alpine and arcto-alpine zones of the Caledonian chains of Scandinavia and of lowlands and hills of Iceland, composed of *Festuca* spp., *Agrostis capillaris*, with *Anthoxanthum odoratum*, other grass species, often with *Polygonum viviparum* and other herbs.

Plant communities

Potentillo-Polygonion vivipara

Corresponding class in other classifications

Nordic Vegetation Classification 1994: 5.1.3.2 Common Bent heath type

5.2.1.2 Sheep's Fescue dry meadow type

5.2.1.3a Dry meadow type rich in herbs, poor Red Fescue variant

5.2.2.2 Common Bent meadow type

5.2.2.5 Northern Sheep's Fescue meadow type

5.2.2.6 Northern Red Fescue meadow type

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Included in

6270 Fennoscandian lowland species-rich dry to mesic grasslands

E1.8 Closed Mediterranean dry acid and neutral grassland

E1.83 Mediterraneo-montane *Nardus stricta* swards

Description

Perennial grasslands on acid soils of the supra-Mediterranean zone, dominated by grasses such as *Festuca elegans* or *Nardus stricta*. Mediterranean annual-rich siliceous grassland of siliceous gravelly, sandy or silty, usually shallow, soils that remain cohesive during the dry season.

Plant communities

Helianthemion guttati, Vulpio-Lotion,Potentillo ternatae-Nardion, Corynephoro-Malcolmion patulae, Festucion elegantis, Campanulo herminii-Nardion strictae, Potentillion calabri

Species

Arnica montana, Colchicum corsicum, Festuca elegans, Gentiana lutea, Nardus stricta

E1.9 Open non-Mediterranean dry acid and neutral grassland, including inland dune grassland

Description

Open grassland, often with therophytes, of the nemoral, boreonemoral and submediterranean zones, developed on raw non-calcareous soils, especially on inland dunes and fixed sands.

Plant communities

Armerion elongatae, Armerion junceae, Armerio-Potentillion, Corynephorion canescentis, Diantho pinifolii-Jasionion heldreichii, Hyperico perforati-Scleranthion perennis, Koelerion glaucae Sedo-Cerastion arvensis, Sedo albi-Veronicion dillenii, Sedion pyrenaici, Sedo-Scleranthion, Scabioso-Trifolion dalmatici, Sileno conicae-Cerastion semidecandri, Thero-Airion

Species

E1.91: *Aira caryophyllea, Aira praecox, Micropyrum tenellum* (*Nardurus lachenalii*), *Vulpia bromoides, Vulpia myuros, Trisetum ovatum, Filago arvensis, Filago gallica, Filago lutescens, Filago minima, Filago pyramidata, Filago vulgaris, Spergula morisonii, Hypochoeris glabra, Evax carpetana, Moenchia erecta, Scleranthus polycarpos, Teesdalia nudicaulis, Myosotis discolor, Myosotis stricta, Linaria elegans, Linaria amethystea, Sedum lagascae, Sedum pedicellatum, Ornithopus perpusillus, Trifolium striatum, Trifolium arvense, Trifolium dubium, Trifolium campestre, Trifolium micranthum, Tuberaria guttata* **E1.92:** *Agrostis capillaris, Agrostis vinealis, Agrostis delicatula, Agrostis durieui, Agrostis castellana, Poa angustifolia, Anthoxanthum odoratum, Festuca filiformis, Corynephorus canescens, Calamagrostis epigejos, Carex arenaria* **E1.93:** *Corynephorus canescens,* sometimes by *Leymus arenarius* or *Carex arenaria* **E1.94:** *Corynephorus canescens, Carex arenaria, Spergula morisonii, Teesdalia nudicaulis* and carpets of fruticose lichens (*Cladonia, Cetraria*) **E1.99:** *Corynephorus canescens, Festuca vaginata, Koeleria glauca, Thymus serpyllum* and *Ceratodon purpureus*

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Includes

2330 Inland dunes with open Corynephorus and Agrostis grasslands

2340 Pannonic inland dunes

E1.B Heavy-metal grassland

Description

Dry, short grasslands, often rich in lichens and mosses, colonizing western and central European soils with a high content in heavy metals such as zinc and lead, and comprising uniquely adapted species, ecotypes or populations mostly related to, or derived from, otherwise montane, boreomontane or steppic species; heavy metal grasslands of distinctly alpine affinities, though spanning an altitudinal range that extends from the montane level and lowland dealpine stations to the subalpine and alpine levels, are included. Vegetation of the order *Violetalia calaminariae*.

Plant communities

Armerion halleri, Plantagini-Festucion ovinae, Thlaspion calaminariae, Thlaspion rotundifolii

Species

Armeria arenaria, Armeria bottendorfensis, Armeria halleri, Armeria maritima, Dianthus sylvestris, Festuca ophioliticola ssp. *calaminaria, Festuca valesiaca, Galium anisophyllon, Minuartia verna var. hercynica, Poa alpina, Silene vulgaris* ssp. *humilis, Thlaspi alpestre* ssp. *calaminare, Thlaspi caerulescens, Viola calaminaria, Viola dubyana*

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6130 Calaminarian grasslands of the Violetalia calaminariae

E2 Mesic grasslands

E2.1 Permanent mesotrophic pastures and aftermath-grazed meadows

E2.15 Macaronesian mesic grassland

Description

Secondary grasslands of the highest levels of the Atlantic islands.

Plant communities

Festucion francoi

Species

Holcus rigidus, Festuca jubata, Deschampsia foliosa, Ranunculus cortusifolius, Rumex azorica, Cardamine caldeirarum, Dryopteris azorica, D. crispifolia, Euphrasia grandiflora, Lactuca watsoniana, Senecio malvifolius, Tolpis azorica, Bellis azorica, Sanicula azorica, Ammi spp.

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6180 Macaronesian mesophile grasslands

E2.2 Low and medium altitude hay meadows

Includes the following subtypes separately listed in the 1998 version

E2.25 Continental meadows

Description

Mesotrophic hay meadows of low altitudes of Europe, fertilised and well-drained. They are most characteristic of the nemoral and boreonemoral zones of Europe, but extend to the Cordillera Central, the Apennines and the supra-Mediterranean zone of the Balkan peninsula and Greece.

Plant communities

Arrhenatherion elatioris, Brachypodio-Centaureion nemoralis, Calthion palustris, Conioselinion tatarici, Cynosurion cristati, Deschampsion cespitosae, Glycyrrhizion echinatae, Glycyrrhizion glabrae, Glycyrrhizion korshinskyi, Molinion caeruleae, Ranunculo neapolitani-Arrhenatherion elatioris, Rumicion thyrsiflori

Species

Arrhenatherum elatius, Alchemilla xanthochlora, Alopecurus pratensis, Anthriscus sylvestris, Arrhenatherum elatius, Bromus erectus, Campanula patula, Crepis biennis, Crepis biennis, Dactylis glomerata, Daucus carota, Equisetum arvense, Festuca rubra, Galium album, Geranium pratense, Heracleum sphondylium, Knautia arvensis, Leucanthemum vulgare, Medicago sativa, Pastinaca sativa, Picris hieracioides, Pimpinella major, Sanguisorba officinalis, Trifolium dubium, Trisetum flavescens

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 4.5.1 Prairie de fauche de basse altitude

EU Habitats Directive Annex I

Includes

6270 Fennoscandian lowland species-rich dry to mesic grasslands

6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)

E2.3 Mountain hay meadows

Description

Often species-rich mesotrophic to eutrophic hay meadows of the montane and subalpine levels of higher mountains of the nemoral and southern boreal zones.

Plant communities

Calthion palustris, Pancicion serbicae, Phyteumato-Trisetion flavescentis, Polygonion kraschenninnikovii, Triseto flavescentis-Polygonion bistortae, Violion cornutae

Species

Trisetum flavescens, *Alchemilla* spp., *Anthoxanthum odoratum*, *Astrantia major*, *Campanula glomerata*, *Carum carvi*, *Centaurea nemoralis*, *Crepis* spp., *Crocus albiflorus*, *Geranium* spp., *Heracleum sphondylium*, *Chaerophyllum hirsutum*, *Lilium bulbiferum*, *Malva moschata*, *Muscari botryoides*, *Narcissus poeticus*, *Phyteuma* spp., *Pimpinella major*, *Polygonum bistorta*, *Primula elatior*, *Salvia pratensis*, *Silene* spp., *Thlaspi caerulescens*, *Trollius europaeus*, *Valeriana repens*, *Viola* spp, *Cynosurus cristatus*, *Festuca pratensis.*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 4.5.2 Prairie de fauche de montagne

EU Habitats Directive Annex I

Includes

6520 Mountain hay meadows

E3 Seasonally wet and wet grasslands

E3.1 Mediterranean tall humid grassland

includes the following subtypes separately listed in or split units from the 1998 version:

E3.111 Serapias grassland

Description

Mediterranean humid grasslands of tall grasses and rushes widespread throughout the Mediterranean basin, extending, along the coasts of the Black Sea, in particular in dune systems, north to the Dobrogea and the Danube Delta, and, in valleys of the Balkan peninsula, north to the Banat.

Plant communities

Molinio-Holoschoenion, Sieglingion decumbentis

Species

Scirpus holoschoenus (*Holoschoenus vulgaris*), *Agrostis stolonifera, A. reuteri, Galium debile, Molinia caerulea, Briza minor, Melica cupanii, Cyperus longus, Linum tenue, Trifolium resupinatum, Schoenus nigricans, Peucedanum hispanicum, Carex mairii, Juncus maritimus, J. acutus, Asteriscus aquaticus, Hypericum tomentosum, H. tetrapterum, Inula viscosa, Oenanthe pimpinelloides, O. lachenalii, Eupatorium cannabinum, Prunella vulgaris, Pulicaria dysenterica, Tetragonolobus maritimus, Orchis laxiflora, Dactylorhiza elata, Succisa pratensis, Sonchus maritimus* ssp. *aquatilis, Silaum silaus, Sanguisorba officinalis, Serratula tinctoria, Genista tinctoria, Cirsium monspessulanum, C. pyrenaicum, Senecio doria, Dorycnium rectum, Erica terminalis, Euphorbia pubescens, Lysimachia ephemerum*

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6420: Mediterranean tall humid grasslands of the *Molinio-Holoschoenion*

E3.3 Sub-mediterranean humid meadows

Description

Humid meadows rich in clover (*Trifolium* spp.) of sub- and supramediterranean regions remote from Atlantic influence, in particular, of the Balkan peninsula, of the Apennines and of Mediterranean Anatolia, mostly developed above the lowlands but below the montane level.

Plant communities

Molinio-Hordeion secalini, Ranunculion velutini, Trifolion resupinati, Trifolion pallidi

Species

E3.31: *Alopecurus pratensis*, *Alopecurus rendlei* (*Alopecurus utriculatus*), *Festuca pratensis* (*Festuca elatior*) or *Poa trivialis ssp. sylvicola* (*Poa sylvicola*), and by numerous *Trifolium* spp., *Medicago hispida ssp. apiculata, Lotus corniculatus var. hirsutus, Hordeum murinum, Ranunculus marginatus, Ranunculus velutinus, Cirsium canum var. macedonicum, Oenanthe stenoloba, Moenchia mantica, Lychnis flos-cuculi ssp. subintegra, Teucrium scordioides, Podospermum canum, Narcissus poeticus, Leucojum aestivum* **E3.32:** *Ranunculus velutinus, Bromus racemosus, Hordeum secalinum, Trifolium dubium, Trifolium resupinatum, Trifolium micranthum, Trifolium patens, Trifolium fragiferum, Trifolium pratense, Trifolium repens, Carex distans, Deschampsia cespitosa, Gaudinia fragilis, Ophioglossum vulgatum, Centaurea jacea, Holcus lanatus, Alopecurus rendlei* (*Alopecurus utriculatus*), *Orchis laxiflora, Colchicum lusitanum* **E3.34:** *Deschampsia cespitosa, Alopecurus pratensis* or *Poa trivialis ssp. sylvicola*, with *Trifolium pallidum, Trifolium patens, Trifolium fragiferum, Trifolium cinctum, Ranunculus stevenii, Lathyrus nissolia, Medicago arabica, Clematis integrifolia*.

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Includes 6540 Sub-Mediterranean grasslands of the *Molinio-Hordeion secalini*

E3.4 Moist or wet eutrophic and mesotrophic grassland

Description

Wet eutrophic and mesotrophic grasslands and flood meadows of the boreal and nemoral zones, dominated by grasses, rushes or *Scirpus sylvaticus*.

Plant communities

Glycyrrhizion glabrae, Calthion palustris, Deschampsion cespitosae, Juncion acutiflori, Cnidion venosi; Agropyro-Rumicion, Molinion caeruleae, Arrhenatherion, Alopecurion pratensis, Filipendulion.

Species

E3.41: *Caltha palustris, Cirsium palustre, C. rivulare, C. oleraceum, Carduus personata, Telekia speciosa, Epilobium parviflorum, Mentha aquatica, Scirpus sylvaticus, Stachys palustris, Bromus racemosus, Crepis paludosa, Fritillaria meleagris, Geum rivale, Polygonum bistorta, Senecio aquaticus, Trollius europaeus, Lotus uliginosus, Trifolium dubium, Equisetum palustre, E. telmateia, Myosotis palustris, Oenanthe silaifolia, Gratiola officinalis, Inula salicina, Succisella inflexa, Dactylorhiza majalis, Alopecurus pratensis, Festuca gigantea, Juncus effusus, Juncus filiformis*. **E3.42:** *Juncus acutiflorus*. **E3.43**: *Deschampsia cespitosa; Cnidium dubium, Viola persicifolia, Allium angulosum, Iris sibirica, Oenanthe lachenalii, Oenanthe silaifolia, Gratiola officinalis, Juncus atratus, Leucojum aestivum, Carex praecox var. suzae, Lythrum virgatum*. **E3.44:** *Juncus effusus, J. conglomeratus, J. inflexus, J. compressus, J. tenuis, Carex hirta, Festuca arundinacea, Alopecurus geniculatus, Rumex crispus, Mentha longifolia, M. pulegium, Potentilla anserina, P. reptans, Ranunculus repens*. **E3.46:** *Cirsium canum, Alopecurus pratensis, Festuca pratensis, Deschampsia cespitosa, Polygonum bistorta, Angelica sylvestris, Scirpus sylvaticus, Caltha palustris, Valeriana simplicifolia, Pedicularis limnogena, Ligularia sibirica, Telekia speciosa*

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subtype E3.43 = 6440: Alluvial meadows of river valleys of the *Cnidion dubii*

E3.5 Moist or wet oligotrophic grassland

Description

Grasslands on wet, nutrient-poor, often peaty soils, of the boreal, nemoral and steppe zones. Includes coarse acid grassland dominated by *Molinia caerulea* and shorter wet heathy grasslands with *Juncus squarrosus, Nardus stricta* and *Scirpus cespitosus*.

Plant communities

Molinion caeruleae, Juncion squarrosi, Junco-Molinion, Juncion acutiflori

Species

Artemisia laciniata, Carex acuta, Juncus squarrosus, Ligularia sibirica, Molinia caerulea, Nardus stricta, Scirpus cespitosus, Thesium ebracteatum

E3.51:, *Succisa pratensis, Allium angulosum, A. suaveolens, Betonica officinalis, Cirsium dissectum, C. tuberosum, Dianthus superbus, Trollius europaeus, Galium boreale, Gentiana asclepiadea, G. pneumonanthe, Gladiolus palustris, Silaum silaus, Selinum carvifolia, Inula salicina, Iris sibirica, Laserpitium prutenicum, Lathyrus pannonicus, Tetragonolobus maritimus, Serratula tinctoria, Dactylorhiza maculata.* **E3.52**:, *Festuca ovina, Gentiana pneumonanthe, Pedicularis sylvatica,* and sometimes *Sphagnum* spp.

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 2.3.1 prairie à molinie

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subtype E3.51 = 6410: *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)

E4 Alpine and subalpine grasslands

E4.1 Vegetated snow-patch

E4.11 Boreo-alpine acidocline snow-patch grassland and herb habitats

Description

Snow patches of the Alps, the Pyrenees, the Carpathians (e.g. alliances *Salicion herbaceae* and *Festucion picturatae*), the Dinarides, the Rhodope Mountains (Rila) and the Pelagonides, occupying areas free from snow for less than two months, with the herbs e.g. *Luzula alpinopilosa*, *Salix herbacea*, *Ligusticum mutellina*; mosses *Polytrichum sexangulare*, *Polytrichum juniperinum*, *Pohlia commutata*, *Kiaeria falcata* (*Dicranum falcatum*), the liverwort *Anthelia juratzkana* or sometimes lichens. Also snow-patch communities of arctic and boreal mountains of Fennoscandia, the Scottish Highlands, Iceland, Greenland and other islands of the Norwegian and Greenland seas, formed of mats of mosses and lichens.

Plant communities

Salicion herbaceae, Salici herbaceae-Caricion lachenalii, Festucion picturatae, Ranunculion crenati, Hyalopoion ponticae, Cassiopo-Salicion herbaceae

Species

4.111: *Polytrichum sexangulare*, *Polytrichum juniperinum*, *Pohlia commutata*, *Kiaeria falcata* (*Dicranum falcatum*), the liverwort *Anthelia juratzkana* **4.112:** *Carex foetida, Alopecurus gerardii*, *Omalotheca supina* (*Gnaphalium supinum*) (including *Omalotheca supina var. pusilla*), *Lepidium stylatum*, *Alchemilla pentaphyllea*, *Mucizonia sedoides*, (*Umbilicus sedoides*, *Sedum candollei*), *Sedum*

alpestre, *Cardamine alpina*, *Carex pyrenaica* **4.113:** *Luzula alpinopilosa ssp. obscura* (*Luzula spadicea*)*Poa granitica*, *Ranunculus montanus*, *Oligotrichum hercynicum* **E4.114:** *Nardus stricta*, *Omalotheca supina* (*Gnaphalium supinum*), *Plantago atrata*, *Salix herbacea*, *Polytrichum gracile*, *Polytrichum norvegicum*, *Luzula desvauxii* **E4.116:** *Deschampsia cespitosa*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 4.4.2 Combe à neige acide

Nordic Vegetation Classification 1994: 1.2.1.4 Wavy Hairgrass - Sweet Vernal grass type

1.2.3.1 Meadow Buttercup - Sweet Vernal grass variant

1.2.3.2 Starry Saxifrage - Mountain Sorrel type

1.2.5.1 Alpine Lady fern type

1.3.1.1 Mossy Mountain heather – Dwarf willow type

1.3.1.2 Rufine Sedge - Arctic Hare's-foot Sedge type

1.3.1.3 Curved Woodrush-Glacier Buttercup type

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Included in 6150 Siliceous alpine and boreal grasslands

E4.12 Boreo-alpine calcicline snow-patch grassland and herb habitats

Description

Herbaceous snow-patch swards of the Alpids, characteristic of calcareous soils under snow for long periods, with *Arabis caerulea*, *Carex atrata*, *Ranunculus alpestris*, *Saxifraga androsacea* and other calciphile snowfield, snowbed and snow-patch communities of boreal and arcto-alpine mountains formed by small herbs, grasses or mosses. Dwarf, underground-stemmed willows may also be present but not dominant (c.f. unit F2.12).

Plant communities

Arabidion caeruleae, *Ranunculo-Oxyrion didynae*

Species

E4.121: *Arabis caerulea*, *Carex atrata*, *Ranunculus alpestris*, *Saxifraga androsacea* **E4.122:** *Distichium capillaceum*, *Pohlia albicans*, *Pohlia drummondii*, *Cardamine pratensis ssp. dentata*, *Cerastium arcticum*, *Cerastium cerastoides*, *Saxifraga oppositifolia* **E4.123:** *Ranunculus nivalis*, *Ranunculus sulphureus*, *Salix herbacea*, *Arabis alpina*, *Polygonum viviparum* (*Bistorta vivipara*), *Cerastium cerastoides*, *Minuartia biflora*, *Oxyria digyna*, *Taraxacum croceum*, *Viola biflora*, *Saxifraga oppositifolia, Saxifraga rivularis*, *Saxifraga nivalis*, *Saxifraga tenuis*, *Saussurea alpina*, *Sibbaldia procumbens*, *Juncus biglumis*, *Poa alpine* **E4.124:** *Salix herbacea*, *Cerastium arcticum*, *Cerastium cerastoides*, *Oxyria digyna*, *Ranunculus glacialis*, *Ranunculus nivalis*, *Ranunculus pygmaeus*, *Saxifraga cernua*, *Saxifraga oppositifolia*, *Saxifraga rivularis*, *Saxifraga stellaris*, *Saxifraga tenuis*, *Carex lachenalii*, *Juncus biglumis*, *Poa alpina f. vivipara*, *Deschampsia alpina*, *Sagina saginoides* **E4.125:** *Luzula arctica*. *Luzula confusa*, *Ranunculus glacialis*, *Ranunculus sulphureus*, *Cerastium* spp. and *Draba crassifolia* **E4.126:** *Ranunculus acris*, *Poa alpina*, *Poa arctica*, *Saxifraga oppositifolia*, *Silene acaulis*, *Oxyria digyna*, *Potentilla crantzii*, *Cerastium alpinum*, *Polygonum viviparum* (*Bistorta vivipara*), *Saussurea alpina*, *Primula stricta*, *Viola biflora*, *Carex norvegica*, *Minuartia biflora*, *Thalictrum alpinum* **E4.127:** *Trisetum spicatum*, *Ranunculus nivalis*, *Ranunculus pygmaeus*, *Oxyria digyna*, *Lidia biflora*, *Poa arctica*, *Potentilla hyparctica*, *Carex lachenalii*.

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 4.4.1 Combe à neige calcaire

Nordic Vegetation Classification 1994: 1.2.4.1 Low herb type

1.2.4.3 Meadow Buttercup - Alpine Meadow grass type

1.2.4.4 Purple Saxifrage - Mountain Sorrel type

1.3.2.1a Distichium capillaceum-variant

1.3.2.2 Snow Buttercup type

1.3.2.3 Snow grass type

1.3.3.1 Arctic Woodrush type

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Included in 6170 Alpine and subalpine calcareous grasslands

E4.3 Acid alpine and subalpine grassland

Description

Alpine and subalpine grasslands developed over crystalline rocks and other lime-deficient substrates or on decalcified soils of mountains. On boreal mountains, *Carex bigelowii* and *Juncus trifidus* often dominate. The acid alpine grasslands of central Europe are more mixed, with *Armeria alpina*, *Armeria alliacea* (*Armeria montana*), *Euphrasia minima*, *Gentiana alpina*, *Geum montanum*, *Juncus trifidus*, *Lychnis alpina*, *Pedicularis pyrenaica*, *Phyteuma hemisphaericum*, *Pulsatilla alpina ssp. sulphurea*, *Ranunculus pyrenaeus*, *Sempervivum montanum*, *Botrychium lunaria*.

Plant communities

Agrostion alpinae, Agrostion schraderanae, Anemonastro sibirici-Festucion ovinae, Anemonion speciosae, Calamagrostion arundinaceae, Calamagrostion villosae, Campanulion albanicae, Campanulo herminii-Nardion strictae, Carici-Juncion trifidi, Carici macrostyli-Nardion, Caricion curvulae, Equiseto-Galion borealis, Festucion eskiae, Festucion macratherae, Festucion supinae, Festucion variae, Festucion versicoloris, Festucion woronowii, Festucion xanthinae, Juncion trifidi, Kobresion capilliformis, Kobresio-Dryadion, Nardo-Caricion rigidae, Poion violaceae, Potentillo montenegrinae-Festucion paniculatae, Potentillo ternatae-Nardion, Potentillo-Polygonion vivipara, Ranunculo pollinensis-Nardion strictae, Sesamoido pygmaeae-Poion violaceae, Seslerion comosae, Trifolion parnassii, Trisetion fusci

Species

E4.31: *Nardus stricta*, *Festuca eskia*, *Festuca nigrescens*, *Festuca rubra*, *Alopecurus gerardii*, *Bellardiochloa violacea* (*Poa violacea*), *Carex sempervirens*, *Anthoxanthum odoratum*, *Hieracium alpinum*, *Trommsdorfia uniflora*, *Potentilla aurea* **E4.32:** *Juncus trifidus*, *Carex bigelowii* **E4.34:** *Carex curvula*, *Festuca* spp., *Oreochloa* spp. *Juncus trifidus*, *Androsace obtusifolia*, *Androsace carnea ssp. laggeri*, *Campanula barbata*, *Juncus jacquinii*, *Juncus trifidus*, *Silene exscapa*, *Gentiana alpina*, *Achillea erba-rotta*, *Euphrasia minima*, *Luzula lutea*, *Luzula spicata*, *Luzula hispanica*, *Lychnis alpina*, *Minuartia recurva*, *Minuartia sedoides*, *Pedicularis kerneri*, *Pedicularis pyrenaica*, *Phyteuma globulariifolium*, *Phyteuma hemisphaericum*, *Potentilla frigida*, *Armeria alpina*, *Senecio incanus*, *Trifolium alpinum*, *Veronica bellidioides*, *Ranunculus pyrenaeus* **E3.35:** *Alopecurus gerardii*, *Poa pumila*, *Anthoxanthum alpinum*, *Phleum alpinum*, *Nardus stricta*, *Bellardiochloa violacea* (*Poa violacea*), *Trisetum flavescens*, *Trifolium pallescens*, *Trifolium parnassi*, *Trifolium heldreichianum*, *Trifolium alpestre*, *Trifolium ottonis*, *Omalotheca supina*, *Omalotheca hoppeana*, *Herniaria parnassica*, *Ranunculus sartorianus*, *Lotus corniculatus*, *Thesium parnassi*, *Plantago lanceolata*, *Plantago atrata*, *Plantago holosteum*, *Scleranthus perennis*, *Rorippa thracica*, *Erigeron epiroticus*, *Acinos alpinus*, *Luzula pindica*, *Crocus veluchensis*, *Scilla nivalis*, *Corydalis densiflora*, *Corydalis parnassica*, *Beta nana*, *Trinia guicciardii*, *Botrychium lunaria* **E4.39:** *Festuca paniculata*, *Bellardiochloa violacea*, *Festuca airoides* (*Festuca supina*), *Agrostis rupestris*, *Festuca valida* and *Sesleria comosa*, *Nardus stricta*, *Aquilegia aurea*, *Lilium jankae*, *Gentiana*

lutea, Gentiana punctata, Viola rhodopeia **E4.3B:** *Minuartia recurva* and *Scleranthus neglectus, Armeria rumelica, Poa violacea, Cardamine pancicii, Luzula campestris, Juncus trifidus, Anthemis carpatica, Jasione orbiculata, Rumex acetosella, Plantago carinata, Campanula scheuchzeri*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 4.3.5 Pâturage maigre acide

4.3.6 Pelouse rocheuse acide

4.3.7 Pelouse acide de l'étage alpin supérieur

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Includes

6140 Siliceous Pyrenean *Festuca eskia* grasslands

6150 Siliceous alpine and boreal grasslands

6160 Oro-Iberian *Festuca indigesta* grasslands

6170 Alpine and subalpine calcareous grasslands

6230 Species-rich *Nardus* grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)

62D0 Oro-Moesian acidophilous grasslands

E4.4 Calcareous alpine and subalpine grassland

Description

Alpine and subalpine grasslands of base-rich soils of the high mountains of the nemoral, submediterranean and supramediterranean zones.

Plant communities

Agrostion alpinae, Anthyllido-Seslerion klasterskyi, Armerion cantabricae

Avenion sempervirentis, Caricion austroalpinae, Caricion ferrugineae, Caricion firmae, Dryadion integrifoliae, Festucion burnatii, Festucion pungentis, Festucion scopariae, Festucion versicoloris, Festucion xanthinae, Festuco saxatilis-Seslerion bielzii, Festuco-Knaution longifoliae, Kobresio-Dryadion, Kobresion capilliformis, Laserpitio nestleri-Ranunculion thorae, Minuartio-Poion ligulatae, Ononidion cristatae, Ononidion striatae, Oxytropidion dinaricae, Oxytropido-Elynion myosuroidis, Primulion intricatae, Seslerio juncifoliae-Caricion firmae, Seslerio-Asterion alpine, Seslerio-Festucion xanthinae, Seslerion apenninae, Seslerion coeruleae, Seslerion nitidae, Seslerion tatrae, Seslerion tenuifoliae

Species

Dryas octopetala, Gentiana nivalis, Gentiana campestris, Alchemilla hoppeana, Alchemilla conjuncta, Alchemilla flabellata, Anthyllis vulneraria, Astragalus alpinus, Aster alpinus, Draba aizoides, Globularia nudicaulis, Helianthemum nummularium ssp. grandiflorum, Helianthemum oelandicum ssp. alpestre, Pulsatilla alpina ssp. alpina, Phyteuma orbiculare, Astrantia major and *Polygala alpestris, Kobresia myosuroides* (*Elyna myosuroides*), *Oxytropis* spp, *Carex* spp

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 4.3.2 Pelouse calcaire sèche à laîche ferme

4.3.4 Gazon des crêtes ventées

4.3.1 Pelouse calcaire sèche à seslerie

4.3.3 Pelouse calcaire fraîche

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6170 Alpine and subalpine calcareous grasslands

E5 Woodland fringes and clearings and tall forb stands

E5.4 Moist or wet tall-herb and fern fringes and meadows

includes the following subtypes separately listed in the 2010 version:

E5.4111 *Angelica archangelica* fluvial communities

E5.4112 *Angelica heterocarpa* fluvial communities

E5.4113 *Althaea officinalis* screens

E5.414 Continental river bank tall-herb communities dominated by *Filipendul*a

E5.415 Eastern nemoral riverbanks with tall herb communities

E5.423 Continental tall-herb communities of humid meadows

E5.424 Eastern nemoral Tall-herb communities of humid meadows

E5.424 Eastern nemoral Tall-herb communities of humid meadows

Description

Tall-herb and fern vegetation of the nemoral and boreal zones, including stands of tall herbs on hills and mountains below the montane level. Tall herbs are often dominant along watercourses, in wet meadows and in shade at the edge of woodlands.

Plant communities

Aegopodion podagrariae, Althaeion officinalis, Archangelicion litoralis, Arunco-Petasition albae, Cynancho-Convolvulion sepium, Deschampsion cespitosae, Dorycnio recti-Rumicion conglomerati, Euphorbion palustris, Filipendulo-Petasition, Impatienti noli-tangere-Stachyion sylvaticae, Ipomoeo acuminatae-Ageratinion adenophorae, Lythro-Euphorbion, Nardosmion laevigatae, Petasition officinalis, Senecionion fluviatilis, Senecionion samniti

Species

E5.41: *Filipendula ulmaria, Aegopodium podagraria, Chaerophyllum hirsutum, Urtica dioica, Mentha longifolia, Angelica sylvestris, Caltha palustris, Crepis paludosa, Epilobium hirsutum, Geranium palustre* **E5.42:** *Filipendula ulmaria* is dominant here, *Crepis paludosa*, *Iris sibirica, Lythrum salicaria, Geranium palustre* **E5.43:** *Galium aparine, Glechoma hederacea, Geum urbanum, Aegopodium podagraria, Silene dioica, Carduus crispus, Chaerophyllum hirsutum, Lamium album, Alliaria petiolata, Lapsana communis, Geranium robertianum, Viola alba, Viola odorata* **E5.54:** *Paspalum paspalodes, Paspalum vaginatum, Polypogon viridis* (*Agrostis semiverticillata*), *Cyperus fuscus, Catabrosa aquatic*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 5.1.3 Ourlet hygrophile de plaine narrower

2.3.3 Mégaphorbiée marécageuse

5.1.4 Ourlet hygrophile d'altitude

EU Habitats Directive Annex I

3280 Constantly flowing Mediterranean rivers with *Paspalo-Agrostidion* species and hanging curtains of *Salix* and *Populus alba*

6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

E5.5 Subalpine moist or wet tall-herb and fern stands

Description

Luxuriant tall herb formations of deep, humid soils in the montane to alpine, but mostly subalpine, levels of the higher mountains.

Plant communities

Adenostylion alliariae, Cirsion appendiculati, Cirsion flavispinae, Delphinion elati, Doronicion corsici, Dryopterido-Athyrion distentifolii, Mulgedion alpine Polemonio acutiflori-Veratrion lobeliani Rumicion alpine, Triseto sibiricae-Aconition septentrionalis

Species

Cicerbita alpina, Cicerbita alpina plumieri, Cirsium helenioides, Cirsium spinosissimum, Cirsium flavispina, Geranium sylvaticum, Polygonatum verticillatum, Ranunculus platanifolius, Aconitum vulparia, Aconitum napellus, Aconitum nevadense, Adenostyles alliariae, Senecio elodes, Veratrum album, Trollius europaeus, Peucedanum ostruthium, Doronicum austriacum, Pedicularis foliosa, Eryngium alpinum, Leuzea rhapontica (*Centaurea rhapontica*), *Valeriana pyrenaica, Tozzia alpine*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 5.2.3 Mégaphorbiaie de montagne mésophile à graminées

5.2.4 Mégaphorbiaie de montagne hygrophile à *Adenostyles alliariae*

Nordic Vegetation Classification 1994: 1.2.4.5 Wood Crane's-bill type

1.2.5.1b Athyrium - Dryopteris type

1.2.6.1 Blue Sowthistle - Wood Crane's-bill type

1.2.6.2 Garden Angelica - Wood Crane's-bill

1.2.6.3 Globeflower type

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Included in

6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

E6 Inland salt steppes

E6.1 Mediterranean inland salt steppes

Description

Vegetated saline land of Mediterranean coastal regions and of the fringes of semiarid salt basins that lack drainage to the sea; often dominated by perennial, rosette-forming *Limonium* spp. or esparto grass, *Lygeum spartum*. The soils are temporarily permeated (though not inundated) by saline water and subject to extreme summer drying, with formation of salt efflorescences.

Plant communities

Limonion gmelinii, Frankenion pulverulentae, Hordeion marini, Puccinellio-Spergularion salinae, Lygeo-Lepidion cardaminis, Romulion, Lygeo sparti-Limonion furfuracei, Thero-Salicornion,

Species

Halopeplis amplexicaulis, Hymenolobus procumbens, Limonium spp., *Lygeum spartum, Microcnemion coralloides, Salicornia patula, Senecio auricula, Sphenopus divaricatus*.

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1510 Mediterranean salt steppes (*Limonietalia*)

E6.2 Continental inland salt steppes

includes the following subtype separately listed in or split unit from the 1998 version:

E6.23 Central Eurasian solonchak grassland with *Crypsis*

Description

Salt steppes and their associated salt-tolerant herbaceous communities outside the Mediterranean basin. In Europe they are found in the substeppe and steppe zones eastwards from the Hungarian Plain.

Plant communities

Scorzonero-Juncion gerardii, Armerion maritimae, Festuco-Limonion gmelinii, Glycyrrhizion echinatae, Potentillion anserinae, Beckmannion eruciformis, Peucedano officinalis-Asterion sedifolii, Limonion gmelinii, Juncion maritimi, Cypero-Spergularion salinae, Puccinellion peisonis, Festucion pseudovinae, Puccinellio-Spergularion salinae, Salicornion herbaceae, Puccinellion limosae, Thero-Salicornion, Malvion neglectae, Scorzonero-Juncetalia gerardii, Glycyrrhizetalia glabrae, Festuco-Limonietalia, Puccinellietalia, Lepidietalia latifolii, Crypsidetalia aculeatae, Agropyro-Artemision coerulescentis

Species

Festuca pseudovina, Achillea collina, A. setacea, Trifolium strictum, T. retusum, Camphorosma annua. **E6.21:** *Achillea asplenifolia, Trifolium subterraneum, T. pallidum, Lotus tenuis, Centaurea pannonica, Scilla autumnalis, Artemisia santonicum, A. maritima, Limonium gmelinii, Sedum caespitosum, Taraxacum bessarabicum Puccinellia distans, Aster tripolium ssp. pannonicus,* and the endemic *Plantago schwarzenbergiana.* **E6.22:** *Camphorosma monspeliaca, Goniolimon tataricum, Petrosimonia triandra, Zingeria pisidica Trifolium resupinatum, Trifolium michelianum, Medicago arabica, Halimione pedunculata, Iris halophile.* **E6.231:** *Cyperus pannonicus (Acorellus pannonicus).* **E6.232:** *(Frankenia pulverulenta, Suaeda confusa, Salsola acutifolia, Parapholis incurva, Hordeum marinum, Cressa cretica).*

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E6.21 = 1530 Pannonic salt steppes and salt marshes

E7 Sparsely wooded grasslands

E7.3 Dehesa

Description

A characteristic landscape of the southwest Iberian peninsula in which crops, pasture land or Mediterranean scrub, in juxtaposition or rotation, are shaded by a fairly closed to very open canopy of native oaks, *Quercus suber, Quercus rotundifolia, Quercus pyrenaica, Quercus faginea*. It is an important habitat of raptors, including the threatened Iberian endemic eagle *Aquila adalberti*, of the crane *Grus grus*, of large insects and their predators and of the endangered Iberian lynx *Lynx pardinus*.

Species

Plants: *Quercus suber, Q. rotundifolia, Q. pyrenaica, Q. faginea*

Animals: *Aquila adalberti, Grus grus, Lynx pardinus*

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6310: Dehesas with evergreen *Quercus* spp

F HEATHLAND, SCRUB AND TUNDRA

F2 Arctic, alpine and subalpine scrub

F2.2 Evergreen alpine and subalpine heath and scrub

The 2014 version of Resolution No. 4 (1996) separately listed:
F2.22 - Alpide acidocline *Rhododendron* heaths
F2.26 - *Bruckenthalia* heaths

Description

Small, dwarf or prostrate shrub formations of the alpine and subalpine zones of mountains, dominated by ericaceous species, *Dryas octopetala*, dwarf junipers, brooms or greenweeds; *Dryas* heaths of the British Isles.

Includes the following subtypes:
F2.21 - Alpide dwarf ericoid wind heaths
F2.22 - Alpide acidocline *Rhododendron* heaths
F2.23 - Southern Palaearctic mountain dwarf *Juniperus* scrub
F2.24 - Alpigenic high mountain *Empetrum - Vaccinium* heaths
F2.25 - Boreo-alpine and arctic heaths
F2.26 - *Bruckenthalia* heaths
F2.27 - Alpide *Arctostaphylos uva-ursi* and *Arctostaphylos alpinus* heaths
F2.28 - Alpide *Rhododendron hirsutum - Erica* heaths
F2.29 - *Dryas octopetala* mats
F2.2A - Alpide high mountain dwarf *Vaccinium* heaths
F2.2B - Alpide high mountain *Genista* and *Chamaecytisus* heaths

Plant communities

Loiseleurio-Arctostaphylion, Cytision oromediterranei, Phyllodoco-Vaccinion myrtilli, Genisto-Vaccinion, Aconito nasuti–Juniperion, Genisto versicoloris-Juniperion hemisphaericae, Rhododendro ferruginei-Vaccinion, Pruno prostratae-Juniperion sabinae, Ericion carneae, Bruckenthalion spiculifoliae, Daphno oleoidis-Juniperion alpinae, Loiseleurio-Vaccinion, Juniperion nanae, Salici kazbekensis–Empetrion nigrae, Dryadion integrifoliae, Daphno-Genistion radiatae, Rhododendrion caucasici, Kobresio-Dryadion

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 5.4.3 Lande subalpine calcicole
5.4.4 Lande subalpine xérophile sur sol acide
5.4.6 Lande alpine ventée
5.4.5 Lande subalpine méso-hygrophile sur sol acide

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4060 Alpine and Boreal heaths

F2.3 Subalpine deciduous scrub

F2.32 Subalpine and oroboreal *Salix* brush

Description

Willow-dominated communities of higher Eurasian mountains and of the boreal zone, mostly characteristic of the subalpine zone of the higher ranges of the Alpine system and its satellites, where many constitute facies of subalpine shrub and tall herb communities, of the slopes of lesser ranges in the boreal zone, including the Scandinavian mountains, of Iceland and of the northern British Isles (cf. unit E5.5). Species composition is very variable and endemic species are highly represented here.

Plant communities

Salicion helveticae, Salicion pentandrae, Salicion silesiacae

Species

Salix lapponum, Salix lanata, Salix arbuscula, Salix myrsinites, Salix glauca, Salix helvetica, Salix bicolor

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 5.3.8 Saulaie buissonnante subalpine

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Includes 4060 Sub-Arctic *Salix* spp scrub

F2.33 Subalpine mixed brushes

F2.336 Rhodope *Potentilla fruticosa* thickets

Description

Closed formations dominated by *Potentilla fruticosa* of the 1550 metre level in the *Picea abies* and *Pinus sylvestris* belt of the west Rhodope mountains of Bulgaria.

Plant communities

Pruno tenellae-Syringion

Species

Amygdalus nana, Prunus fruticosa, Rosa gallica, R. pimpinellifolia, Amelanchier ovalis, Acer tataricum, Cotoneaster integerrimus, C. niger, Adonis vernalis, Anemone sylvestris, Geranium sanguineum, Galium purpureum, Peucedanum carvifolia, Teucrium chamaedrys, T. polium, T. montanum, Aster linosyris, Inula ensifolia, I. hirta, Melica picta, Nepeta nuda, Peucedanum cervaria, Phlomis tuberosa, Jurinea mollis, Vinca herbacea, Agropyron cristatum, Salvia austriaca, Syringa vulgaris

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40B0 Rhodope *Potentilla fruticosa* thickets

References

Biserkov, V. *et al*. (Eds) 2011. Red Data Book of the Republic of Bulgaria. Volume 3. Natural habitats. IBEI – BAS & MOEW, Sofia.

F2.4 Conifer scrub close to the tree limit

F2.41 Inner Alpine *Pinus mugo* scrub

Description

Pinus mugo scrub of the dry eastern inner Alps, of local occurrence throughout the area, accompanied by *Rhododendron hirsutum*, or, on siliceous ground, *Rhododendron ferrugineum* and *Vaccinium myrtillus*.

Plant communities

Pinion mugo, Pino mugo-Ericion

Species

Pinus mugo, Rhododendron hirsutum, Rhododendron ferrugineum, Vaccinium myrtillus, Erica herbacea, Arctostaphylos uva-ursi, Arctostaphylos alpinus, Rhodothamnus chamaecistus

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 5.4.3 Lande subalpine calcicole

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4070 Bushes with *Pinus mugo* and *Rhododendron hirsutum* (*Mugo-Rhododendretum hirsuti*)

F2.42 Outer Alpine *Pinus mugo* scrub

Description

Main range *Pinus mugo* scrub of well-drained, mostly calcareous, soils of the northern and southeastern outer Alps, usually with *Rhododendron hirsutum, Arctostaphylos uva-ursi, Arctostaphylos alpinus, Sorbus chamaemespilus, Lonicera caerulea, Lonicera alpigena, Calamagrostis varia*, sometimes with *Erica herbacea* or *Rhodothamnus chamaecistus* and, in acidophilous variants, known in particular from the Karawanken, *Vaccinium myrtillus, Vaccinium vitis-idaea, Rhododendron ferrugineum, Empetrum hermaphroditum*.

Plant communities

Pinion mugo, Pino mugo-Ericion

Species

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 5.4.3 Lande subalpine calcicole

EU Habitats Directive Annex I

4070 Bushes with *Pinus mugo* and *Rhododendron hirsutum* (*Mugo-Rhododendretum hirsuti*)

F2.43 Southwestern *Pinus mugo* scrub

Description

Very local *Pinus mugo* scrub of the southwestern Alps (Moyen-Valais, Haute-Roya, Ligurian Alps), with *Juniperus nana, Arctostaphylos uva-ursi, Daphne striata, Erica herbacea, Carex firma* and, in some stations, *Rhododendron hirsutum*; cold-block *Pinus mugo* formations of the Swiss Jura.

Plant communities

Pino mugo-Ericion

Species

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 5.4.3 Lande subalpine calcicole

EU Habitats Directive Annex I

4070 Bushes with *Pinus mugo* and *Rhododendron hirsutum* (*Mugo-Rhododendretum hirsuti*)

F2.44 Apennine *Pinus mugo* scrub

Description

Rare and local Apennine formations of the Parmian Apennines, the Abruzzi and the Campanian Apennines

Plant communities

Rhododendro-Vaccinion

Species

Pinus mugo

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4070 Bushes with *Pinus mugo* and *Rhododendron hirsutum* (*Mugo-Rhododendretum hirsuti*)

F2.45 Hercynian *Pinus mugo* scrub

Description

Pinus mugo scrub of the Sudeten, the Erzgebirge, the Bayerischerwald and the Böhmerwald.

Plant communities

Ledo-Pinion, Pinion mugo

Species

Pinus mugo, Vaccinium myrtillus, *Salix silesiaca* s.l., *Trientalis europaea*, *Homogyne alpine*

EU Habitats Directive Annex I

4070 Bushes with *Pinus mugo* and *Rhododendron hirsutum* (*Mugo-Rhododendretum hirsuti*)

F3 Temperate and mediterranean-montane scrub

F3.1 Temperate thickets and scrub

F3.12 *Buxus sempervirens* thickets

Description

Buxus sempervirens-dominated variants of units F3.11, F3.22, F3.23 or F3.24 with for example *Juniperus oxycedrus* or *Pteridium aquilinum*.

Plant communities

Berberidion vulgaris

Species

Buxus sempervirens, *Prunus spinosa*, *Prunus mahaleb*, *Cornus mas*, *Crataegus* spp., *Berberis vulgaris*, *Ligustrum vulgare*, *Viburnum lantana*, *Amelanchier ovalis*, *Geranium sanguineum*, *Dictamnus albus*

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 5.3.2 Buissons xérothermophiles sur sol neutre à alcalin

EU Habitats Directive Annex I

5110 Stable xerothermophilous formations with *Buxus sempervirens* on rock slopes (*Berberidion* pp)

Associated habitat types

Succession phase of calcareous grasslands toward mixed deciduous forests, for example with *Quercus pubescens* or continental pine forests with *Pinus sylvestris.* On very superficial soils where natural succession towards forest can not take place these formations are stable. These communities are associated with calcareous grasslands, mixed oak or *Quercus pubescens* groves, beech groves rich in orchid species or with *Pinus nigra* and *Pinus leucodermis* (e.g. in Greece).

F3.16 *Juniperus communis* scrub

Description

Temperate and mediterranean-montane communities dominated by *Juniperus communis*, mostly *Juniperus*-dominated variants of units F3.11, F3.13, F3.22-F3.24. *Calluna vulgaris, Crataegus* spp., *Pinus sylvestris, Quercus petraea, Bromus erectus* and *Festuca rupicola* are also present.

Plant communities

Vaccinio-Juniperion communis

Species

Juniperus communis, Crataegus spp., *Rosa* spp., *Prunus spinosa*.

Corresponding class in other classifications

Milieux Naturels de Suisse 2008: 5.4.1 Lande subatlantique acidophile

Nordic Vegetation Classification 1994: 5.1.1.5e Juniper-heather heath-variant

EU Habitats Directive Annex I

5130 Juniperus communis formations on heaths or calcareous grasslands

Associated habitat types

Most often found as a succession from mesophilous or xerophilous calcareous and nutrient poor grasslands, such as *Festuco-Brometea* and *Elyno-Sesleretea*, or more rarely, heathlands of the *Calluno vulgaris-Ulicetea minoris*

F3.2 Submediterranean deciduous thickets and brushes

F3.21 Montane *Cytisus purgans* fields

Description

Cytisus (*Genista*) *purgans*-dominated formations of higher levels (upper montane, subalpine, oro-mediterranean) of southwestern European and North African mountains, often associated with dwarf juniper scrubs (unit F2.23) or hedgehog-heaths (unit F7.4), and physiognomically reminiscent of the latter.

Plant communities

Cytision multiflori (syn *Genistion polygaliphyllae*)

Species

Cytisus (*Genista*) *purgans*

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5120 Mountain *Cytisus purgans* formations

F3.24 Subcontinental and continental deciduous thickets

F3.241 Central European subcontinental thickets

Description

Deciduous thickets of the Pannonic basin and neighbouring regions, with northwestern irradiations in Central Europe, within and around the range of occurrence of white cinquefoil oak woods (**G1.7A11**), of western tartar maple steppe oak woods (**G1.7A12**) and of Pannonian white oak woods (unit **G1.7374**).

Plant communities

Prunion fruticosae, Orno-Cotinion p.

Species

Prunus fruticosa. **F3.2412:** *Amygdalus nana, Spiraea media, Prunus spinosa, Rhamnus catharticus, Rosa gallica, R. pimpinellifolia, R. spinosissima, Peucedanum alsaticum, Asparagus officinalis, Agropyron intermedium, Vinca herbacea.* **F3.2413:** *Cotinus coggygria, Amelanchier ovalis, Cotoneaster tomentosus, C. matrensis, Pyrus nivalis, Prunus mahaleb, Spiraea media, Sorbus graeca, Fraxinus ornus.*

EU Habitats Directive Annex I

40A0 *Subcontinental peri-Pannonic scrub

F3.245 Eastern Mediterranean deciduous thickets

Description

Deciduous thickets of Cyprus and of the Mediterranean or sub-Mediterranean zones of Asia Minor and the Levant, within the regions of occurrence of eastern white oak woods (unit G1.73), hop-hornbeam mixed oak woods (unit G1.74), Balkano-Anatolian thermophilous oak forests (unit G1.76), Macedonian-oak woodland (unit G1.78) and Mediterranean valonia oak woodland (unit G1.79).

Plant communities

Genisto-Ceratonietum

Species

Crataegus azarolus var. *aronia*

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Included in

5330 Thermo-Mediterranean and pre-desert scrub

F3.247 Ponto-Sarmatic deciduous thickets

Description

Deciduous thickets of the wooded steppe zone of the Pontic and Sarmatic regions and of adjacent areas, including the Thracian steppe zone, within and around the zone of occurrence of easternmost white cinquefoil oak woods (unit G1.7A114), of tartar maple steppe oak woods (unit G1.7A122) and of sub-Euxinian steppe woods (unit G1.7A13).

Species

Prunus spinosa, Crataegus monogyna, Caragana frutex, Spiraea crenifolia (*Spiraea crenata*), *Prunus tenella (Amygdalus nana), Jasminum fruticans, Paliurus spina-christi, Rhamnus catarhica, Asparagus verticillatus, Asphodeline lutea, Bromus inermis, Dianthus nardiformis, Kochia prostrata, Medicago minima, Genista sessilifolia, Moehringia grisebachii, Moehringia jankae, Orlaya grandiflora, Ornithogalum amphibolum, Paeonia tenuifolia, Salvia ringens, Thymus zygioides, Veronica jacquini.*

Corresponding class in other classifications

Habitatele din România: R3132 Tufărişuri ponto-sarmatice de *Caragana frutex*

EU Habitats Directive Annex I

40C0 Ponto-Sarmatic deciduous thickets

References

Biserkov, V. *et al*. (Eds) 2011. *Red Data Book of the Republic of Bulgaria. Volume 3. Natural habitats*. IBEI – BAS & MOEW, Sofia.
Sanda, V., Arcus, M. (1999). *Sintaxonomia gruparilor vegetale din Dobrogea şi Delta Dunarii,* Ed. Cultura, Pitesti.

F4 Temperate shrub heathland

F4.1 Wet heaths

Description

Wet or humid ericoid-shrub dominated heaths of the Atlantic and sub-Atlantic zones, developed on peaty or semipeaty soils, waterlogged for at least part of the year, sometimes temporarily inundated, and usually moist even in summer.

Plant communities

Daboecion cantabricae, Ericion cinereae, Ericion umbellatae, Stauracanthion boivinii, Ulicion minoris, Genisto pilosae-Vaccinion, Ericion arboreae

Species

Calluna vulgaris, Erica tetralix, Erica ciliaris, Erica scoparia, Genista anglica, Molinia caerulea, Scirpus cespitosus, Sphagnum compactum, Sphagnum molle, Sphagnum tenellum, Ulex gallii, Ulex minor

EU Habitats Directive Annex I

4010 Northern Atlantic wet heaths with *Erica tetralix*

4020 *Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix* [a priority subtype of 4010]

References

Gorissen, I. 2004. *Dwarf shrub heaths of Europe - from Atlantic to Caucasus and Ural.* Verlag Ingmar Gorissen, Siegburg.

F4.2 Dry heaths

Description

Heaths on siliceous, podsolic, rarely- or never-waterlogged soils in moist Atlantic and sub-Atlantic climates of the plains and low mountains of Western and Central Europe.

Plant communities

Calluno-Festucion tenuifoliae, Daboecion cantabricae, Dactylido maritimae-Ulicion maritimi, Ericion cinereae, Ericion umbellatae, Genistion micrantho-anglicae, Genistion pilosae, Genisto-Vaccinion, Koelerio-Phleion phleoidis, Loiseleurio-Vaccinion, Loiseleurio-Diapension, Ulicion minoris, Ulici-Ericion ciliaris

Species

Vaccinium spp., *Calluna vulgaris; Arctostaphylos uva-ursi, Bruckenthalia speculifolia, Cistus salvifolius, C incanus, Empetrum nigrum, E. hermaphroditum, Erica cinerea E. mackaiana, E. vagans, E.*

aragonensis, E. andevalensis, E umbellata, Genista anglica, G. germanica, G. pilosa, G. tinctoria, Genistella sagittalis, Ulex maritimus, U. gallii, Pleurozium schreberi, Hylocomium splendens.

Corresponding class in other classifications

Milieux naturels de Suisse 2008: included in 5.4.1 Lande subatlantique acidophile

EU Habitats Directive Annex I

4030 European dry heaths

References

Gorissen, I. 2004. *Dwarf shrub heaths of Europe - from Atlantic to Caucasus and Ural.* Verlag Ingmar Gorissen, Siegburg.

F4.3 Macaronesian heaths

Description

Heaths of the Canary Islands, Azores and Madeira.

Plant communities

Myrico fayae-Ericion arboreae, Daboecion azoricae

Species

Adenocarpus foliolosus, Calluna vulgaris, Chamaecytisus proliferus ssp. *proliferus, Cistus chinamadensis, Cletura arborea, Daboecia azorica, Erica arborea, E. maderensis, E. platycodon, E. scoparia* ssp. *azorica, Ilex canariensis, Juniperus brevifolia, Laurus azorica, Luzula purpureo-splendens, Lysimachia azorica, Myrica faya, Pteridium aquilinum, Teline canarienis, T. splendens, T. stenopetala, Thymus caespititius, Vaccinium cilindraceum*

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4050 Endemic macaronesian heaths

F5 Maquis, arborescent matorral and thermo-Mediterranean brushes

F5.1 Arborescent matorral

F5.13 *Juniper* matorral

Description

Mediterranean and sub-mediterranean evergreen sclerophyllous brush and scrub organized around arborescent junipers of different species.

Plant communities

Juniperion turbinatae

Species

Juniperus oxycedrus, Juniperus phoenicea, Juniperus lycia, Juniperus excelsa, Juniperus foetidissima, Juniperus communis, Juniperus drupacea, Juniperus thurifera

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5210 Arborescent matorral with *Juniperus* spp

F5.17 Arid zone matorral

F5.171 Iberian arid zone *Ziziphus* matorral

Description

Pre-desert brush of *Periploca laevigata*, *Lycium intricatum*, *Asparagus stipularis*, *Asparagus albus*, *Withania frutescens* with tall *Ziziphus lotus*, confined to the arid Iberian Southeast under a xerophytic thermo-Mediterranean bio-climate; corresponds to the mature phase or climax of climatophile and edapho-xero-psammophile vegetation series (*Periplocion angustifoliae*: *Ziziphetum loti, Zizipho-Maytenetum europaei, Mayteno-Periplocetum*).

Plant communities

Mayteno-Periplocetum angustifoliae, Ziziphetum loti, Gymnosporio europaei-Ziziphetum loti

Species

Lycium intricatum, Asparagus stipularis, Asparagus albus, Calicotome intermedia, Chamaerops humilis, Maytenus senegalensis ssp. europaeus, Periploca laevigata ssp. angustifolia, Phlomis purpurea ssp. almeriensis, Rhamnus oleoides ssp. angustifolia, Withania frutescens, Zyziphus lotus.

EU Habitats Directive Annex I

5220 Arborescent matorral with *Zyziphus*

Associated habitat types

Similar formations with lower *Ziziphus lotus* bushes are listed in unit F5.551.

References

Tirado, R., 2009. 5220 Matorrales arborescentes con *Ziziphus* (*). En: VV.AA., *Bases ecológicas preliminares para la conservación de los tipos de hábitat de interés comunitario en España*. Ministerio de Medio Ambiente, y Medio Rural y Marino. 68 p.

F5.18 *Laurus nobilis* matorral

Description

Humid arborescent matorral with tall laurel (*Laurus nobilis*) developed locally in Sardinia, Sicily, the Maltese Islands, Campania, in particular.

Species

Arbutus unedo, Ceratonia siliqua, Fraxinus ornus, Laurus nobilis, Olea europaea var. sylvestris, Phillyrea latifolia, Quercus ilex, Rubia peregrina ssp. *longifolia, Smilax aspera var. altissima, Viburnum tinus*.

EU Habitats Directive Annex I

5230 Arborescent matorral with *Laurus nobilis*

Associated habitat types

Similar formations without tall *Laurus nobilis* are F5.516

F5.5 Thermo-Mediterranean scrub

F5.51 Thermo-Mediterranean brushes, thickets and heath-garrigues

F5.516 *Laurus* thickets

Description

Laurus nobilis thickets of humid or fresh stations of thermo-mediterranean regions, low-growing facies of unit F5.18, noted in particular in Sardinia, Sicily, the Maltese Islands, Campania and Crete.

Species

Laurus nobilis

EU Habitats Directive Annex I

5310 *Laurus nobilis* thickets

F5.517 Coastal *Helichrysum* garrigues

Description

Low formations of *Helichrysum* (*Helichrysum italicum ssp. microphyllum*, *Helichrysum italicum ssp. italicum*) with spurges (*Euphorbia pithyusa*, i.a.), *Pistacia lentiscus*, *Camphorosma monspeliaca*, *Artemisia densiflora* or *Thymelaea passerina*, *Thymelaea hirsuta*, *Thymelaea tartonraira* of the immediate vicinity of sea cliffs, forming the transition between cliff vegetations or clifftop phryganas and thermo-Mediterranean scrub; they are particularly characteristic of the large Mediterranean islands.

Plant communities

Euphorbion pithyusae

Species

Helichrysum italicum ssp. microphyllum, Helichrysum italicum ssp. talicum, Euphorbia pithyusa, Pistacia lentiscus, Camphorosma monspeliaca, Artemisia densiflora, Thymelaea passerina, Thymelaea hirsuta, Thymelaea tartonraira.

EU Habitats Directive Annex I

5320 Low formations of *Euphorbia* close to cliffs

F5.51G Tall spiny broom brush

Description

Scrub dominated by tall, spiny species of *Genista*.

Plant communities

Sarcopoterio spinosi-Genistion fasselatae

Species

Genista fasselata

EU Habitats Directive Annex I

Included in

5330 Thermo-Mediterranean and pre-desert scrub

F5.52 *Euphorbia dendroides* formations

Description

Stands of *Euphorbia dendroides*, a tertiary relict of Macaronesian origin; they occur as a facies of the thermo-Mediterranean scrub of the Balearics, Corsica, Sardinia, Sicily, Islas Eolie, Egadi, Pelagi, Pantelleria, Crete, and, very locally, of those of the coasts of northern Catalonia, southeastern France, peninsular Italy and its islands, central Greece, notably on slopes facing the gulf of Corinth, the Peloponnese, the Aegean archipelagoes, Albania and enclaves of the Mediterranean periphery of Anatolia

and the Levant. Particularly extensive and robust stands occur in Sicily, Sardinia and Crete where they may extend to relatively high altitudes. Very local formations in Mediterranean North Africa occupy the steep rocky slopes of some coastal capes and isolated inland sites, in Cyrenaica, northern Tunisia (Ichkeul), and in a narrow coastal strip in northern Algeria.

Plant communities

Oleo-Ceratonion siliquae p

Species

Euphorbia dendroides

EU Habitats Directive Annex I

included in 5330 Thermo-Mediterranean and pre-desert scrub

F5.53 *Ampelodesmos mauritanica* -dominated garrigues

Description

Garrigues invaded and dominated by the high tussocks of *Ampelodesmos mauritanica*; typically thermo-Mediterranean, they also occur extensively in the meso-Mediterranean zone. They are most prevalent on the Tyrrhenian coast of central and southern Italy, in Sicily, in the Mediterranean zone and the less arid parts of the Saharo-Mediterranean transition zone of North Africa.

Species

Ampelodesmos mauritanica

EU Habitats Directive Annex I

Included in

5330 Thermo-Mediterranean and pre-desert scrub

F5.54 *Chamaerops humilis* brush

Description

Chamaerops humilis dominated scrub in coastal regions of the Mediterranean.

Plant communities

Pistacio lentisci-Rhamnetalia alaterni p

Species

Chamaerops humilis

EU Habitats Directive Annex I

included in 5330 Thermo-Mediterranean and pre-desert scrub

F5.55 Mediterranean pre-desert scrub

Description

Shrub formations constituting, with the halo-nitrophilous scrubs (unit F6.824) and the localized gypsum scrubs (unit F6.73), much of the natural and semi-natural vegetation of the arid zone of southeastern Spain (Almeria, Murcia, Alicante), a highly distinctive region of unique climatological, biological and landscape character within Europe, extremely rich in African and endemic species. Several of the most remarkable formations remain in only a few undisturbed localities and are gravely at risk.

Similar formations occur in the upper arid (Mediterranean arid) zone of North Africa. Outposts of these communities also exist in Sicily, the Egadi islands, the Pelagie islands, the Maltese Islands and Pantelleria.

Plant communities

Anthyllido terniflorae-Salsolion papillosae, Thymo moroderi-Sideritidion leucanthae

Species

Ziziphus lotus, Maytenus senegalensis var. *europaeus, Periploca laevigata* ssp. *angustifolia, Salsola webbii, Sideretis foetens, Ulex argentatus* ssp. *erinaceus, Genista umbellata*

EU Habitats Directive Annex I

included in 5330 Thermo-Mediterranean and pre-desert scrub

F5.56 Thermo-Mediterranean broom fields (retamares)

Description

Mediterranean formations dominated by retamas (*Lygos* spp.) or by large, non-spiny thermo-mediterranean brooms of the genera *Cytisus* and *Genista*, limited to the Iberian peninsula, the Balearics, mediterranean North Africa, the Cilento coast of Campania and Sicily and its associated islands.

Plant communities

Adenocarpion decorticantis, Genistion floridae, Genistion polygaliphyllae, Pruno-Rubion radulae, Retamion sphaerocarpae, Ulici europaei-Cytision striate

Species

Lygos sphaerocarpa, L. monosperma, L. raetam ssp. *gussonei, Genista cinerea* ssp. *speciosa, G. valentina, G. spartioides* ssp. *retamoides, G. s.* ssp. *pseudoretamoides, G. haenseleri, G. ramosissima, G. ephedroides, G. dorycnifolia, Cytisus aeolicus*

EU Habitats Directive Annex I

included in 5330 Thermo-Mediterranean and pre-desert scrub

F5.5B Cabo de Sao Vicente brushes

Description

Low brush and garrigue formations of the dolomitic tableland, karsts, sands and terra-rosas of the vicinity of Cape San Vicente (Portugal), with dwarf *Juniperus phoenicea* ssp. *lycia*, *Cistus palhinhae*, *Ulex argenteus* ssp. *erinaceus*, rich in endemic species.

Plant communities

Junipero-Cistetum palhinhae, Asparago-Rhamnetum oleoidis juniperetosum lyciae i.a.

Species

Biscutela vicentina,Cistus palhinhae, Genista hirsuta ssp. *algarbiensis, G. triacanthus, Juniperus turbinata, Juniperus phoenicea* ssp. *lycia, Serratula monardii* var. *algarbiensis, Sideritis arborescens* ssp. *lusitanica, Teucrium vincentinum, Ulex erinaceus* (*Ulex argenteus* ssp. *erinaceus*)

EU Habitats Directive Annex I

5140 *Cistus palhinhae* formations on maritime wet heaths

F6 Garrigue

F6.7 Mediterranean gypsum scrubs

Description

Garrigues occupying gypsum-rich soils of the Iberian peninsula, usually very open and floristically characterised by the presence of numerous gypsophilous species, among which *Gypsophila struthium, Gypsophila hispanica, Centaurea hyssopifolia, Teucrium libanitis, Ononis tridentata, Lepidium subulatum, Herniaria fruticosa, Reseda stricta, Helianthemum squamatum*. They are often rich in thymes (*Thymus*), germanders (*Teucrium*), rockroses (*Helianthemum*), composites (*Centaurea, Jurinea, Santolina*), *Frankenia*.

Plant communities

Thymo-Teucrienion verticillati, Lepidion subulati, Thymo-Teucrion verticillati

Species

Centaurea hyssopifolia, Centaurea sp., Frankenia sp., Gypsophila hispanica, Gypsophila struthium, Helianthemum sp., Helianthemum squamatum, Herniaria fruticosa, Jurinea sp., Lepidium subulatum, Ononis tridentate, Reseda stricta, Santolina sp., Teucrium libanitis, Teucrium sp., Teucrium turredanum, Thymus sp.

EU Habitats Directive Annex I

1520 Iberian gypsum vegetation (*Gypsophiletalia*)

F6.8 Xero-halophile scrubs

Description

Salt-tolerant shrub formations of dry ground in areas of low-precipitation in the mediterranean region, in particular, the Iberian peninsula and Sicily, and of the Macaronesian Islands.

Plant communities

Chenoleion tomentosae, Oleo cerasiformis-Rhamnetea crenulatae, Oleo-Rhamnetalia crenulatae, Forsskaoleo angustifoliae-Rumicetalia lunariae, Helichryso stoechadis-Santolinetalia squarrosae, Polycarpaeo niveae-Traganetea moquini, Salsolo vermiculatae-Peganetalia harmalae, Cisto monspeliensis-Micromerietalia hyssopifoliae

Species

F6.81: *Chenoleoides tomentosa* **F6.82:** *Peganum harmala, Artemisia herba-alba, Lycium intricatum, Capparis ovata, Salsola vermiculata, Salsola genistoides, Salsola verticillata, Suaeda pruinosa, Atriplex halimus, Atriplex glauca, Camphorosma monspeliaca, Anabasis articulata, Haloxylon articulatum* **F6.83:** *Arthrocnemum glaucum, Arthrocnemum perenne, Suaeda pruinosa, Suaeda fruticosa* var. *brevifolia,*

EU Habitats Directive Annex I

includes 1430 Halo-nitrophilous scrubs (*Pegano-Salsoletea*)

F7 Spiny Mediterranean heaths (phrygana, hedgehog-heaths and related coastal cliff vegetation)

Description

Shrublands with dominant low spiny shrubs, widespread in Mediterranean and Anatolian regions with a summer-dry climate, occurring from sea level to high altitudes on dry mountains.

Plant communities

Anthyllion hermanniae, Crithmo-Staticion, Dorycnio-Coridothymion capitati, Hypericion balearici, Launaeion cervicornis, Micromerion julianae, Rosmarinion officinalis Verbascion spinosi

Species

Anthyllis hermanniae, Armeria soleirolii, Astragalus massiliensis, Centaurea balearica, Centaurea horrida, Limonium insulare, Limonium lanceolatum, Limonium multiflorum, Limonium pseudolaetum, Limonium strictissimum, Sarcopoterium spinosum, Silene holzmannii, Silene velutina, Iris timofeevi, Corydalis tarkiensis, Himantoglossum formosum

EU Habitats Directive Annex I

Includes

5410 West Mediterranean clifftop phryganas (*Astragalo-Plantaginetum subulatae*)

5420 *Sarcopoterium spinosum* phryganas

5430 Endemic phryganas of the *Euphorbio-Verbascion*

F9 Riverine and fen scrubs

F9.1 Riverine scrub

Description

Scrub of broad-leaved willows, e.g. *Salix pentandra*, beside rivers. Also scrub of *Alnus* spp. and narrow-leaved willows, e.g. *Salix elaeagnos*, where these are less than 5 m tall. Riverside scrub of *Hippophae rhamnoides* and *Myricaria germanica*. Excludes riversides dominated by taller narrow-leaved willows *Salix alba, Salix purpurea*, *Salix viminalis* which are considered as a forest habitat (G1.1).

Plant communities

Salicion incanae, Salicion albae, Salicion triandrae, Tamaricion parviflorae, Salicion triandro-neotrichae, Salicion eleagno-daphnoidis, Salicion salviifoliae, Salicetalia purpureae

Species

Salix pentandra, Salix elaeagnos, Frangula alnus, Hippophae rhamnoides, Myricaria germanica

Corresponding class in other classifications

Nordic Vegetation Classification 1994: 2.2.5.1 Willow thicket of wet herb type

Milieux Naturels de Suisse 2008: 5.3.6 Saulaie buissonnante alluviale

EU Habitats Directive Annex I

Includes

3230 Alpine rivers and their ligneous vegetation with *Myricaria germanica*

3240 Alpine rivers and their ligneous vegetation with *Salix elaeagnos* p

F9.3 Southern riparian galleries and thickets (Excluding F9.35: Riparian stands of invasive shrubs)

Description

Tamarisk, oleander, chaste tree galleries and thickets and similar low woody vegetation of permanent or temporary streams and wetlands of the thermo-Mediterranean zone and southwestern Iberia.

Stands dominated by invasive species (e.g. *Reynoutria japonica*) are not included in this habitat type.

Plant communities

Arbuto unedonis-Laurion nobilis, Nerion oleandri, Salicion cinereae, Securinegion buxifoliae, Tamaricion africanae, Tamaricion boveano-canariensis

Species

F9.311: *Nerium oleander, Vitex agnus-castus, Tamarix spp., Dittrichia viscosa, Saccharum ravennae, Arundo donax, Rubus ulmifolius*. **F9.3133:** *Tamarix parviflora, T. tetrandra, T. dalmatica, T. smyrnensis, T.hampeana, T. hohenackeri* **F9.32:** *Securinega tinctoria, Bryonia cretica, Tamus communis, Clematis campaniflora*, **F9.33:** *Prunus lusitanica, Viburnum tinus*. **F9.34:** *Salix atrocinerea, Salix salvifolia, Myrica gale*

EU Habitats Directive Annex I

subtypes F9.31 to F9.34 = 92D0 Southern riparian galleries and thickets (*Nerio-Tamaricetea* and *Securinegion tinctoriae*)

G WOODLAND, FOREST AND OTHER WOODED LAND

The following comment from the Interpretation Manual of European Union Habitats (European Commission 2013) may be helpful in selecting suitable sites for the Emerald Network

"(Sub)natural woodland vegetation comprising native species forming forests of tall trees, with typical undergrowth, and meeting the following criteria: rare or residual, and / or hosting species of Community interest

For forest habitat types the following additional criteria were accepted by the Scientific Working Group (21-22 June 1993):

forests of native species;

forests with a high degree of naturalness;

forests of tall trees and high forest;

presence of old and dead trees;

forests with a substantial area;

forests having benefited from continuous sustainable management over a significant period."

G1 Broadleaved deciduous woodland

G1.1 Riparian and gallery woodland, with dominant *Alnus, Betula, Populus* or *Salix*

G1.11 Riverine *Salix* woodland

Description

Bush or arborescent formations dominated by willow (*Salix* spp), lining flowing water and submitted to periodic flooding, developed on recently deposited alluvion. Willow brushes are particularly characteristic of rivers originating in major mountain ranges. Shrubby willow formations also constitute an element of lowland and hill riverine successions in all major biomes, often making the belt closest to the water course. Taller arborescent willow formations often constitute the next belt landwards in riverine successions of lowland western nemoral, eastern nemoral and warm-temperate humid forest regions, and a large part of the less diverse riverine systems of the steppic, mediterranean and cold desert zones. May be affected by the invasive alien species such as *Solidago canadensi, Aster novi-belgi, Aster novi-angli* and *Impatiens glandulifera.*

Plant communities

Salicetea purpureae, Salicion albae, Salicion canariensis

Species

Aster novi-belgii, Impatiens glandulifera, Lycopus europaeus, Lysimachia vulgaris, Phalaroides arundinacea, Populus alba, Populus canescens, Populus nigra, Salix sp., Urtica dioica

Corresponding class in other classifications

Milieux Naturels de Suisse 2008: 6.1.2 Saulaie blanche

EU Habitats Directive Annex I

3240 Alpine rivers and their ligneous vegetation with *Salix elaeagnos* (tree dominated stands)

91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)

92A0 *Salix alba* and *Populus alba* galleries

Associated Habitat types

European forest types: 12.1 Riparian forest

G1.12 Boreo-alpine riparian galleries

Description

Riverside, lakeside and seaside alder, birch or pine galleries and cordons of the boreal, boreonemoral and boreosteppic zones, of the high mountains of the nemoral zone and of their piedmont influence region, dominated by *Alnus incana* along the montane and submontane rivers of the Alps, the Carpathians, the northern Apennines, the Dinarides, the Balkan Range, the Rhodopides and neighbouring regions, by *Alnus incana* or *Alnus glutinosa* in boreal Fennoscandia and northeastern Europe, by *Betula pendula* or *Pinus sylvestris* in western Siberia. Nitrophilous and hygrophilous species dominate the herb layer.

Plant communities

Alnion incanae, Roso majalis-Betulion pendulae,

Species

Alnus incana, Aegopodium podagraria, Chaerophyllum hirsutum, Petasites hybridus, Crepis paludosa, Caltha palustris ssp. laeta **G1.123:** *Betula pubescens, Prunus padus, Valeriana sambucifolia, Anemone nemorosa, Geranium sylvaticum, Geum rivale, Matteuccia struthiopteris, Paris quadrifolia, Silene dioica (Melandrium rubrum), Equisetum pratense*. **G1.124:** *Lycopus europaeus, Filipendula ulmaria, Lysimachia vulgaris, Equisetum arvense*. **G1.127:** *Alnus subcordata, Alnus barbata,*

Corresponding class in other classifications

European forest types: 12.1 Riparian forest

Milieux naturels de Suisse 2008: 6.1.3 Aulnaie alluviale

EU Habitats Directive Annex I

included in 9030 Natural forests of primary succession stages of land upheaval coast

91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)

Associated Habitat types

Can occur as a band between larger rivers and floodplain forests such as G1.221, G1.223, G1.223 and G1.224

G1.13 Southern *Alnus* and *Betula* galleries

Description

Riparian formations of *Alnus glutinosa*, locally of *Alnus cordata* or *Betula* spp. of the Mediterranean basin and of western Iberia, often with *Fraxinus angustifolia* and *Osmunda regalis*.

Plant communities

Osmundo-Alnion, Populetalia albae

Species

Alnus cordata, Alnus glutinosa, Betula spp*, Frangula alnus, Quercus canariensis, Myrica gale, Salix atrocinerea, Scilla ramburei, Salix pedicellata, Rhododendron ponticum* ssp*. baeticum, Diplazium caudatum, Galium broterianum, Osmunda regalis*

Corresponding class in other classifications

European forest types: 12.3 Mediterranean and Macaronesian riparian forest

EU Habitats Directive Annex I

subtypes G1.132 and G1.134 = 92B0 Riparian formations on intermittent Mediterranean water courses with *Rhododendron ponticum, Salix* and others

G1.2 Mixed riparian floodplain and gallery woodland

G1.21 Riverine *Fraxinus - Alnus* woodland, wet at high but not at low water

Description

Riparian forests of *Fraxinus excelsior* and *Alnus glutinosa*, sometimes *Alnus incana*, of middle European and northern Iberian lowland or hill watercourses, on soils periodically inundated by the annual rise of the river level, but otherwise well-drained and aerated during low-water; they differ from riparian alder woods within units G1.41 and G1.52 by the strong representation in the dominated layers of forest species not able to grow in permanently waterlogged soils.

Plant communities

Alnion incanae, Carpinion betuli, Fraxinion excelsioris

Species

Fraxinus excelsior, Alnus glutinosa, A. incana. **G1.211:** *Carex remota, Carex pendula, Carex strigosa, Equisetum telmateia, Rumex sanguineus, Lysimachia nemorum, Cardamine amara, Chrysosplenium oppositifolium, Chrysosplenium alternifolium, Impatiens noli-tangere, Ribes rubrum*. **G1.212:** *Ribes rubrum, R. uva-crispa, Stellaria nemorum, Impatiens noli-tangere, Aconitum vulparia, Allium ursinum, Geum rivale, Athyrium filix-femina, Dryopteris carthusiana, Matteuccia struthiopteris, Ranunculus platanifolius, Urtica dioica, Ranunculus ficaria, Primula elatior, Lamium galeobdolon, Filipendula ulmaria, Luzula sylvatica. Chaerophyllum hirsutum, Crepis paludosa, Aegopodium podagraria, Astrantia major, Aruncus sylvestris, Carex remota, C. brizoides, Equisetum maximum*

Corresponding class in other classifications

European forest types: 12.2 Fluvial forest

Milieux naturels de Suisse 2008: 6.1.4 Frênaie humide

EU Habitats Directive Annex I

included in 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)

Associated Habitat types

Can occur as a band between larger rivers and floodplain forests such as G1.221, G1.223, G1.223 and G1.224

G1.22 Mixed *Quercus - Ulmus - Fraxinus* woodland of great rivers

Includes the following subtypes separately listed in the 1998 version:

G1.221Great medio-European fluvial forests

G1.223 Southeast European *Fraxinus - Quercus - Alnus* forests

G1.224 Po *Quercus - Fraxinus - Alnus* forests

Description

Diverse riparian forests of the middle courses of great rivers, inundated only by large floods. Hardwood trees with dominant *Fraxinus*, *Ulmus* or *Quercus* spp. with a very typical spring herb aspect. Often with several layers in the canopy and with lianes.

Plant communities

Alnion incanae, Carpinion betuli

Species

G1.221: *Quercus robur, Fraxinus excelsior, Ulmus minor, Ulmus laevis, Ulmus glabra, Populus alba, Populus tremula, Populus canescens, Populus nigra, Acer pseudoplatanus, Acer platanoides, Salix alba, Alnus glutinosa, Prunus avium, Malus sylvestris, Tilia cordata, Alnus incana, Prunus padus* and *Crataegus monogyna*. *Clematis vitalba, Tamus communis, Humulus lupulus, Hedera helix* and *Vitis vinifera ssp. Sylvestris* **G1.223:** *Quercus robur* and/or *Fraxinus angustifolia*, with varying admixtures of *Ulmus minor, Ulmus laevis, Carpinus betulus, Acer campestre, Alnus glutinosa, Fraxinus excelsior, Salix alba, Populus alba* **G1.224:** *Quercus robur, Quercus cerris, Fraxinus excelsior, Fraxinus ornus, Carpinus betulus, Ulmus minor, Populus alba, Populus nigra, Acer campestre, Acer pseudoplatanus, Prunus padus, Prunus avium, Alnus glutinosa, Salix alba, Corylus avellana, Sorbus torminalis, Sorbus domestica, Ruscus aculeatus, Cornus mas, Cornus sanguinea, Crataegus laevigata, Crataegus monogyna, Pyracantha coccinea, Rubus fruticosus, Rubus ulmifolius, Rubus caesius, Ribes uva-crispa, Sambucus nigra, Daphne mezereum, Viburnum lantana, Mespilus germanica, Lonicera xylosteum, Ligustrum vulgare, Prunus spinosa, Rosa canina, Euonymus europaeus, Rhamnus catharticus*; *Hedera helix, Tamus communis, Rubia peregrina, Bryonia cretica*; *Equisetum hyemale, Symphytum officinale, Polygonatum multiflorum, Pulmonaria officinalis, Lathyrus vernus, Mercurialis perennis, Primula acaulis, Asarum europaeum, Euphorbia dulcis, Melittis melissophyllum, Erythronium dens-canis, Leucojum vernum, Brachypodium sylvaticum, Carex pilosa* **G1.225:** *Quercus robur, Tilia cordata, Ulmus laevis, Ulmus effusa, Alnus cordata*

Corresponding class in other classifications

European forest types: 12.2 Fluvial forest

Milieux naturels de Suisse 2008: 6.1.4 Frênaie humide

EU Habitats Directive Annex I

91F0 Riparian mixed forests of *Quercus robur, Ulmus laevis and Ulmus minor, Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (*Ulmenion minoris*)

References

Schnitzler A. (2007) *Les forêts alluviales d'Europe. Biodiversité. Ecologie, biogéographie et valeur intrinsèque*. Tec et Doc Lavoisier, Paris

G1.3 Mediterranean riparian woodland

Includes the following subtypes separately listed in the 2010 version:

G1.36 Ponto-Sarmatic mixed *Populus* riverine forests

G1.37 Irano-Anatolian mixed riverine forests

G1.38 *Platanus orientalis* woods

G1.39 *Liquidambar orientalis* woods

Description

Alluvial forests and gallery woods of the mediterranean region. Dominance may be of a single species, of few species or mixed with many species including *Fraxinus*, *Liquidambar*, *Platanus*, *Populus*, *Salix*, *Ulmus*. Excludes mediterranean *Salix* woods (G1.1) and shrubby riparian vegetation (F9.3).

Plant communities

Lauro nobilis-Fraxinion angustifoliae, Osmundo-Alnion glutinosae, Platanion orientalis, Populion albae, Rhododendro pontici-Prunion lusitanicae

Corresponding class in other classifications

European forest types: 12.3 Mediterranean and Macaronesian riparian forest

EU Habitats Directive Annex I

92A0 *Salix alba* and *Populus alba* galleries

92C0 *Platanus orientalis* and *Liquidambar orientalis* woods (*Platanion orientalis*)

G1.4 Broadleaved swamp woodland not on acid peat

G1.41 *Alnus* Swamp Woods not on acid peat

Description

Marshy *Alnus glutinosa*-dominated woods and scrubs, usually with shrubby willows in the undergrowth or with other shrubs, e.g. *Frangula alnus*.

Plant communities

Alnion glutinosae

Corresponding class in other classifications

National Vegetation Classification (UK) W5: *Alnus glutinosa-Carex paniculata* woodland
Milieux Naturels de Suisse 2008: 6.1.1: Aulnaie noire

G1.44 Wet-ground woodland of the Black and Caspian Seas

Description

The most hygrophilous communities of the mixed mesic Euxino-Hyrcanian forests (units G1.A71, G1.A74). They may include, *Fraxinus angustifolia* galleries, as well as dense *Alnus barbata* forest stands occupying areas of black damp or swampy soils on coastal alluvial plains, with *Fraxinus angustifolia* and an understorey of *Rubus hirtus, Smilax excelsa* and other climbers and shrubs, notably of the Rosaceae.

Plant communities

Alnetea hyrcanica p., *Alnetea glutinosae euxina* p.

Species

Alnus barbata, Fraxinus angustifolia, Smilax excels, Rubus hirtus

Corresponding class in other classifications

European forest types: 11.2 Alder swamp forest

G1.5 Broadleaved swamp woodland on acid peat

G1.51 *Sphagnum Betula* woods

Description

Forests of *Betula pubescens* or *Betula carpatica* on peaty, humid and very acid soils, colonizing bogs of reduced peat building activity and acid fens of the boreal, sub-boreal and nemoral zones, very locally of the wooded steppe and steppe zones, with *Molinia caerulea, Vaccinium spp., Empetrum nigrum, Trientalis europaea, Eriophorum vaginatum* and many sphagna and other bryophytes. In European Russia these forests may also host *Salix lapponicum, Salix myrtilloides* and *Scheuchzeria palustris*

Plant communities

Betulion pubescentis

Species

Betula carpatica, Betula pubescens, Empetrum nigrum, Eriophorum vaginatum, Molinia caerulea, Sphagnum fallax, Sphagnum magellanicum, Trientalis europaea, Vaccinium sp. *Salix lapponicum, Salix myrtilloides, Scheuchzeria palustris*

Corresponding class in other classifications

European forest types: 11.3 Birch swamp forest

Milieux naturels de Suisse 2008: 6.5.1 Betulion

EU Habitats Directive Annex I

9080 Fennoscandian deciduous swamp woods

91D0 Bog woodland

G1.6 *Fagus* woodland

Description

Forests dominated by beech *Fagus sylvatica* in western and central Europe, and *Fagus orientalis* and other *Fagus* species in southeastern Europe and the Pontic region. Many montane and oro-Mediterranean formations are mixed beech-fir or beech-fir-spruce forests, which are listed under G4.6 in EUNIS but included here.

Plant communities

Scillo lilio-hyacinthi-Fagion, Galio rotundifolii-Fagion, Geranio nodosi-Fagion, Geranio striati-Fagion, Doronico orientalis-Fagion moesiacae, Symphyto cordati-Fagion, Dentario quinquefoliae-Fagion, Fagion sylvaticae, Sorbo-Fagion, Lonicero alpigenae-Fagion, Aremonio-Fagion, Endymio non-scripti-Fagion, Rhododendro pontici-Fagion orientalis, Vaccinio-Fagion orientalis, Carpino-Fagion orientalis, Violo odoratae-Fagion orientalis, Luzulo-Fagion sylvaticae, Ilici-Fagion sylvaticae

Species

Fagus sylvatica, Abies alba. **G1.61:** *Luzula luzuloides, Polytrichum formosum, Deschampsia flexuosa, Calamagrostis villosa, Vaccinium myrtillus, Pteridium aquilinum.* **G1.62:** *Ilex aquifolium.* **G1.63:** *Anemone nemorosa, Carex pilosa, Galium odoratum, Lamium galeobdolon, Melica uniflora, Picea abies.* **G1.64:** *Scilla lilio-hyacinthus, Lathraea clandestina, Athyrium filix-femina, Gymnocarpium dryopteris, Asplenium scolopendrium, Dryopteris spp., Polystichum spp., Melica uniflora, Galium odoratum, Helleborus viridis ssp. occidentalis, Lathyrus occidentalis, Paris quadrifolia, Euphorbia hyberna.* **G1.65:** *Acer pseudoplatanus* **G1.66:** *Cephalanthera spp., Carex digitata, C. flacca, C. montana, C. alba, Sesleria albicans, Brachypodium pinnatum), Neottia nidus-avis, Epipactis leptochila, E. microphylla) and thermophile species, transgressive of the Quercetalia pubescenti-petraeae. The bush-layer includes several calcicolous species (Ligustrum vulgare, Berberis vulgaris) and Buxus sempervirens.* **G1.69:** *Fagus moesiaca.* **G1.6D:** *Symphytum cordatum, Cardamine glanduligera (Dentaria glandulosa), Hepatica transsilvanica, Pulmonaria rubra, Leucanthemum waldsteinii, Silene heuffelii, Ranunculus carpaticus, Euphorbia carniolica, Aconitum moldavicum, Saxifraga rotundifolia ssp. heuffelii, Primula elatior ssp. leucophylla, Hieracium rotundatum, Galium kitaibelianum, Moehringia pendula, Festuca drymeja.*

G1.6F: *Fagus taurica var. dobrogica, Tilia tomentosa, T. cordata, Fraxinus ornus, F. angustifolia, F. pallisiae, Carpinus betulus, Populus tremula, Ulmus glabra, Potentilla micrantha, Scutellaria altissima,* ***Caucasus:*** *Rhododendron ponticum, Vaccinium arctostaphylos, Acer laetum, Ruscus colchicus, Galanthus bortkewitschianus, Cephalanthera damasonium, Colchicum umbrosum, Taxus baccata*

Corresponding class in other classifications

European forest types: 6 Beech forest (all subtypes)

Milieux Naturels de Suisse 2008: 6.2 Hêtraies

EU Habitats Directive Annex I

Includes:

G1.61 = 9110 *Luzulo-Fagetum* beech forests

G1.62 = 9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*)

G1.63 = 9130 Asperulo-Fagetum beech forests

G1.65 = 9140 Medio-European subalpine beech woods with *Acer* and *Rumex arifolius*

G1.66 = 9150 Medio-European limestone beech forests of the *Cephalanthero-Fagion*

G1. 681, G1.685 and G1.686 = 9210 Apeninne beech forests with *Taxus* and *Ilex*

G1.186 and G1.687 = 9220 Apennine beech forests with *Abies alba* and beech forests with *Abies nebrodensis*

References

Dzwonko, Z. & Loster, S. (2000). Syntaxonomy and phyto-geographical differentiation of the Fagus woods in the Southwest Balkan Peninsula. *J. Veg. Sci.* 11*:* 667–678.

Tzonev, R., Dimitrov, M., Chytrý, M., Roussakova, V, Di-mova, D., Gussev, C, Pavlov, D., Vulchev, V, Vitkova, A., Gogoushev, G., Nikolov, I., Borisova, D. & Ganeva, A. (2006). Beech forest communities in Bulgaria. *Phytocoenologia* 36*:* 247–279.

Willner, W. (2002). Syntaxonomische Revision der südmittel-europäischen Buchenwälder. *Phytocoenologia* 32*:* 337–453.

G1.7 Thermophilous deciduous woodland (excluding G1.7D *Castanea sativa* woodland)

Includes the following subtypes

G1.71 : Western *Quercus pubescens* woods and related communities
G1.72 : Cyrno-Sardinian *Quercus pubescens* woods
G1.73 : Eastern *Quercus pubescens* woods
G1.74 : Italo-Illyrian *Ostrya carpinifolia* sub-thermophilous *Quercus* woods
G1.75 : Southeastern sub-thermophilous *Quercus* woods
G1.76 : Balkano-Anatolian thermophilous *Quercus* forests
G1.77 : Afro-Iberian thermophilous *Quercus* forests
G1.78 : *Quercus trojana* woodland
G1.79 : Mediterranean *Quercus macrolepis* woodland
G1.7A : Steppe *Quercus* woods
G1.7B : *Quercus pyrenaica* woodland
G1.7C : Mixed thermophilous woodland

The 1998 version of Resolution No. 4 (1996) separately listed:

G1.7B : *Quercus pyrenaica* woodland

G1.7C : Mixed thermophilous woodland

Description

Forests or woods of submediterranean climate regions and supramediterranean altitudinal levels, and of western Eurasian steppe and substeppe zones, dominated by deciduous or semideciduous thermophilous *Quercus* species or by other southern trees such as *Carpinus orientalis* and *Ostrya carpinifolia*. Thermophilous deciduous trees may, under local microclimatic or edaphic conditions, replace the evergreen oak forests in mesomediterranean or thermomediterranean areas, and occur locally to the north in central and western Europe. In the Crimean peninsula and the Krasnodar region the habitat can be dominated by *Pistacia mutica*.

Plant communities

Quercion petraeae, Quercion pubescenti-petraeae, Aceri tatarici-Quercion, Lathyro pisiformis-Quercion roboris, Aceri granatensis-Quercion fagineae, Fraxino orni-Ostryion, Syringo-Carpinion orientalis, Elytrigio nodosae-Quercion, Physospermo-Quercion, Crataego laevigatae-Quercion cerridis, Pino calabricae-Quercion, Quercion confertae, Quercion petraeo-cerridis, Melitto albidae-Quercion, Quercion macrolepidis

Species

G1.73: *Ostrya carpinifolia, Carpinus orientalis, C. betulus, Fraxinus ornus, Quercus pubescens, Quercus virgiliana*. **G1.74:** *Quercus cerris, Q. petraea, Ostrya carpinifolia, Carpinus orientalis, C. betulus, Fraxinus ornus.* **G1.7C2:** *Carpinus orientalis, Fraxinus ornus, Cotinus coggygria, Oryzopsis holciformis, Oxytropis virescens, Stachys leucoglossa, Paeonia peregrina, Salvia ringens, Cornus mas, Quercus pubescens*. **G1.7C3:** *Acer granatense, Acer monspessulanum, Quercus faginea, Quercus pyrenaica, Sorbus aria, Sorbus torminalis, Taxus baccata, Daphne laureola, Paeonia officinalis* ssp. *humilis*. **G1.7C4:** *Tilia tomentosa, T. platyphyllos, Fraxinus excelsior, Brachypodium pinnatum, Galium erectum, Cruciata glabra, Digitalis grandiflora, Erysimum odoratum, Sisymbrium strictissimum, Aconitum anthora, Hesperis vrabelyiana, Carduus collinus, Waldsteinia geoides, Melica altissima, Carex brevicollis*. **G1.7C6:** *Fraxinus angustifolia, F. ornus, Cornus sanguinea, Tilia platyphyllos, T. tomentosa, Ulmus minor, Carpinus orientalis*. **G1.7C7:** *Juniperus communis, Ligustrum vulgare, Rhamnus catharticus, Crataegus monogyna, Prunus spinosa, Prunus mahaleb, Rubus caesius, Euonymus verrucosus, Berberis vulgaris*. **G1.7C8:** *Tilia* spp., *Fraxinus* spp., *Quercus* spp., *Carpinus* spp., *Ostrya carpinifolia, Acer* spp., *Sorbus* spp., *Populus* spp., *Celtis australis* **Caucasus:** *Pterocarpa pterocarpa, Lilium caucasicum, Ruscus colchicus*

Corresponding class in other classifications

European forest types: 8 Thermophilous deciduous forest (all subtypes except 8.7 Chestnut forest)
Milieux Naturels de Suisse 2008: 6.3.4: Chênaie buissonnante
6.3.5: Ostryaie buissonnante du sud des Alpes

EU Habitats Directive Annex I
Includes:
91AA Eastern white oak woods

91B0 Thermophilous *Fraxinus angustifolia* woods
91H0 Pannonian woods with *Quercus pubescens*
91I0 Euro-Siberian steppic woods with *Quercus* spp
91M0 Pannonian-Balkanic turkey oak –sessile oak forests
91N0 Pannonic inland sand dune thicket (*Junipero-Populetum albae*)
91Z0 Moesian silver lime woods
9230 Galicio-Portuguese oak woods with *Quercus robur* and *Quercus pyrenaica*
9240 *Quercus faginea* and *Quercus canariensis* Iberian woods
9250 *Quercus trojana* woods
9310 Aegean *Quercus brachyphylla* woods
9350 *Quercus macrolepis* forests

G1.8 Acidophilous *Quercus*-dominated woodland

Description

Forests of *Quercus robur* or *Quercus petraea* on acid soils.

Plant communities

Genisto germanicae-Quercion, Quercion petraeae, Quercion roboris, Quercion pyrenaicae

Species

Quercus robur, Quercus petraea, Deschampsia flexuosa, Vaccinium myrtillus, Pteridium aquilinum, Lonicera periclymenum, Holcus mollis, Maianthemum bifolium, Convallaria majalis, Hieracium sabaudum, Hypericum pulchrum, Luzula pilosa, Polytrichum formosum, Leucobryum glaucum

Corresponding class in other classifications

European forest types: 4 Acidophilous oak and oak-birch forest (all subtypes)

Milieux Naturels de Suisse 2008: 6.3.6 Chênaie acidophile

EU Habitats Directive Annex I

Subtypes:

G1.81 & G1.84 = 9190 Old acidophilous oak woods with *Quercus robur* on sandy plains

G1.83 = 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

G1.9 Non-riverine woodland with *Betula, Populus tremula* or *Sorbus aucuparia*

G1.91 *Betula* woodland not on marshy terrain

G1.917 Oroboreal *Betula* woods and thickets

Description

Timberline birch woods and thickets dominating the subalpine belt of the mountains of the boreal taiga zone or the transition zone between taiga and tundra or polar deserts in the Atlantic or Pacific influenced extreme western and extreme eastern regions of the northern Palaearctic, formed by *Betula pubescens ssp. czerepanovii* (*Betula pubescens* ssp. *tortuosa*, *Betula kusmisscheffii*) or *Betula ermani*.

Plant communities

Betulion tortuosae

Species

Cladonia spp., *Dicranum* spp., *Empetrum hermaphroditum, Hylocomium splendens, Linnea borealis, Pleurozium schreberi, Stereocaulon paschale, Trientalis europaea, Vaccinium myrtillus; Aconitum lycoctonum, Cicerbita alpina, Cornus suecica, Geranium sylvaticum, Gymnocarpium dryopteris, Hierochloë odorata, Melica nutans, Rubus saxatilis, Trollius europaeus*

Corresponding class in other classifications

European forest types: 3.4 Mountainous birch forest

Nordic Vegetation Classification 1994: 2.2.1.1 Mountain birch forest of lichen - dwarf shrub type

2.2.1.2 Mountain Birch forest of dwarf shrub - grass type

2.2.1.3 Mountain Birch forest of low herb type

2.2.1.4 Mountain birch forest of tall herb type

EU Habitats Directive Annex I

9040 Nordic subalpine/subarctic forests with *Betula pubescens* ssp *czerepanovii*

G1.918 Eurasian boreal *Betula* woods

Description

Birch woods of the taiga belt, of the wooded tundra belt, and of the taiga-nemoral forest transition zone of Eurasia, formed by *Betula pendula*, *Betula pubescens* s.l. or *Betula platyphylla*.

Plant communities

Trollio europaei-Pinion sylvestris, Veronico teucrii-Pinion sylvestris

Corresponding class in other classifications

European forest types: 13.3 Birch forest

Nordic Vegetation Classification 1994: 2.2.1.5 Birch forest of dwarf shrub-grass type

2.2.1.7 Birch forest of herb type

EU Habitats Directive Annex I

Included in

9010 Western Taïga

9030 Natural forests of primary succession stages of landupheaval coast

G1.92 *Populus tremula* woodland

G1.925 Boreal *Populus tremula* woods

Description

Populus tremula stands of the taiga zone and of the transition zone between taiga and nemoral woods of Fennoscandia and the northern Sarmatic region.

Corresponding class in other classifications

European forest types: 13.4 Aspen forest

Nordic Vegetation Classification 1994: 2.2.1.8 Aspen forest

EU Habitats Directive Annex I

Included in 9010 Western Taïga

G1.A Meso- and eutrophic *Quercus, Carpinus, Fraxinus, Acer, Tilia, Ulmus* and related woodland

G1.A1 *Quercus - Fraxinus - Carpinus betulus* woodland on eutrophic and mesotrophic soils

Description

Atlantic, medio-European and eastern European forests dominated by *Quercus robur* or *Quercus petraea*, on eutrophic or mesotrophic soils, with usually ample and species-rich herb and bush layers. *Carpinus betulus* is generally present. They occur under climates too dry or on soils too wet or too dry for beech or as a result of forest management favouring oaks.

Plant communities

Carpinion betuli

Species

Carpinus betulus, Quercus robur, Q. petraea, Chamaecytisus wulffi, Juniperus foetidissima, Juniperus excelsa, Cotinus coggygria. **G1.A16:** *Quercus cerris, Sorbus torminalis, S. domestica, Acer campestre, Ligustrum vulgare, Cornus mas, Ulmus minor, Rhamnus catharticus, Viola mirabilis, V. alba, V. suavis, Primula veris, Polygonatum latifolium, P. multiflorum, P. odoratum, Pulmonaria mollis ssp. mollis, P. murinii, Chamaecytisus supinus, Convallaria majalis, Carex montana, C. umbrosa, C. curvata, C. michelii, Festuca heterophylla, Melica uniflora, Poa nemoralis.* **G1.A1A:** *Acer tataricum, Cyclamen purpurascens, Epimedium alpinum, Erythronium dens-canis, Helleborus dumetorum ssp. atrorubens, Knautia drymeia.* **G1.A1B:** *Carex brizoides, Anemone nemorosa, Corydalis solida, Galanthus nivalis, Gagea spathacea, G. lutea, Gladiolus imbricatus, Cyclamen purpurascens, Crocus neapolitanus, Erythronium dens-canis, Helleborus dumetorum, Adoxa moschatellina, Anemone ranunculoides, Ranunculus ficaria, Scilla vindobonensis, Leucojum vernum.* **G1.A1C:** *Tilia tomentosa, Pyrus eleagrifolia, P. malus, Acer stevenii, Lonicera caprifolium, Cotinus coggygria, Stellaria holostea, Carex pilosa, Galium schultesii, Festuca heterophylla, Ranunculus auricomus, Lathyrus hallersteinii, Melampyrum bihariense, Aposeris foetida, Helleborus odorus*

Corresponding class in other classifications

European forest types: 5 Mesophytic deciduous forest (all subtypes except except 5.8 Ravine and slope forest).

Milieux naturels de Suisse 2008: 6.3.3 Carpinion

EU Habitats Directive Annex I

Subtypes:

G1.A14 = 9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*

G1.A161 = 9170 *Galio-Carpinetum* oak-hornbeam forests

G1.A1B, G1.A166, G1.A167 = 91G0 Pannonic woods with *Quercus petraea* and *Carpinus betulus*

G1.A1C = 91Y0 Dacian oak & hornbeam forests

G1.A4 Ravine and slope woodland

Description

Cool, moist forests with a varied tree layer, especially species of *Acer*, *Tilia* and *Fraxinus* of variable dominance, most often on steep slopes. They are of considerable biohistorical and biogeographical

importance, as examples of the mixed forests of the Atlantic period, preserved in stations inaccessible to beech domination.

Plant communities

Tilio platyphylli-Acerion pseudoplatani

Species

Acer pseudoplatanus, Actaea spicata, Fraxinus excelsior, Helleborus viridis, Lunaria rediviva, Taxus baccata, Ulmus glabra, Carpinus betulus, Corylus avellana, Quercus sp., *Sesleria varia, Tilia cordata, T. platyphyllos*. **G1.A41:** *Acer platanoides, Fagus sylvatica, Quercus robur. Actaea spicata, Galeobdolon montanum*. **G1.A42:** *Polygonatum verticillatum, Galium odoratum, Ranunculus platanifolius, Centaurea montana, Poa chaixii, Pulmonaria montana, Circaea alpina, Sambucus racemosa, Mercurialis perennis, Dryopteris filix-mas*. **G1.A43:** *Aegopodium podagraria, Cirsium oleraceum, Filipendula ulmaria, Carex pendula, C. sylvatica, Equisetum telmateia, Matteuccia struthiopteris, Cardamine trifolia, Paris quadrifolia, Stachys sylvatica.* ***G1.A45:*** *Tilia cordata, T. platyphyllos, Acer platanoides, Fraxinus excelsior, Ulmus glabra, Fagus sylvatica, Euonymus latifolius, Asperula taurina, Cyclamen purpurascens*.

Corresponding class in other classifications

European forest types: 5.8 Ravine and slope forest

Milieux Naturels de Suisse 2008: 6.3.1 Erablaie de ravin méso-hygrophile

6.3.2 Tiliaie thermophile sur éboulis ou lapiez

EU Habitats Directive Annex I

9180: *Tilio-Acerion* forests of slopes, screes and ravines

G1.A7 Mixed deciduous woodland of the Black and Caspian Seas

Description

Mixed summer-green broad-leaved forests limited mainly to the mountains bordering the Black Sea and the Caspian Sea.

Plant communities

Astrantio-Carpinion caucasicae, Carpinion orientalis, Crataego-Carpinion caucasicae,

Junipero excelsae-Quercion pubescentis, Quercetalia pubescenti-petraeae

Species

Carpinus betulus, C. orientalis, Quercus dshorochensis, Q. syspirensis, Q. anatolica, Q. iberica, Q. macranthera, Acer cappadocium, Fagus orientalis, Abies bornmuelleriana, Prunus avium, Pyrus caucasica, Corylus avellana, Euonymus europaeus, Euonymus verrucosus

G1.B Non-riverine Alnus woodland

G1.B3 Boreal and boreonemoral *Alnus* woods

Description

Non-riparian, non-marshy formations of the boreal zone of the Palaearctic region dominated by *Alnus glutinosa* or *Alnus incana*.

Plant communities

Alnion incanae

Corresponding class in other classifications

European forest types: 13.1 Alder forest

Nordic Vegetation Classification 1994: 2.2.4.1 Grey alder forest

2.2.4.2 Alder shore forest

EU Habitats Directive Annex I

9010 Western Taïga

9030 Natural forests of primary succession stages of landupheaval coast

G2 Broadleaved evergreen woodland (excluding G2.8 Highly artificial broadleaved evergreen forestry plantations and G2.9 Evergreen orchards and groves)

Description

Temperate forests dominated by broad-leaved sclerophyllous or lauriphyllous evergreen trees, or by palms. They are characteristic of the Mediterranean and warm-temperate humid zones. EUNIS includes plantations and orchards under G2 but they are not included in this habitat type for Emerald. Woodlands dominated by exotic lauriphyllous trees and shrubs as in Ticino, Switzerland[2] are also excluded.

Plant communities

Cistion laurifolii, Quercion pubescenti-sessiliflorae, Aceri granatensis-Quercion fagineae, Oleo-Ceratonion siliquae, Quercion ilicis, Querco rotundifoliae-Oleion sylvestris, Arbuto andrachnae-Quercion cocciferae, Quercion broteroi, Lathyrion veneti, Quercion pyrenaicae, Paeonio broteroi-Abietion pinsapo, Quercetalia ilicis

Species

Pistacia terebinthus, Ilex aquifolium, Fraxinus ornus, Coronilla emerus, Ostrya carpinifolia, Carpinus orientalis, Laurus nobilis, Viburnum tinus, Rhamnus alaternus, Rosa sempervirens, Lonicera etrusca, Clematis flammula, Rubia peregrina, Smilax aspera, Vitis vinifera ssp. sylvestris, Cyclamen purpurascens, Prunus mahaleb, Myrtus communis, Juniperus phoenicea, Quercus pubescens, Acer monspessulanum, Frangula rupestris, Hedera helix

Corresponding class in other classifications

European forest types: 9 Broadleaved evergreen forest (all subtypes)

EU Habitats Directive Annex I

Subtypes:

G2.1 includes 9330 *Quercus suber* forests

9340 *Quercus ilex* and *Quercus rotundifolia* forests

9390 Scrub and low forest vegetation with *Quercus alnifolia*

93A0 Woodlands with *Quercus infectoria* (*Anagyro foetidae-Quercetum infectoriae*)

G2.3 = 9360 Macaronesian laurel forests (*Laurus, Ocotea*)

G2.4 = 9320 *Olea* and *Ceratonia* forests

[2] See e.g. Walther, G. R. (2002). Weakening of climatic constraints with global warming and its consequences for evergreen broad-leaved species. *Folia Geobotanica, 37*(1), 129-139.

G2.5 = 9370 Palm groves of *Phoenix*

G2.6 = 9380: Forests of *Ilex aquifolium*

G3 Coniferous woodland

G3.1 *Abies* and *Picea* woodland

G3.13 Acidophilous *Abies alba* forests

G3.134 Holy Cross fir forests

Description

Upland fir, or fir-dominated fir-spruce or fir-pine-oak forests developed on mesotrophic acid soils of Little-Poland, in particular, of the Holy Cross mountains and of sub-Carpathic hills, with an undergrowth rich in ferns, bryophytes and lowland forest species shared with the deciduous forests of the *Tilio-Carpinetum*.

Plant communities

Abietetum polonicum

Species

Abies alba, Fagus sylvatica, Quercus robur, Quercus sessilis, Pinus sylvestris, Betula verrucosa, Populus tremula, Picea excelsa, Alnus glutinosa, Sambucus racemosa, Rubus idaeus, Dryopteris austriaca, Athyrium filix-femina, Phegopteris dryopteris, Phegopteris polypodioides, Lycopodium annotinum, Hylocomium splendens, Polytrichum formosum, Maianthemum bifolium, Rubus hirsutus, Galeobdolon luteum, Oxalis acetosella, Luzula pilosa.

Corresponding class in other classifications

European forest types: 3.2 Subalpine and mountainous spruce and mountainous mixed spruce-silver fir forest

EU Habitats Directive Annex I

Same as 91P0 Holy Cross fir forest (*Abietetum polonicum*)

G3.15 Southern Apennine *Abies alba* forests

Description

Relict *Abies alba* woods associated with the beech forests of the *Geranio versicolori-Fagion* of the Lucano-Calabrian Apennines (Pollino, Sila, Aspromonte).

Plant communities

Cardamino kitaibelii-Fagenion sylvaticae.

Species

Abies alba, Abies alba subsp. apennina, Juniperus hemisphaerica, Monotropa hypopitis, Orthilia secunda, Cirsium erisithales, Oxalis acetosella, Veronica urticifolia, Daphne mezereum.

Corresponding class in other classifications

European forest types: 10.6 Mediterranean and Anatolian fir forest

EU Habitats Directive Annex I

9510 Southern Apennine *Abies alba* forests

Associated Habitat types

Stands where *Fagus sylvatica* is also present are treated under G1.6 *Fagus* woodland

References

Spampinato G & E Biondi (not dated) 9510*: Foreste sud-appenniniche di *Abies alba* in Habitat Italia http://vnr.unipg.it/habitat/cerca.do?formato=stampa&idSegnalazione=85#

G3.16 Moesian *Abies alba* forests

Description

Forests of *Abies alba* or of *Abies alba* mixed with *Fagus sylvatica, Picea abies, Pinus sylvestris* or *Pinus nigra* of the Rhodopides, the Balkan Range, the Moeso-Macedonian mountains and the Pelagonids, within the geographical range of the alliance *Fagion moesiacum*.

Plant communities

Fagion sylvaticae, Fagion moesiacum p.

Species

Abies alba, Picea abies, Pinus sylvestris, P. nigra.

Corresponding class in other classifications

European forest types: 10.6 Mediterranean and Anatolian fir forest

EU Habitats Directive Annex I

91BA Moesian silver fir forests

Associated Habitat types

Stands where *Fagus sylvatica* is co-dominant are treated under 61.6 *Fagus* woodland

G3.17 Balkano-Pontic *Abies* forests

Description

Forests of *Abies nordmanniana, Abies borisii-regi, Abies bornmuelleriana* of the southern Balkans peninsula, the Pontic range and the Caucasus, often mixed with beech, or adjacent to beech forests.

Plant communities

Fagion sylvaticae, Rhododendro pontici-Fagion orientalis, Abieti nordmannianae-Fagenion orientalis

Species

Abies nordmanniana, Abies borisii-regis, Buxus sempervirens, Vaccinium arctostaphylos, Rhododenrron ponticum, Actaea spicata, Ruscus colchicus, Acer laetum

Corresponding class in other classifications

European forest types: 10.6 Mediterranean and Anatolian fir forest

EU Habitats Directive Annex I

9270 Hellenic beech forests with *Abies borisii-regis*

G3.19 *Abies pinsapo* forests

Description

Fir or fir-cedar forests dominated by relict species of *Abies*, including forests of *Abies pinsapo*, *Abies marocana, Abies numidica, Abies cilicica* or *Abies nebrodensis*, distributed along the coasts of the Mediterranean basin, well outside the range of beech.

Plant communities

Paeonio coriaceae-Abietetum pinsapi, Bunio macucae-Abietetum pinsapi

Species

Abies pinsapo, A. marocana, A. numidica, A. cilicica, A. nebrodensis

Corresponding class in other classifications

European forest types: 10.6 Mediterranean and Anatolian fir forest

EU Habitats Directive Annex I

9520 *Abies pinsapo* forests

G3.1B Alpine and Carpathian subalpine *Picea* forests

Description

Spruce (*Picea abies*) forests of the lower subalpine level, and of anomalous stations in the montane level, of the outer, intermediate and inner Alps; in the latter, they are often adjacent to montane spruce forests of unit G3.1C. Also Spruce forests of the lower subalpine level of the Carpathians. The spruces, often stunted or columnar, are accompanied by an undergrowth of decidedly subalpine affinities.

Plant communities

Piceion excelsae

Species

Picea abies, Vaccinium spp. **G3.1B1:** *Oxalis acetosella, Vaccinium vitis-idaea, Vaccinium myrtillus, Calamagrostis villosa and the moss Hylocomium splendens*. **G3.1B2:** *Adenostyles spp., Chaerophyllum hirsutum, Peucedanum ostruthium, Ranunculus aconitifolius, Aconitum vulparia, Aconitum paniculatum, Stellaria nemorum, Geranium sylvaticum, Cicerbita alpina*. **G3.1B3:** *Listera cordata, Sphagnum acutifolium, S. quinquefarium, S. girgensohnii*. **G3.1B6:** *Pinus mugo, Pinus cembra, Rhododendron myrtifolium, Vaccinium myrtillus, Vaccinium vitis-idaea, Homogyne alpina, Soldanella hungarica ssp. major, Calamagrostis villosa. East Carpathians: Bruckenthalia spiculifolia, Campanula abietina, Campanula serrata, Hieracium rotundatum, Sphagnum palustre, S. wulfianum, S. squarrosum, Bazzania trilobata, Leucanthemum waldsteinii*.

Corresponding class in other classifications

European forest types: 3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

Milieux naturels de Suisse 2008: included in 6.6.2 Pessière

EU Habitats Directive Annex I

included in 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)

G3.1C Inner range montane *Picea* forests

Description

Picea abies forests of the montane level of the inner Alps, characteristic of regions climatically unfavourable to both beech and fir. Also analogous *Picea abies* forests of the montane and collinar levels of the inner basin of the Slovakian Carpathians subjected to a climate of high continentality.

Plant communities

Piceion excelsae

Species

Picea abies. **G3.1C2:** *Calamagrostis varia, Carex flacca, Sesleria caerulea, Hieracium trifidum, Aster bellidiastrum.* **G3.1C3:** *Oxalis acetosella, Galium rotundifolium, Galium odoratum, Anemone nemorosa, Doronicum austriacum, Petasites albus, Primula elatior, Fragaria vesca, Cardamine trifolia, Carex montana and Melica nutans.* **G3.1C5:** *Sphagnum* spp., *Equisetum sylvaticum, Listera cordata, Dryopteris dilatata*

Corresponding class in other classifications

European forest types: 3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

Milieux naturels de Suisse 2008: included in 6.6.2 Pessière

EU Habitats Directive Annex I

included in 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)

G3.1D Hercynian subalpine *Picea* forests

Description

Subalpine Spruce (*Picea abies*) forests of high ranges of the central and eastern sections of the Hercynian arc, from the Harz to the Bohemian Quadrangle.

Plant communities

Soldanello montanae-Piceetum, Calamagrostio villosae-Piceetum, Plagiothecio-Piceetum hercynicum

Species

Picea abies, Abies alba, Sorbus aucuparia, Vaccinium myrtillus, Homogyne alpina, Soldanella montana, Calamagrostis villosa

Corresponding class in other classifications

European forest types: 3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

EU Habitats Directive Annex I

included in 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)

G3.1E Southern European *Picea abies* forests

Includes the following subtypes separately listed in the the 2010 version:

G3.1E1 Southeastern Moesian *Picea abies* forests

G3.1E3 Montenegrine *Picea abies* forests

G3.1E4 Pelagonide *Picea abies* forests

G3.1E5 Balkan Range *Picea abies* forests

Description

Outlying *Picea abies* formations of the Apennines, the southern Dinarides, the Balkan Range and the Rhodope Mountains, at the southern limit of the range of the species and mostly south of its continuous range. *Pinus sylvestris* may be present, and undergrowth species may include *Vaccinium myrtillus*, *Urtica dioica*, *Rubus idaeus*, *Bruckenthalia spiculifolia*, *Poa nemoralis*, *Daphne oleoides*, *Calamagrostis arundinacea* and *Fragaria vesca*.

Plant communities

Piceion excelsae

Corresponding class in other classifications

European forest types: 3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

EU Habitats Directive Annex I

included in 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)

G3.1F Enclave *Picea abies* forests

Description

Spontaneous *Picea abies* formations occupying outlying altitudinal or edaphic enclaves within the range of more predominant vegetation types, in particular the montane levels of the outer Alps, the Carpathians, the Dinarides, the Jura, the Hercynian ranges, the subalpine levels of the Jura, the western Hercynian ranges and the Dinarides.

Plant communities

Chrysanthemo rotundifolii-Piceion, Piceion excelsae

Species

Picea abies, Bazzania trilobata, Vaccinium myrtillus, Listera cordata, Lycopodium annotinum

Corresponding class in other classifications

European forest types: 3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

Milieux naturels de Suisse 2008: included in 6.6.1 Pessière-sapinière

EU Habitats Directive Annex I

included in 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)

G3.1G *Picea omorika* forests

Description

Picea omorika dominated forests of the Drina basin of central Serbia, also in Bosnia and Hercegovina. *Picea abies* and *Abies alba* are usually also present while the herb layer is relatively species-poorwhile bryophytes can be widespread.

Plant communities

Piceion excelsae

Species

Picea omorika, Salix caprea, Pinus nigra, Rosa pendulin,a Valeriana montana, Vaccinium myrtillus, Luzula sylvatica, Hieracium transsilvanicum, Gentiana asclepiadea, Erica carnea, Calamagrostis varia, Veronica chamaedrys, Lathyrus vernus, Euphorbia amygdaloides Bryophytes - *Dicranum scoparium, Ctenidium molluscum, Eurhynchium striatum, Hylocomium splendens, Rhytidiadelphus triquetrus*

Corresponding class in other classifications

European forest types: 3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

EU Habitats Directive Annex I

Not present in the European Union

G3.1H *Picea orientalis* forests

Description

Picea orientalis dominated forests of the Caucasus and of the eastern Pontic Range.

Plant communities

Geranio iberici-Pinion orientalis

Species

Picea orientalis

Corresponding class in other classifications

European forest types: 3.2 Subalpine and montane spruce and montane mixed spruce-silver fir forest

EU Habitats Directive Annex I

Not present in the European Union

References

Ketenoglu, O et al (2010) Synopsis of syntaxonomy of Turkish forests. *Journal of Environmental Biology* 31 (1) 71-80.

G3.2 Alpine *Larix - Pinus cembra* woodland

G3.21 Eastern Alpine siliceous *Larix* and *Pinus cembra* forests

Description

Subalpine forests of *Larix decidua* and/or*Pinus cembra of* the eastern and central Alps, mostly of the inner ranges, usually on siliceous substrates, with an often species-poor undergrowth.

Plant communities

Piceion excelsae, Rhododendro-Vaccinion

Species

Larix decidua, Pinus cembra, Rhododendron ferrugineum, Vaccinium myrtillus, Calamagrostis villosa, Luzula albida

Corresponding class in other classifications

European forest types: 3.1 Subalpine larch-arolla pine and dwarf pine forest

Milieux Naturels de Suisse 2008: 6.6.3 Forêt de mélèzes et d'aroles

EU Habitats Directive Annex I

Included in 9420 Alpine *Larix decidua* and/or *Pinus cembra* forests

G3.22 Eastern Alpine calcicolous *Larix* and *Pinus cembra* forests

Description

Subalpine and montane forests of *Larix decidua, Picea abies* and *Pinus cembra* of the eastern and central Alps on calcareous substrates. The undergrowth is usually species-rich.

Plant communities

Piceion excelsae, Rhododendro-Vaccinion

Species

Larix decidua, Picea abies, Pinus cembra, Pinus mugo, Erica herbacea, Rhododendron hirsutum, Polygala chamaebuxus

Corresponding class in other classifications

European forest types: 3.1 Subalpine larch-arolla pine and dwarf pine forest

Milieux Naturels de Suisse 2008: 6.6.3 Forêt de mélèzes et d'aroles

EU Habitats Directive Annex I

Included in 9420 Alpine *Larix decidua* and/or *Pinus cembra* forests

G3.25 Carpathian *Larix* and *Pinus cembra* forests

Description

Uncommon *Larix decidua* or *Pinus cembra* formations of the Carpathians, occurring as a single dominant, together as codominants, or mixed with spruce (*Picea abies*).

Plant communities

Pino cembrae-Piceetum, Erico-Pinion sylvestris

Species

Larix decidua, Pinus cembra, Picea abies, Rhododendron myrtifolium, Bruckenthalia spiculifolia, Melampyrum saxosum, Soldanella hungarica ssp. major, Campanula abietina

Corresponding class in other classifications

European forest types: 3.1 Subalpine larch-arolla pine and dwarf pine forest

Habitate din România

R4201 Rarişti sud-est carpatice de molid (*Picea abies*) şi zâmbru *(Pinus cembra)* cu *Bruckenthalia spiculifolia*

R4202 Rarişti sud-est carpatice de molid (*Picea abies*) şi zâmbru (*Pinus cembra*) cu *Rhododendron myrtifolium*

R4204 Păduri şi rarişti de larice (*Larix decidua*) cu *Saxifraga cuneifolia*

EU Habitats Directive Annex I

Included in 9420 Alpine *Larix decidua* and/or *Pinus cembra* forests

G3.26 *Larix polonica* forests

Description

Larix decidua ssp. *polonica* -dominated facies of the white cinquefoil oak woods (units G1.7A111 & G1.7A114) of Poland and the western Ukraine.

Plant communities

Piceion excelsae.

Species

Larix decidua ssp. *polonica*

Corresponding class in other classifications

European forest types: 3.1 Subalpine larch-arolla pine and dwarf pine forest

Associated Habitat types

G1.7A111, G1.7A114

G3.3 *Pinus uncinata* woodland

G3.31 *Pinus uncinata* forests with *Rhododendron ferrugineum*

Description

Pinus uncinata forests of the western outer Alps, the Jura and north facing slopes (‘ubac’) of the Pyrenees developed on siliceous or decalcified soils of the subalpine level with a predominately ericaceous undergrowh usually dominated by *Rhododendron ferrugineum*.

Plant communities

Rhododendro-Vaccinion p.

Species

Pinus uncinata, Rhododendron ferrugineum, Vaccinium myrtillus, V. uliginosum, Calluna vulgaris, Homogyne alpina, Deschampsia flexuosa, Lycopodium annotinum

Corresponding class in other classifications

European forest types: 3.1 Subalpine larch-arolla pine and dwarf pine forest

EU Habitats Directive Annex I

included in 9430 Subalpine and montane *Pinus uncinata* forests (* if on gypsum or limestone)

G3.32 Xerocline *Pinus uncinata* forests

Description

Pinus uncinata forests of the inner Alps, of the western outer Alps and the Jura, and of south facing slopes (‘adret’) of the Pyrenees, accompanied by shrubby undergrowth in which *Rhododendron ferrugineum* is absent or rare.

Plant communities

Seslerio caeruleae-Pinion uncinatae

Species

Pinus uncinata, Juniperus nana, J. hemisphaerica, Arctostaphylos uva-ursi, A. alpinus, Erica herbacea, Rhododendron hirsutum, Cotoneaster integerrimus, Daphne striata, Dryas octopetala, Polygala chamaebuxus

Corresponding class in other classifications

European forest types: 3.1 Subalpine larch-arolla pine and dwarf pine forest

Milieux naturels de Suisse 2008: 6.6.5 Pinède de montagne

EU Habitats Directive Annex I

included in 9430 Subalpine and montane *Pinus uncinata* forests (* if on gypsum or limestone)

G3.4 *Pinus sylvestris* woodland south of the taiga

G3.41 Caledonian forest

Description

Relict, indigenous Scots pine forests of endemic *Pinus sylvestris* var. *scotica*, limited to the central and northeastern Grampians of Scotland. They are mostly open and have a ground layer usually rich in ericaceous species and mosses, in particular, *Hylocomium splendens*.

Plant communities

Dicrano-Pinion

Species

Pinus sylvestris, Sorbus aucuparia, Betula pubescens, B. pendula, Juniperus communis, Ilex aquifolium, Populus tremula, Calluna vulgaris, Corallorhiza trifida, Deschampsia flexuosa, Goodyera repens, Linnaea borealis, Listera cordata, Moneses uniflora, Orthilia secunda, Pyrola minor, Trientalis europaea. Bryophytes - *Hylocomium splendens, Pleurozium schreberi.*

Corresponding class in other classifications

European forest types: 2.2 Nemoral scots pine forest

National Vegetation Classification (UK): W18 *Pinus sylvestris - Hylocomium splendens* woodland

EU Habitats Directive Annex I

91C0 Caledonian forest

References

Rodwell, J.S. & Cooper, E.A. 1995. Scottish pinewoods in a European context. pp. 4-21in J.R. Aldhous (ed.) *Our Pinewood Heritage.* ForestryCommission, Royal Society for the Protection of Birds & Scottish Natural Heritage, Inverness.

G3.42 Middle European *Pinus sylvestris* forests

G3.423 Western Eurasian steppe pine forests

G3.4232 Sarmatic steppe *Pinus sylvestris* forests

Description

Xerophilous *Pinus sylvestris* woods of the wooded steppe belt of the Sarmatic region of western Eurasia and of areas with extreme continental local climates of northeastern Central Europe and Eastern Europe, extending from northeastern and eastern Brandenburg and Mecklenburg-Vorpommern, north-central and eastern Poland in the west, through Podolia and the southern Russian plateaux, to Bashkiria.

Plant communities

Cytiso ruthenici-Pinion sylvestris

Species

Pinus sylvestris, Vaccinium myrtillus, Pyrola minor, Orthilia minor, Chimaphilla umbellata, Ophrys insectifera, Coronilla vaginalis, Globularia punctata, Brachypodium pinnatum, Astragalus zingeri, Potentilla volgarica, Sempervivum ruthenicum, Chamaecyticis wulfii

Corresponding class in other classifications

Biotopes of the Czech Republic 2001: L8.2 Lesostepní bory

European forest types: 2.2 Nemoral scots pine forest

EU Habitats Directive Annex I

91U0 Sarmatic steppe pine forest (*Cytiso-Pinetalia*)

G3.4233 Carpathian steppe *Pinus sylvestris* woods

Description

Local xerophile *Pinus sylvestris* steppe woods of sub-Pannonic low Carpathian spurs of southwestern and southeastern Slovakia and of the Slovakian inner Carpathian basins.

Plant communities

Cytiso ruthenici-Pinion p.

Species

Cornus mas, Brachypodium pinnatum, Melica nutans, Luzula luzuloides, Hypochoeris maculata, Buglossoides purpurocaerulea, Lathyrus niger, Vicia dumetorum, Melittis melissophyllum, Digitalis grandiflora, Viola collina, Achillea distans, Euphorbia epithymoides, Orchis purpurea

Corresponding class in other classifications

Biotopes of Slovakia: 2114300 Dubové subxerotermofilné a borovicové xerofilné lesy

European forest types: 2.2 Nemoral scots pine forest

G3.4234 Pannonic steppe *Pinus sylvestris* woods

Description

Pinus sylvestris sand steppe woods of the western Pannonic plain and its satellite basins, in particular, the Zahorie (Marchfeld) and the little Alf'ld.

Plant communities

Festuco vaginatae-Pinion

Species

Pinus sylvestris, Festuca vaginata

Corresponding class in other classifications

European forest types: 2.2 Nemoral scots pine forest

G3.43 Inner-Alpine *Ononis* steppe forests

Description

Xerophile, often calcicolous, open *Pinus sylvestris* or *Pinus sylvestris* and *Pinus uncinata* forests of the montane level of inner Alpine valleys submitted to extreme continental climate (upper Durance, Ubaye, upper Tiné, Val di Susa, Maurienne, Val d'Aoste, Alto Adige (Val Venosta), Upper Engadine, Vintschgau, Virgental), rich in leguminous plants.

Plant communities

Ononido rotundifoliae-Pinion sylvestris

Species

Pinus sylvestris, Pinus uncinata, Juniperus communis, Juniperus sabina, Berberis vulgaris, Amelanchier ovalis, Ononis rotundifolia, Ononis cenisia, Astragalus austriacus, Astragalus purpureus, Coronilla minima, Onobrychis saxatilis

Corresponding class in other classifications

Milieux Naturels de Suisse 2010: 6.4.3 Pinède continentale xérophile

European forest types: 3.3 Alpine Scots pine & black pine forest

References

Steiger P. (2010) Wälder der Schweiz. Von Lindengrün zu Lärchengold. Vielfalt der Waldbilder und Waldgesellschaften in der Schweiz. Ott Verlag, Thun, 464 p.

G3.44 Spring heath *Pinus sylvestris* forests

Includes the following subtypes separately listed in the 2010 version

G3.442 Carpathian relict calcicolous *Pinus sylvestris* forests

Description

Mesophile, mostly calcicolous, *Pinus sylvestris* forests of the intermediate Alps, the inner Alps, the northern and southeastern outer Alps, with outposts in northern peri-Alpine areas, in the Jura and in the Carpathians, generally characterised by the presence of *Erica herbacea*.

Plant communities

Erico-Fraxinion orni, Erico carneae-Pinion, Pulsatillo slavicae-Pinion

Species

Pinus sylvestris, **G3.441:** *Erica herbacea, Juniperus communis, Berberis vulgaris, Sorbus aria, Amelanchier ovalis, Lembotropis nigricans, Chamaecytisus supinus, Polygala chamaebuxus, Goodyera repens, Pyrola chlorantha, Epipactis atrorubens, Melampyrum pratense, Melampyrum sylvaticum, Carex alba, Carex ornithopoda, Carex humilis, Carex flacca, Molinia caerulea, Calamagrostis varia, Sesleria albicans* **G3.442:** *Linum flavum, Carex humilis, Carex alba, Calamagrostis varia, Pulsatilla slavica, Thymus carpathicus, Primula auricula ssp. hungarica, Globularia aphyllanthes, Campanula carpatica, Festuca tatrae.*

Corresponding class in other classifications

Milieux Naturels de Suisse 2008: 6.4.1 Pinède subatlantique des pentes marneuses

6.4.2 Pinède subcontinentale basophile

European forest types: 3.3 Alpine Scots pine and black pine forest

EU Habitats Directive Annex I

Includes 91Q0 Western Carpathian calcicolous *Pinus sylvestris* forests

References

Steiger P. (2010) Wälder der Schweiz. Von Lindengrün zu Lärchengold. Vielfalt der Waldbilder und Waldgesellschaften in der Schweiz. Ott Verlag, Thun, 464 p.

G3.4C Southeastern European *Pinus sylvestris* forests

Description

Pinus sylvestris forests of the eastern Carpathians and of the mountains of the Balkan peninsula, south to northern Greece, formed by the largely isolated, disjunct, southeastern forms of *Pinus sylvestris* (*Pinus sylvestris* var. *rhodopaea*, *Pinus sylvestris* var. *illyrica*, *Pinus sylvestris* var. *romanica*), and often limited to azonal edaphic enclaves.

Plant communities

Fraxino orni-Ericion, Fraxino orni-Pinion nigrae

Species

Pinus sylvestris var. rhodopaea, Pinus sylvestris var. illyrica, Pinus sylvestris var. romanica. **G3.4C5:** *Erica herbacea (Erica carnea), Galium lucidum, Aquilegia vulgaris.* **G3.4C6:** *Abies alba, Fagus sylvatica, Picea abies, Populus tremula, Betula pendula, Juniperus communis, Cotoneaster nebrodensis, Vaccinium myrtillus, Arctostaphylos uva-ursi, Galium licidum, Luzula sylvatica, Brachypodium pinnatum.* **G3.4C7:** *Picea abies, Abies alba, Betula pendula, undergrowth dominated by Leucobryum glaucum.* **G3.4C8:** *Sesleria rigida, Helianthemum nummularium ssp. obscurum, Thymus comosus, Asperula*

capitata, Dianthus spiculifolius, Arctostaphylos uva-ursi, Sorbus aria, Cotoneaster integerrimus. **G3.4C9:** *Vaccinium myrtillus, Vaccinium vitis-idaea, Luzula luzuloides, Oxalis acetosella, Deschampsia flexuosa and Dicranum scoparium.* **G3.4CA:** *Daphne blagayana, Iris ruthenica, Bruckenthalia spiculifolia, Anthemis carpatica*

Corresponding class in other classifications

European forest types: 3.3 Alpine scots pine and black pine forest

EU Habitats Directive Annex I

91Q0 Western Carpathian calcicolous *Pinus sylvestris* forests

G3.4E Ponto-Caucasian *Pinus sylvestris* forests

Description

Pine forests dominated by the *Pinus sylvestris* group, mostly included in *Pinus sylvestris* ssp. *hamata* or its intermediates with *Pinus sylvestris* ssp. *sylvestris*, also forests with *Pinus kochiana, Pinus hamata* or *Pinus armena*, of the Pontic Range, its satellites and inner Anatolian outposts, of the mountains of the Crimea and of the Caucasus.

Plant communities

Pinion kochianae

Species

Pinus sylvestris ssp. hamata, P. kochiana, P. hamata, P. armena

EU Habitats Directive Annex I

Not present in the European Union

G3.4G Pinus *sylvestris* forest on chalk in the steppe zone

Description

Forests with *Pinus sylvestris* var. *cretacea* of the alliance *Libanotido intermediae-Pinion sylvestris* on the chalk outcrops of the Steppic zone

EU Habitats Directive Annex I

Not present in the European Union

G3.5 *Pinus nigra* woodland (but excluding G3.57 *Pinus nigra* reforestation)

Includes the following subtypes separately listed in the 2010 version

G3.51 Alpino-Apennine *Pinus nigra* forests

G3.52 Western Balkanic *Pinus nigra* forests

G3.53 *Pinus salzmannii* forests

G3.54 Corsican *Pinus laricio* forests

G3.55 Calabrian *Pinus laricio* forests

G3.56 *Pinus pallasiana* and *Pinus banatica* forests

Description

Forests dominated by pines of the *Pinus nigra* group.

Plant communities

Abietion cephalonicae, Berberido aetnensis-Pinion laricionis, Berberido creticae-Juniperion foetidissimae, Chamaecytiso hirsuti-Pinion pallasianae, Erico carneae-Pinion, Erico-Fraxinion orni, Fraxino orni-Pinion nigrae, Junipero sabinae-Pinion sylvestris, Pinion pallasianae, Querco-Cedrion libani

Species

Pinus nigra ssp. *nigra, Pinus dalmatica, Pinus salzmannii* (*Pinus nigra* ssp. *salzmannii*, *Pinus nigra* ssp. *clusiana*, *Pinus nigra* ssp. *mauretanica*) *Pinus laricio, Pinus pallasiana, Pinus banatica* (*Pinus nigra* var. *banatica*)

Corresponding class in other classifications

European forest types: 10.2 Mediterranean and Anatolian black pine forest

EU Habitats Directive Annex I

9530 (Sub-) Mediterranean pine forests with endemic black pines

References

Spampinato G (not dated) 9530* Pinete (sub)mediterranee di pini neri endemici in Habitat Italia http://vnr.unipg.it/habitat/cerca.do?formato=stampa&idSegnalazione=86

Papastergiadou, E. *et al*. (1997). Syntaxonomic Typology of Greek Habitats. *Folia Geobotanica & Phytotaxonomica* 32 (3): 335-341..

G3.6 Subalpine mediterranean *Pinus* woodland

Description

Balkan endemic forests of *Pinus heldreichii* or *Pinus peuce*, restricted to the southern Balkans, Northern Greece and Southern Italy. Accompaning species are *Picea abies, Pinus sylvestris, Pinus mugo* with understory including *Juniperus sibirica, Vaccinium myrtillus, Calamagrostis arundinacea, Brachypodium pinnatum, Luzula luzuloides, Luzula sylvatica, Geranium macrorhizum*

Plant communities

Pinion peucis, Pinion heldreichii

Species

G3.61: *Pinus heldreichii, Pinus leucodermis, Brachypodium pinnatum, Festuca penzesii, Calamagrostis arundinacea, Orthilia secunda*. **G3.62:** *Pinus peuce, Vaccinium myrillus, Luzula sylvatica, Calamagrostis arundinacea, Pinus mugo*

Corresponding class in other classifications

European forest types: 10.5 Alti-Mediterranean pine forest

EU Habitats Directive Annex I

95A0 High oro-Mediterranean pine forests

G3.7 Lowland to montane mediterranean Pinus woodland (excluding *Pinus nigra*)

Includes the following subtypes separately listed in the 2010 version

G3.711 Charente *Pinus pinaster* ssp. *atlantica* - *Quercus ilex* forests

G3.712 Aquitanian *Pinus pinaster* ssp. *atlantica* - *Quercus suber* forests

G3.714 Iberian *Pinus pinaster* ssp. *atlantica* forests

G3.72 *Pinus pinaster* ssp. *pinaster* (*Pinus mesogeensis*) forests

G3.73 *Pinus pinea* forests

G3.741 Iberian *Pinus halepensis* forests

G3.742 Balearic *Pinus halepensis* forests

G3.743 Provenço-Ligurian *Pinus halepensis* forests

G3.744 Corsican *Pinus halepensis* woods

G3.745 Sardinian *Pinus halepensis* woods

G3.746 Sicilian *Pinus halepensis* woods

G3.7471 Gargano *Pinus halepensis* forests

G3.7472 Metapontine *Pinus halepensis* forests

G3.7473 Umbrian *Pinus halepensis* forests

G3.748 Hellenic *Pinus halepensis* forests

G3.749 Illyrian *Pinus halepensis* forests

G3.74A East Mediterranean *Pinus halepensis* forests

G3.75 *Pinus brutia* forests

Description

Mediterranean and thermo-Atlantic forests of thermophilous pines, mostly appearing as successional stages or plagioclimax replacements of Mediterranean evergreen broadleaved woodland G2.1 or G2.4. Long-established plantations of these pines, within their natural area of occurrence, and with an undergrowth basically similar to that of G2.1 and G2.4, are included.

Plant communities

Alkanno baeoticae-Pinion halepensis, Pinion pineae

Species

G3.71: *Arbutus unedo, Calluna vulgaris, Cistus salvifolius, Cytisus scoparius, Daphne gnidium, Erica scoparia, Frangula alnus, Hedera helix, Ilex aquifolium, Pinus pinaster ssp. atlantica, Pteridium aquilinum, Quercus ilex, Quercus pubescens, Quercus robur, Rubia peregrine, Ruscus aculeatus, Ulex europaeus,* **G3.72:** *Arbutus unedo, Calicotome spinosa, Erica arborea, Genista corsica, Lavandula stoechas, Pinus pinaster, Pistacia lentiscus, Quercus faginea, Quercus ilex, Quercus pyrenaica, Quercus rotundifolia, Quercus suber, Rosmarinus officinalis, Rubia peregrina, Teucrium marum.* **G3.73:** *Pinus pinea, Arbutus unedo, Calicotome spinose, Calicotome villosa, Chamaerops humilis, Cistus albidus, Cistus creticus, Cistus crispus, Cistus laurifolius, Cistus monspeliensis, Cistus salvifolius, Cistus salvifolius, Corema album, Corynephorus canescens, Crataegus monogyna, Cytisus scoparius, Cytisus scoparius, Erica arborea, Erica scoparia, Halimium halimifolium, Halimium rosmarinifolium, Helichrysum serotinum, Juniperus communis, Juniperus oxycedrus, Juniperus oxycedrus, Juniperus*

phoenicea, Juniperus thurifera, Lavandula latifolia, Lavandula pedunculata, Pinus pinaster, Pistacia palaestina, Pistacia terebinthus, Retama sphaerocarpa, Rhamnus oleoides, Salvia officinalis, Ulex australis

Corresponding class in other classifications

European forest types: 10.1 Thermophilous pine forest

EU Habitats Directive Annex I

included in 9540 Mediterranean pine forests with endemic Mesogean pines

Associated habitat types

Pinus brutia on coastal dunes are included in habitat type B1.71

Pinus nigra woodlands are G3.6

References

Gamisans, J (1991) La Végétation de la Corse. Edisud, Aix en Provence.

G3.8 Canary Island *Pinus canariensis* woodland

Description

Forests of endemic *Pinus canariensis*, of the dry montane level at around 800 to 2000 m (locally down to 500 and up to 2500 m) in Tenerife, La Palma, Gran Canaria and Hierro. These forests, of which well-preserved examples have become rare, are the only habitat of Blue Chaffinch (*Fringilla teydea*), Tenerife Great Spotted Woodpecker (*Dendrocopos major canariensis*) and Gran Canaria Great Spotted Woodpecker (*Dendrocopos major thanneri*).

Plant communities

Cisto-Pinion canariensis

Species

Pinus canariensis, Chamaecytisus proliferus, Adenocarpus foliolosus, Cistus symphytifolius, Lotus campylocladus, L. hillebrandii, L. spartioides, Daphne gnidium, Juniperus cedrus, Micromeria spp.

Corresponding class in other classifications

European forest types: 10.3 Canarian pine forest

EU Habitats Directive Annex I

9550 Canary Island endemic pine forests

G3.9 Coniferous woodland dominated by Cupressaceae or Taxaceae

includes the following subtypes separately listed in or split unit from the 1998 version:
G3.9C *Cedrus* woodland

Description

Woods dominated by *Cupressus sempervirens, Juniperus* spp. or *Taxus baccata* of the nemoral and Mediterranean mountains and hills.

Plant communities

Juniperion brevifoliae, Acero sempervirenti-Cupression sempervirentis, Oleo-Ceratonion siliquae, Quercion ilicis, Mayteno-Juniperion canariensis, Juniperion thuriferae, Periplocion angustifoliae, Juniperion excelsae, Fagion sylvaticae, Junipero excelsae-Quercion pubescentis, Quercetea pubescentis

Species

Abies nebrodensis, Anagyris latifolia, Arceuthobium azoricum, Argyranthemum lidii, Argyranthemum winteri, Astragalus maritimus, Bupleurum handiense, Centaurea attica ssp. megarensis, Cephalanthera cucullata, Cheirolophus duranii, Cheirolophus junonianus, Convolvulus lopez-socasi, Cupressus sempervirens, Cupressus sp., *Cypripedium calceolus, Cytisus aeolicus, Dendriopoterium pulidoi, Dorycnium spectabile, Dracaena draco, Erica scoparia ssp. azorica, Euphorbia lambii, Euphorbia stygiana, Frangula azorica, Fritillaria conica, Fritillaria obliqua, Galanthus nivalis, Jankaea heldreichii, Juniperus sp., Limonium arborescens, Limonium dendroides, Limonium sventenii, Ophrys argolica, Phoenix theophrasti, Picconia azorica, Prunus lusitanica ssp. azorica, Rumex azoricus, Ruscus aculeatus, Sideritis cystosiphon, Sideritis infernalis, Sideritis marmoreal, Sideroxylon marmulano, Solanum lidii, Taxus baccata, Teline salsoloides, Tetraclinis articulate, Zelkova abelicea*

Corresponding class in other classifications

Includes European forest types

10.7 Juniper forest

10.8 Cypress forest

10.9 Cedar forest

10.10 *Tetraclinis articulata* stands

10.11 Mediterranean yew stands

EU Habitats Directive Annex I

Includes

91J0 *Taxus baccata* woods of the British Isles

9290 *Cupressus* forests (*Acero-Cupression*)

9560 Endemic forests with *Juniperus* spp

9570 *Tetraclinis articulata* forests

9580 Mediterranean *Taxus baccata* woods

9590 *Cedrus brevifolia* forests (*Cedrosetum brevifoliae*)

G3.A *Picea* taiga woodland

Description

Boreal spruce or spruce-pine forests of Fennoscandia, northeastern Poland, the Baltic States, Belarus and European Russia, with G3.B constituting the westernmost section of the continuous Eurasian northern taiga belt. In the boreo-nemoral zone, deciduous trees such as *Quercus robur*, *Tilia cordata*, *Acer platanoides, Ulmus laevis, Populus tremula* may accompany the conifers.

Plant communities

Aconito septentrionalis-Piceion obovatae, Empetro-Piceion obovatae, Piceion excelsae

Species

G3.A1: *Picea abies*, *Picea obovate, Pinus sylvestris, Vaccinium myrtillus*, *Deschampsia flexuosa,Betula pubescens*, *Sorbus aucuparia*, *Empetrum* spp., *Juniperus communis*, *Vaccinium vitis-idaea*, *Ledum palustre, Linnaea borealis, Maianthemum bifolium, Melampyrum pratense, Solidago virgaurea, Trientalis europaea*, *Luzula pilosa, Lycopodium annotinum*, *Dicranum* spp., *Hylocomium splendens*, *Pleurozium schreberi*, **G3.A3:** *Picea abies*, *Picea obovata*, *Pinus sylvestris Populus tremula, Sorbus aucuparia*, *Vaccinium myrtillus*, *Alnus* spp., *Betula* spp., *Juniperus communis*, *Vaccinium vitis-idaea*, *Oxalis*

acetosella, *Melampyrum sylvaticum*, *Maianthemum bifolium*, *Trientalis europaea*, *Gymnocarpium dryopteris*, *Thelypteris phegopteris*, *Linnaea borealis*, *Geranium sylvaticum*, *Melampyrum pratense*, *Solidago virgaurea*, *Rubus saxatilis*, *Viola riviniana*, *Hieracium silvaticum* grp., *Pyrola* spp., *Paris quadrifolia*, *Melica nutans*, *Deschampsia flexuosa*, *Luzula pilosa*, *Lycopodium annotinum*, *Equisetum sylvaticum*, **G3.A4:** *Picea abies*, *Picea obovate*, *Betula pubescens*, *Alnus incana*, *Sorbus aucuparia*; *Oxalis acetosella* and *Sambucus nigra*, *Actaea spicata*, *Campanula latifolia*, *Mercurialis perennis*, *Aconitum septentrionale* (*Aconitum lycoctonum*), *Cicerbita alpina*, *Geranium sylvaticum*, *Angelica sylvestris*, *Crepis paludosa*, *Filipendula ulmaria*, *Geum rivale*, *Viola epipsila*, *Melica nutans*, *Milium effusum*, *Paris quadrifolia*, *Rubus idaeus*, *Rubus saxatilis*, *Trientalis europaea*, *Trollius europaeus*, *Equisetum pratense*, *Equisetum sylvaticum*, *Dryopteris expansa*, *Athyrium filix-femina*, *Matteuccia struthiopteris*.

Corresponding class in other classifications

European forest types: 1.1 Spruce and spruce-birch boreal forest

Nordic Vegetation Classification 1994: 2.1.2.1 Spruce forest of bilberry type

2.1.2.2 Spruce forest of low fern type

2.1.2.4 Spruce forest of low herb type

2.1.2.5 Spruce forest of fern type

2.1.2.6 Spruce forest of tall herb type

EU Habitats Directive Annex I

9010 Western Taïga

9050 Fennoscandian herb-rich forests with Picea abies

G3.B *Pinus* taiga woodland

Description

Boreal pine forests of Fennoscandia, northeastern Poland, the Baltic States, Belarus and European Russia, with G3.A constituting the westernmost section of the continuous Eurasian northern taiga belt.

Plant communities

Cladonio stellaris-Pinion sylvestris, *Dicrano-Pinion*

Species

G3.B1: *Pinus sylvestris*, *Calluna vulgaris*, *Empetrum hermaphroditum*, *Empetrum nigrum* **G3.B2:** *Pinus sylvestris*, *Vaccinium vitis-idaea*, *Empetrum nigrum*, *Empetrum hermaphroditum*, *Betula pubescens*, *Calluna vulgaris*, *Ledum palustre*, *Vaccinium myrtillus*, *Vaccinium uliginosum*, *Pyrola chlorantha*, *Goodyera repens*, *Deschampsia flexuosa*, *Lycopodium complanatum*, *Cladonia* spp., *Dicranum scoparium*, *Dicranum polysetum*, *Dicranum fuscescens*, *Hylocomium splendens*, *Pleurozium schreberi* **G3.B4:** *Pinus sylvestris*, *Cladonia* (notably *Cladonia rangiferina*, *Cladonia alpestris*, *Cladonia mitis*), *Arctostaphylos uva-ursi*, *Calluna vulgaris*, *Vaccinium vitis-idaea*, *Cetraria islandica*, *Dicranum polysetum*, *Dicranum spurium*, *Pleurozium schreberi*, *Stereocaulon* spp

Corresponding class in other classifications

European forest types: 1.2 Pine and pine-birch boreal forest

Nordic Vegetation Classification 1994: 2.1.1.1 Pine forest of lichen type

2.1.1.2 Pine forest of heather - crowberry type

2.1.1.4 Pine forest of cowberry type

2.1.1.5 Pine forest, Leguminous plants-Stone bramble-type

2.1.1.6 Pine forest on calcareous ground

EU Habitats Directive Annex I

9010 Western Taïga

G3.D Boreal bog conifer woodland

Description

Woods of *Pinus* spp. or *Picea* spp., sometimes mixed with *Betula pubescens*, colonizing bogs and fens in the boreal and boreonemoral zones of northern Europe.

Species

Betula pubescens, Picea sp., *Pinus* sp. *Sphagnum* spp

Corresponding class in other classifications

European forest types: 11.1 Conifer dominated or mixed mire forests

EU Habitats Directive Annex I

91D0: Bog woodland

G3.E Nemoral bog conifer woodland

Description

Woods of *Pinus* spp. or *Picea* spp., sometimes mixed with *Betula pubescens*, colonizing bogs and fens in the nemoral zone. Conifer-dominated bog woodland occurs mainly in the boreal and boreonemoral zones, but extends into the nemoral, wooded steppe and steppe zones.

Plant communities

Sphagnion medii, Salicion cinereae, Piceion excelsae, Dicrano-Pinion, Sphagno-Betuletalia, Betulion pubescentis

Species

Eriophorum vaginatum, Vaccinium oxycoccos, Vaccinium uliginosum

Corresponding class in other classifications

European forest types: 11.1 Conifer dominated or mixed mire forests

Milieux naturels de Suisse 2008: 6.5.2 Pinède sur tourbe

6.5.3 Pessière sur tourbe

EU Habitats Directive Annex I

91D0 Bog woodland

H INLAND UNVEGETATED OR SPARSELY VEGETATED HABITATS

H1 Terrestrial underground caves, cave systems, passages and waterbodies

Description

Natural caves, cave systems, underground waters and subterranean interstitial spaces. Caves and their associated waters harbour varied, but species poor, communities of animals, fungi and algae that are restricted to them (troglobiont organisms), or are physiologically and ecologically capable of conducting their entire life cycle within them (troglophile organisms), or are dependent on them for part of the life cycle (subtroglophile organisms). Underground waters not associated with caves (stygon) and interstitial spaces harbour distinctive faunas.

Species

Plants: bryophytes only (e.g. *Schistostega pennata*) and algal carpets at the entry of caves.

Animals: Very specialised and highly endemic cavernicolous fauna. It includes underground relic forms of a fauna which has been diversified outside. This fauna is mainly composed of invertebrates which exclusively live in caves and underground waters. The cavernicolous terrestrial invertebrates are mainly coleoptera, belonging to the *Bathysciinae* and *Trechinae* families in particular, which are carnivorous and have a very limited distribution. Cavernicolous aquatic invertebrates constitute a highly endemic fauna, dominated by crustaceans (*Isopoda*, *Amphipoda*, *Syncarida*, *Copepoda*) and include many living fossils. Aquatic molluscs, belonging to the *Hydrobiidae* family are also found. With regard to vertebrates, caves constitute hibernation sites for most European bat species, among which many are threatened and listed on Resulution 6. Caves also shelter some very rare amphibious species like *Proteus anguinus* and several species of the *Speleomantes* genus

EU Habitats Directive Annex I

8310 Caves not open to the public

H1.4 Lava tubes is included in 8320 Fields of lava and natural excavations

H2 Screes

H2.1 Cold siliceous screes

Description

Noncalcareous screes of the mountains and uplands of the boreal zone, developed on siliceous substrates including basic to ultrabasic igneous or metamorphic substrates. Included are the screes of northern Europe including Iceland.

Plant communities

Allosuro-Athyrion alpestris, Antitrichio-Rhodiolion roseae, Ranunculo-Oxyrion didynae

Corresponding class in other classifications

Nordic Vegetation Classification 1994: 7.1.4.1 Rock Speedwell type

7.1.4.2 Rock Speedwell type rich in bushes

7.1.4.3b Alpine Lady's Mantle-Thymus arcticus variant

7.1.4.3a Alpine Mouse-ear-Viviparous fescue variant

7.1.4.4 Bog Bilberry type

7.1.4.5 Thrift-Moss Campion type

7.1.4.6 Roseroot-Moss Campion type

7.1.4.7 Dwarf Willow type

EU Habitats Directive Annex I

8110 Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)

H2.2 Cold limestone screes

Description

Unstable, gravelly, humus-poor, highly calcareous screes of the subalpine, low alpine and middle alpine levels of boreal and arctic mountains. Often with endemic species or species of restricted range.

Plant communities

Arenarion norvegicae, Salici reticulatae-Poion alpinae

Species

Arenaria norvegica, Arenaria humifusa, Arenaria pseudofrigida, Artemisia norvegica, Papaver radicatum group, *Papaver relictum, Papaver laestadianum, Braya linearis*.

Corresponding class in other classifications

Nordic Vegetation Classification 1994: 7.1.4.3 Arctic Sandwort type

EU Habitats Directive Annex I

8120 Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*)

H2.3 Temperate-montane acid siliceous screes

Description

Siliceous screes of high altitudes and cool sites in mountain ranges of the nemoral zone, including the Alps, Pyrenees and Caucasus.

Plant communities

Androsacion alpinae, Chaerophyllion humilis, Dryopteridion oreadis, Scrophulario minimae-Symphyolomion graveolens, Senecionion leucophylli

Species

H2.31: *Androsace alpina, Achillea nana, Oxyria digyna, Geum reptans, Saxifraga bryoides, Ranunculus glacialis, Linaria alpina, Oreochloa disticha, Silene acaulis* **H2.32:** *Epilobium collinum, Galeopsis segetum, Acetosella vulgaris, Dalanum ladanum, Petasites albus, Tussilago farfara, Senecio viscosus, Anarrhinum bellidifolium, Cryptogramma crispa* **H2.33:** *Saxifraga bryoides, Saxifraga adscendens, Saxifraga oppositifolia, Oxyria digyna, Androsace hedraeantha Poa cenisia, Cryptogramma crispa, Vaccinium* spp., *Polygonum alpinum, Pleuropteropyrum undulatum, Lerchenfeldia flexuosa, Senecio rupestris*.

Corresponding class in other classifications

Milieux Naturels de Suisse 2008: 3.3.2.2Eboulis siliceux d'altitude

3.3.2.3Eboulis siliceux thermophiles

EU Habitats Directive Annex I

8110 Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)

8150 Medio-European upland siliceous screes

H2.4 Temperate-montane calcareous and ultra-basic screes

Description

Calcareous and calcschist screes of high altitudes and cool sites in mountain ranges of the nemoral zone, including the Alps, Pyrenees and Caucasus. Usually sparse vegetation cover, unstable, on steep slopes.

Plant communities

Androsacion ciliatae, Arabidion alpinae, Bunion alpine, Drabion hoppeanae, Festucion dimorphae, Iberidion spathulatae, Iberido apertae-Linarion propinquae, Papaverion tatrici, Papavero-Thymion pulcherrimi, Petasition paradoxi, Platycapno saxicolae-Iberidion granatensis, Saxifragion praetermissae, Saxifragion prenjae, Thlaspion rotundifolii, Thlaspion stylosi, Veronico-Papaverion degenii

Species

H2.41: *Draba hoppeana*, *Campanula cenisia*, *Saxifraga biflora*, *Herniaria alpina*, *Trisetum spicatum* **H2.42:** *Thlaspi rotundifolium*, *Papaver rhaeticum*, *Papaver sendtneri*, *Viola cenisia*, *Linaria alpina*, *Arabis alpine* **H2.43:** *Petasites paradoxus*, *Valeriana montana*, *Gypsophila repens*, *Hieracium* spp **H2.44:** *Cerastium latifolium*, *Cerastium tatrae*, *Arabis alpina*, *Hutchinsia alpina*, *Sedum atratum*, *Cystopteris montana* **H2.45**: *Morina persica*, *Sideritis scardica*.

Corresponding class in other classifications

Milieux Naturels de Suisse 2008: 3.3.1.2 Eboulis calcaire d'altitude (roche dure)

3.3.1.3 Eboulis de calcschistes d'altitude

3.3.1.4 Eboulis calcaire humide

EU Habitats Directive Annex I

8120 Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*)

H2.5 Acid siliceous screes of warm exposures

Description

Siliceous screes of warm exposures in mountain ranges of the nemoral zone, including the Alps, Pyrenees and Caucasus, and of Mediterranean mountains, hills and lowlands and, locally, of warm, sunny middle European upland or lowland sites.

Plant communities

Dryopteridion oreadis, Gymnogrammo-Scrophularion, Galeopsion, Galeopsion pyneraicae, Holcion caespitose, Linario saxatilis-Senecionion carpetani, Sesamoidion suffruticosae

Species

H2.51: *Senecio leucophyllus*, *Taraxacum pyrenaicum*, *Galeopsis pyrenaica*, *Xatardia scabra*, *Armeria alpine* **H2.54:** *Linaria saxatilis*, *Linaria alpina*, *Digitalis purpurea var. carpetana*, *Senecio pyrenaicus ssp. carpetanus*, *Rumex suffruticosus*, *Santolina oblongifolia*, *Conopodium bunioides*, *Reseda gredensis* **H2.58:** *Achnatherum calamagrostis*, *Melica ciliata*.

Corresponding class in other classifications

Milieux Naturels de Suisse 2008: 3.3.2.3 Eboulis siliceux thermophiles

EU Habitats Directive Annex I

8130 Western Mediterranean and thermophilous scree

H2.6 Calcareous and ultra-basic screes of warm exposures

Includes the following subtype separately listed in the 2010 version

H2.613 Paris Basin screes

Description

Calcareous and calcschist screes of warm exposures in mountain ranges of the nemoral zone, including the Alps, Pyrenees and Caucasus, and of Mediterranean mountains, hills and lowlands and, locally, of warm, sunny middle European upland or lowland sites.

Plant communities

Alysso sphaciotici-Valantion apricae, Andryalion ragusinae, Arrhenatherion sardoi, Campanulion hawkinsianae, Iberido apertae-Linarion propinquae, Leontodontion hyoseroidis, Linarion purpureae, Peltarion alliaceae, Pimpinello tragium-Gouffeion provincialis, Platycapno saxicolae-Iberidion granatensis, Ptilostemonion echinocephali, Silenion caesiae, Silenion marginatae, Stipion calamagrostis.

Species

H2.62: *Arenaria provincialis* (*Gouffeia arenarioides*), *Ptychotis heterophylla*, *Linaria supina*, *Centranthus ruber*, *Centranthus lecoqii*, *Crucianella latifolia* **H2.68:** *Drypis spinosa*, *Ranunculus brevifolius*, *Senecio thapsoides*, *Aethionema saxatile*, *Geranium robertianum ssp. purpureum*, *Centranthus calcitrapa*, *Mercurialis annua*, *Theligonum cynocrambe* and *Thlaspi perfoliatum* **H2.6A:** *Alyssum troodi*, *Hedysarum cyprium*, *Salvia veneris* **H2.6C:** *Dianthus petraeus*, *Corydalis ochroleuca*, *Peltaria alliacea*, *Drypis spinosa ssp. jacquiniana*, *Malcolmia serbica*, *Galium corrudifolium*, *Teucrium chamaedrys*, *Geranium robertianum* **H2.6D:** *Achnatherum calamagrostis*, harbouring the endemics *Halacsya sendtneri*, *Scrophularia tristis*, *Alyssum markgrafii*, *Linaria rubioides*, *Stachys chrysophaea*, *Cotinus coggygria* **H2.6E:** *Achnatherum calamagrostis* **H2.6G:** *Achnatherum calamagrostis*, *Parietaria officinalis*, *Lamium garganicum ssp. laevigatum*, *Galium album ssp. album*, *Vincetoxicum hirundinaria*

Corresponding class in other classifications

Milieux Naturels de Suisse 2008: 3.3.1.5 Eboulis calcaire thermophile

EU Habitats Directive Annex I

8130 Western Mediterranean and thermophilous scree

8140 Eastern Mediterranean screes

8160 Medio-European calcareous scree of hill and montane levels

H3 Inland cliffs, rock pavements and outcrops

H3.1 Acid siliceous inland cliffs

Description

Dry non-calcareous inland cliffs. Specific plant associations colonize montane and Mediterranean cliffs. Most of the subdivisions refer to them. Northern lowland cliffs usually support fragments of other less specialized communities.

Plant communities

Androsacion vandellii, Asarinion procumbentis, Asplenion septentrionalis, Cheilanthion hispanicae, Gymnogrammo-Scrophularion, Gypsophilion tenuifoliae, Hieracion carpetani, Hypno-Polypodion vulgaris, Linarion caprariae, Pohlio crudae-Asplenion septentrionalis, Polygonion icarici, Polypodion serrati, Potentillion crassinerviae, Saxifragion continentalis, Saxifragion cotyledonis, Saxifragion cymosae, Saxifragion nevadensis, Saxifragion pedemontanae, Sesamoidion suffruticosae, Silenion lerchenfeldianae, Thalictro foetidi-Asplenion

Species

H3.11: *Acetosella vulgaris, Aurinia saxatilis, Polypodium vulgare, Woodsia ilvensis, Primula minima, Ranunculus alpestris, Saxifraga bryoides, Silene acaulis* **H3.13:** *Saxifraga pedemontana* **H3.14:** *Potentilla crassinervia, Armeria leucocephala, Silene requienii, Saxifraga pedemontana ssp. cervicornis, Amelanchier ovalis ssp. rhamnoides, Festuca sardoa, Phyteuma serratum, Helechryssum frigidum, Aquilegia bernardii, Leucanthemum corsicum, Scabiosa corsica, Draba dubia, Asplenium viride, Draba loiseleurii, Erigeron paolii* **H3.16:** *Asarina procumbens* (*Antirrhinum asarina*), *Sedum hirsutum, Centaurea pectinata, Sempervivum arvernense, Dianthus graniticus, Saxifraga clusii, Saxifraga hypnoides* **H3.17:** *Cheilanthes tinaei, Cheilanthes hispanica* **H3.18:** *Cheilanthes spp, Asplenium* spp, *Polypodium spp, Dianthus spp*

Corresponding class in other classifications

Nordic Vegetation Classification 1994: 7.1.1.1 Forked Spleenwort-Maidenhair Spleenwort type

7.1.1.2 Catchfly-Heather-type

7.1.1.3 Oblong Woodsia-Red German Catchfly-type

Milieux Naturels de Suisse 2008: 3.4.2 Paroi de roche siliceuse, serpentine

EU Habitats Directive Annex I

8220 Siliceous rocky slopes with chasmophytic vegetation

H3.2 Basic and ultra-basic inland cliffs

Description

Dry, calcareous inland cliffs. Specific plant associations colonize montane and Mediterranean cliffs and most of the subdivisions refer to these. Northern lowland cliffs usually support fragments of other less specialized communities.

Plant communities

Amphoricarpion neumayeri, Arenarion balearicae, Arenarion bertolonii, Arenarion creticae, Asperulion garganicae, Asplenio celtiberici-Saxifragion cuneatae, Asplenion glandulosi, Asplenion serpentine, Asterion cretici, Brassicion insularis, Brassico balearicae-Helichrysion rupestris, Calendulo lusitanicae-Antirrhinion linkiani, Campanulion velutinae, Campanulion versicoloris, Capparo-Amaracion tournefortii, Caro multiflori-Aurinion megalocarpae, Centaureo dalmaticae-Campanulion, Centaureo filiformis-Micromerion cordatae, Centaureo-Portenschlagiellion, Cheilanthion pulchellae, Cosentinio bivalentis-Lafuenteion rotundifoliae, Cymbalario muralis-Asplenion, Dianthion rupicolae, Drabo cuspidatae-Campanulion tauricae, Edraianthion, Edraiantho graminifolii-Erysimion comati, Galion degenii, Gypsophilion petraeae, Inulion heterolepidis, Jasionion foliosae, Micromerion croaticae, Micromerion pulegii, Parietario judaicae-Hyoscyamion aurei, Parietario-Galion muralis, Petrocoptidion glaucifoliae, Petromarulo-Centaurion argenteae, Phagnalo saxatilis-Cheilanthion maderensis, Phyteumato-Saxifragion petraeae, Polypodion serrati, Potentillion caulescentis, Ramondion nathaliae, Sarcocapnion enneaphyllae, Sarcocapnion pulcherrimae, Saxifragion australis, Saxifragion camposii, Saxifragion lingulatae, Saxifragion mediae, Saxifragion scardicae, Sedo albi-Seslerion hispanicae, Silenion auriculatae, Teucrion buxifolii, Valeriano longifoliae-Petrocoptidion, Violo biflorae-Cystopteridion alpinae

Species

H3.21: *Asplenium petrarchae, Phagnalon sordidum, Sarcocapnos enneaphylla, Biscutella frutescens, Hieracium stelligerum, Lavatera maritima, Campanula macrorhiza, Melica minuta, Melica bauhinii. Scabiosa saxatilis, Teucrium buxifolium, Rhamnus lycioides ssp. borgiae Brassica balearica, Helichrysum rupestre var. cambessedesii, Brassica insularis, Ruta graveolens, Stachys glutinosa, Dianthus rupicola, Iberis semperflorens, Lithodora rosmarinifolia, Antirrhinum siculum, Brassica rupestris, Brassica incana,*

Scabiosa limonifolia, *Pimpinella anisoides*, *Seseli bocconi ssp. bocconi*, *Silene fruticosa*, *Asperula rupestris*, *Cymbalaria pubescens*, *Odontites bocconei* **H3.22:** *Saxifraga media*, *Saxifraga longifolia*, *Saxifraga aretioides*, *Potentilla alchimilloides*, *Potentilla nivalis*, *Ramonda myconi*, *Asperula hirta* H3.23: *Saxifraga lingulata*, *Primula marginata*, *Primula allionii*, *Phyteuma charmelii*, *Phyteuma villarsii*, *Silene campanula*, *Potentilla saxifraga*, *Ballota frutescens* **H3.25:** *Asplenium ruta-muraria*, *Asplenium trichomanes*, *Asplenium viride*, *Cystopteris fragilis*, *Gymnocarpium robertianum*, *Saxifraga paniculata* *Potentilla caulescens*, *Potentilla clusiana*, *Potentilla nitida*, *Primula auricula*, *Hieracium humile*, *Cardaminopsis petraea*, *Androsace helvetica*, *Minuartia rupestris*. *Cystopteris fragilis*, *Cystopteris regiaAsplenium scolopendrium Carex brachystachys* **H3.26:** *Campanula versicolor*, *Campanula rupestris*, *Sideritis roeseri*, *Stachys candida*, *Hypericum vesiculosum*, *Asperula arcadiensis*, *Galium boryanum*, *Centaurea pelia*, *Alkanna graeca*, *Alyssum orientale*, *Linaria microcalyx*, *Onosma frutescens*, *Inula candida*, *Centranthus ruber*, *Silene congesta*, *Teucrium flavum* **H3.27:** *Petromarula pinnata*, *Galium fruticosum*, *Centaurea argentea*, *Ebenus cretica*, *Verbascum arcturus* (*Celsia arcturus*), *Inula candida*, *Eryngium ternatum*, *Asperula incana*, *Dianthus juniperinus*, *Aster canus*, *Campanula pelviformis*, *Campanula saxatilis*, *Teucrium heliotropifolium*, *Silene fruticosa*, *Galium incurvum*, *Inula heterolepis*, *Campanula hagielia*, *Lactuca leburnea*, *Dianthus rhodensis*, *Inula heterolepis*, *Rosularia serrata*, *Sedum creticum*, *Fibigia lunarioides*, *Eryngium amorginum*, *Amaracus tournefortii*, *Campanula amorgina*, *Campanula heterophylla*, *Helichrysum amorginum*, *Inula sophiae*, *Capparis spinosa*, *Dianthus arboreus*, *Amaracus tournefortii* **H3.28:** *Silene auriculata*, *Achillea umbellata*, *Campanula rupicola*, *Saxifraga sibthorpii*, *Saxifraga marginata*, *Saxifraga spruneri*, *Minuartia stellata*, *Valeriana olenaea*, *Satureja parnassica*, *Rosa glutinosa*, *Viola poetica*, *Edraianthus parnassicus*, *Campanula aizoon* **H3.29:** *Saxifraga scardica*, *Saxifraga glabella*, *Campanula oreadum*, *Arabis bryoides*, *Potentilla deorum*, *Galium dagenii*, *Edraianthus graminifolius*, *Asplenium fissum*, *Aubrietea gracilis*, *Achillea clavennae*, *Satureja parnassica* **H3.2A:** *Carex brachystachys*, *Valeriana elongata*, *Aster bellidiastrum*, *Campanula cochlearifolia ssp. croatica*, *Cystopteris montana*, *Asplenium ruta-muraria*, *Asplenium trichomanes*, *Corydalis ochroleuca*, *Moehringia muscosa*, *Cardaminopsis croatica*, *Saxifraga rotundifolia*, *Campanula justiniana* **H3.2I:** *Halacsya sendtneri*, *Potentilla mollis* and ferns *Asplenium cuneifolium*, *Notholaena marantae*, *Asplenium trichomanes*, *Silene serbica*, *Jovibarba heuffelii var. kopaonikensis*, *Edraianthus jugoslavicus var. subalpinus*, *Festuca panciciana*, *Sedum serpentini*

Corresponding class in other classifications

Milieux Naturels de Suisse 2008: 3.4.1 Paroi de roche calcaire

Nordic Vegetation Classification 1994: 7.1.2.1 Green Spleenwort type

7.1.3.1 Rock vegetation on serpentine, Green Spleenwort type

7.1.3.2 Rock vegetation on serpentine, Dwarf shrub type

7.1.3.3 Rock vegetation on serpentine, *Asplenium adulterinum* type

EU Habitats Directive Annex I

8210 Calcareous rocky slopes with chasmophytic vegetation

H3.511 Limestone pavements

Description

More or less level surfaces of calcareous rock of lowlands, hills and mountains of non-desert regions of the Palaearctic, including karstic pavements, lapis, with their clints (fissures) and grikes (blocks).

EU Habitats Directive Annex I

8240 Limestone pavements

References

Gaudillat, V. (2008). *Les « Pavements calcaires », habitat d'intérêt communautaire prioritaire (UE 8240). Présentation et situation en France*. Rapport SPN 2008/1, MNHNDEGB-

SPN, Paris, 34 p. http://spn.mnhn.fr/spn_rapports/archivage_rapports/2008/SPN%202008%20-%201%20-%20Pavements_calcaires.pdf

Webb, S and Glading, P (1998) The ecology and conservation of limestone pavement *British Wildlife*, 10, 103-113.

H4 Snow or ice-dominated habitats

H4.2 Ice caps and true glaciers

Description

Permanent and near-permanent ice. Includes ice sheets, ice caps, cirque glaciers, valley glaciers, and small ice masses (glacierets) that are either permanent or persist for a few years.

Corresponding class in other classifications

Milieux Naturels de Suisse 2008: 3.1.1 Glaciers

EU Habitats Directive Annex I

8340 Permanent glaciers

H4.3 Rock glaciers and unvegetated ice-dominated moraines

Description

Mixtures of ice and rocks in which the rocks ride on top of the ice (rock glaciers), or form ridges or mounds of morainic material containing buried ice (ice-core moraines), or are in the process of losing the ice to become glacial moraines. Excludes unvegetated glacial moraines where ice is no longer dominant (H5.2).

Corresponding class in other classifications

Milieux Naturels de Suisse 2008: 3.1.2 Glacier rocheux

EU Habitats Directive Annex I

8340 Permanent glaciers

H6 Recent volcanic features

Description

Hard rock surfaces, rock jumbles, loose material deposits, soils, water bodies resulting from recent or present volcanic activity, unvegetated, occupied by lichens or mosses, or colonized by specialised, relatively sparse herb- or shrub-dominated communities. Includes a wide variety of active and non-active features including steam vents (fumaroles), vapour and hot sulphurous gas vents (solfatares), paint pots, porridge pots and mud volcanoes, as well as cold carbon dioxide, methane and nitrogen vents (mofettes), that emit directly into the open atmosphere, barren lava flows, fields of volcanic ash and summits of dormant volcanoes.

EU Habitats Directive Annex I

8320 Fields of lava and natural excavations

X HABITAT COMPLEXES

X01 Estuaries

Description

Downstream part of a river valley, subject to the tide and extending from the limit of brackish waters. River estuaries are coastal inlets where there is generally a substantial freshwater influence. The mixing of freshwater and sea water and the reduced current flows in the shelter of the estuary lead to deposition of fine sediments, often forming extensive intertidal sand and mud flats. In addition to herbs, they can also be colonised by shrubs creating thickets (e.g. *Tamarix* spp.). Where the tidal currents are faster than flood tides, most sediments deposit to form a delta at the mouth of the estuary. Baltic river mouths, considered here to be an estuary subtype, have brackish water and no tide, with helophytic wetland vegetation and luxurious aquatic vegetation in shallow water areas. Littoral and sublittoral habitat types typical of estuaries are included in A2 and A5, although many other habitat types including tidal rivers may occur in estuaries. Includes Transitional waters as defined by the European Union's Water Framework Directive.

Species

Plants: Benthic algal communities, *Zostera* beds e.g. *Zostera noltii* (*Zosteretea*) or vegetation of brackish water: *Ruppia maritima* (= *R. rostellata* (*Ruppietea*)); *Spartina maritima* (*Spartinetea*); *Sarcocornia perennis* (*Arthrocnemetea*). Both species of fresh water and brackish water can be found in Baltic river mouths (*Carex* spp., *Myriophyllum* spp., *Phragmites australis*, *Potamogeton* spp., *Scirpus* spp.).

Animals: Invertebrate benthic communities; important feeding areas for many birds.

EU Habitats Directive Annex I

1130 Estuaries

References

McLusky, D. S. & Elliott, M. (2004). *The estuarine ecosystem: ecology, threats, and management*. Oxford University Press, Oxford.

X02 Saline coastal lagoons

Description

Lagoons are expanses of shallow coastal salt water, of varying salinity and water volume, wholly or partially separated from the sea by sand banks or shingle, or, less frequently, by rocks. Salinity may vary from brackish water to hypersalinity depending on rainfall, evaporation and through the addition of fresh seawater from storms, temporary flooding of the sea in winter or tidal exchange. With or without vegetation of seagrasses or charophytes. Habitat types typical of lagoons are included in A5, although many other habitat types may also occur in lagoons.

EU Habitats Directive Annex I

1150 Coastal lagoons

X03 Brackish coastal lagoons

Description

Lagoons are expanses of shallow coastal salt water, of varying salinity and water volume, wholly or partially separated from the sea by sand banks or shingle, or, less frequently, by rocks. Fully saline coastal lagoons are classified as X02.

Flads and gloes, considered a Baltic variety of lagoons, are small, usually shallow, more or less delimited water bodies still connected to the sea or cut off from the sea very recently by land upheaval. Characterised by well-developed reedbeds and luxuriant submerged vegetation and having several morphological and botanical development stages in the process whereby sea becomes land.

Mediterranean lagoons may host the *Ruppietum* community with halophytic vegetation, while at sites with a fresh water supply, plant communities of *Juncetum* and *Phragmitetum* can develop. *Sarcocornia perennis* and *Arthrocnemum macrostachyum* may occur here.

EU Habitats Directive Annex I

1150 Coastal lagoons

X04 Raised bog complexes

Description

Raised bogs are highly oligotrophic, strongly acidic, domed peatlands, whose peat is composed mainly of *Sphagnum* remains and whose surface derives moisture and nutrients only from rainfall.

Plant communities

Erico-Sphagnetalia magellanici, Scheuchzerietalia palustris p., Utricularietalia intermedio-minoris p., *Caricetalia fuscae* p

Species

Plants: Erico-Sphagnetalia magellanici- *Andromeda polifolia, Carex pauciflora, Cladonia* spp., *Drosera rotundifolia, Eriophorum vaginatum, Odontoschisma sphagni, Sphagnum magellanicum, S. imbricatum, S. fuscum, Vaccinium oxycoccos;* in the Boreal region also *Betula nana, Chamaedaphne calyculata, Calluna vulgaris, Ledum palustre* and *Sphagnum angustifolium.* Scheuchzerietalia palustris *p.*, Utricularietalia intermedio-minoris *p.*, Caricetalia fuscae *p.- Carex fusca, C. limosa, Drosera anglica, D. intermedia, Eriophorum gracile, Rhynchospora alba, R. fusca, Scheuchzeria palustris, Utricularia intermedia, U. minor, U. ochroleuca*; in the Boreal region also *Sphagnum balticum* and *S. majus*.

Animals: Dragonflies- *Leucorrhinia dubia, Aeshna subartica, A. caerulea, A. juncea, Somatochlora arctica, S. alpestris*; Butterflies- *Colias palaeno, Boloria aquilonaris, Coenonympha tullia, Vacciniina optilete, Hypenodes turfosalis, Eugraphe subrosea*; Spiders- *Pardosa sphagnicola, Glyphesis cottonae;* Ants- *Formica transkaucassia;* Cricket/Grasshopper- *Metrioptera brachyptera, Stethophyma grossum*.

Corresponding class in other classifications

Milieux naturels de Suisse 2008: 2.4.1 Tourbière à sphaignes

EU Habitats Directive Annex I

7110 *Active raised bogs

7120 Degraded raised bogs still capable of natural regeneration

Associated Habitat types

Raised bog complexes may include elements of the main mire surface (D1.1) comprising a complex of low hummocks, small pools and their associated vegetation, together with larger pools (C1.46), a marginal lagg (C1.47), pre-woods (G5.64) and other associated habitat types.

X09 Pasture woods (with a tree layer overlying pasture)

Description

Pasture woods are the products of historic land management systems, and represent a vegetation structure rather than being a particular plant community. Typically this structure consists of large, open-grown or high forest trees (often pollards) at various densities, in a matrix of grazed grassland, heathland and/or woodland floras. This habitat is most common in southern Britain, but scattered examples occur throughout the UK. Outgrown wood-pasture and mature high forest remnants occur in northern and central Europe, but the number and continuity of ancient (veteran) trees with their associated distinctive saproxylic (wood-eating) fauna and epiphytic flora are more abundant in Britain than elsewhere. Component habitat

types include beech and yew woodland (G1.6 and G3.97), heathland (F4) and dry acid grassland (E1.7). A range of native species usually predominates amongst the old trees but there may be non-native species which have been planted or regenerated naturally.

EU Habitats Directive Annex I

Includes

6530 Fennoscandian wooded meadows

9070 Fennoscandian wooded pastures

References

Bergmeier, E., Petermann, J., & Schröder, E. (2010). Geobotanical survey of wood-pasture habitats in Europe: diversity, threats and conservation. *Biodiversity and Conservation*, *19*(11), 2995-3014.

Hartel, T., Dorresteijn, I., Klein, C., Máthé, O., Moga, C. I., Öllerer, K., ... & Fischer, J. (2013). Wood-pastures in a traditional rural region of Eastern Europe: Characteristics, management and status. *Biological conservation*, *166*, 267-275.

Plieninger, T., Hartel, T., Martín-López, B., Beaufoy, G., Bergmeier, E., Kirby, K., ... & Van Uytvanck, J. (2015). Wood-pastures of Europe: Geographic coverage, social–ecological values, conservation management, and policy implications. *Biological Conservation*, *190*, 70-79.

X18 Wooded steppe

Description

The transition zone between forests and the middle Eurasian, Irano-Anatolian or Saharo-Mediterranean steppes, occurring in a vast swath extending from Pannonia to the Far East, south of and inland from the boreal and nemoral forest belts, in regions of reduced summer humidity, as well as in areas adjacent to, or under the influence of the Mediterranean and warm-temperate humid zones, represented by a macromosaic of steppe and connected, contiguous, disjunct or widely spaced woodland stands, the latter usually with a very developed grassy understorey, or by a scattering of trees within a steppe environment. The forest elements are often located on porous or slightly raised ground, valley sides or slopes, the grasslands occupying less well drained soils and lower places. Component habitat types include those of E1.2 in combination with G1.7.

Species

Fritillaria ruthenica, Bulbocodium versicolor, Delphinium puniceum, Pulsatilla pɔatensis, Stipa zalesski, Stipa pulcherrima, Adonis wolgensis

X29 Salt lake islands

Description

Permanently or usually emergent features of inland saline lakes and of permanent or temporary saline lakes or ponds.

Species

Saussurea salsa, Ruppia drepanensis, Marsilea strigosa, Ceratophyllum tanaiticum

EU Habitats Directive Annex I

Not present in the European Union

X35 Inland Sand Dunes

Description

Sand bodies of eolian origin, possessing constructional relief and separated from the coast and its dune cordons by nondunal habitats, developed within the boreal, nemoral, steppic, warm-temperate humid, mediterranean or subdesert steppe zones. The vegetation is a mosaic of grasslands, heaths and open areas which differs markedly from coastal sand dune communities. Desert sands are excluded. (Habitat type not yet incorporated into the EUNIS habitats classification)

Species

Pulsatilla patens, Dianthus arenarius ssp. arenarius, Ligularia sibirica, Serratula lycopifolia, Chamaedaphne calyculata, Cinna latifolia, Inula helenium, Helichrysum arenarium, Serratula coronata, Adenophora lilifolia, Hypericum hirsutum, Dracocephalum ruyschiana, Origanum vulgare, Lilium martagon, Gladiolus tenuis, Hierochloë odorata, Polemonium caeruleum, Chimaphila umbellata

EU Habitats Directive Annex I

Includes

2310 Dry sand heaths with *Calluna* and *Genista*

2320 Dry sand heaths with *Calluna* and *Empetrum nigrum*

2330 Inland dunes with open *Corynephorus* and *Agrostis grasslands*

2340*Pannonic inland dunes

X36 Depressions (pody) of the Steppe zone

Description

Pody are a heterogeneous group of closed depressions of the Steppic region, predominantly on the left bank of the Lower Dnipro and along the Lower Volga and Lower Don, some of them are relics of the ancient hollows of the former Dnipro valley, others are formed as a result of subsidence processes or deflationary phenomena. Characterised by Gleysols ("gleysolod") with iron-manganese nodules, formed as a result of prolonged flooding. Characterised by a wide spectrum of vegetation including free-floating, coastal, ephemeral, meadow, meadow-steppe communities from the *Isoëto-Nanojuncetea, Nanocyperetalia, Myosuro-Beckmannion eruciformis, Eleocharition soloniensis, Molinio-Arrhenatheretea, Molinietalia, Lythro virgati-Elytrigion pseudocaesiae, Festuco-Brometea, Festucetalia valesiacae* and *Festucion valesiacae*

EU Habitats Directive Annex I

Not present in EU28