

Supporting information

Mucina et al. 2016. Vegetation of Europe: Hierarchical floristic classification of vascular plant, bryophyte, lichen, and algal communities. *Applied Vegetation Science* 19 (Suppl. 1): 3–264.

Electronic Appendix S3: Glossary of vegetation, ecological, and geographical terminology used in the verbal diagnoses of the syntaxa.

This Glossary summarises the scientific terms used in the verbal diagnoses and Remarks of all three parts of the EuroVegChecklist (i.e. EVC1, EVC2 and EVC3). Some widely used terms that are often interpreted in multiple ways have also been included. This Glossary was compiled and edited by K. Šumberová and L. Mucina, assisted by H. Bültmann, A. Čarni, M. Chytrý, F. Daniëls, J. Dengler, R. Di Pietro, R. Gavilán, M. Hájek, T. Lysenko, J.S. Rodwell, A. Santos Guerra, J.-P. Theurillat and M. Valachovič. Note that the biogeographical terminology pertaining to the Iberian Peninsula is largely based on Rivas-Martínez (2002).

Terms and definitions

acidophilous (organism, vegetation): limited to or favouring acidic substrates.

aerohaline (vegetation, habitat): subject to sea-salt spray brought by winds, such as the vegetation of maritime cliffs.

aero-hygrophilous (organism, vegetation): able to gather water from the air and growing in sites with at least temporarily high air humidity.

aerophytic (organism, vegetation): living in contact with the air on the surface of e.g. rocks and bark, not submerged and not in the soil.

aero-xerophilous (organism): living in habitats with little air humidity.

Aljibic (biogeography): a biogeographical unit of the Coastal-Lusitanian-Andalusian Province that comprises the southernmost territories of the Iberian Peninsula (Spain and Portugal).

Almerian (biogeography): biogeographical unit belonging to the Murcian-Almerian Province and comprising southeastern regions of the Iberian Peninsula (Spain).

Alpic (geography): referring to the Alps ('of the Alps').

alpine (vegetation belt): vegetation belt below the snow line and above the tree-line of temperate mountain ranges; it is characterised by natural grasslands and low scrub vegetation.

alvar (habitat): extensive cracked limestone pavement scraped by glacial action and covered with shallow skeletal calcareous soils prone to desiccation in summer; found around and on some islands in the Baltic Sea.

amphiadriatic (organism, biogeography, vegetation): occurring on both sides of the Adriatic Sea and having a range restricted to the Apennine and Balkan Peninsulas.

andosol (soil): substrate developed on young pyroclastic sediments (ash and pumice) typical of steep slopes and high regional rainfall.

andropogonoid (plant): grasses of the tribe Andropogonoideae (Poaceae) widespread throughout tropical and temperate regions including many well-known genera dominant in dry grasslands of southern Europe (e.g. *Andropogon*, *Bothriochloa*, *Cymbopogon*, *Heteropogon*, etc.).

anthropogenic (vegetation): plant communities occupying man-made habitats or natural habitats modified by heavy disturbance; includes ruderal vegetation occurring on various man-made and heavily disturbed habitats and segetal (weedy) vegetation occurring on arable land and accompanying the vegetation of agricultural crops.

Aragonian (geography): region on Iberian Peninsula comprising regions north of the Central Pyrenees and southwards to the Sistema Ibérico (Spain).

Arctic (biogeography): a tree-less bioclimatic zone north of the polar treeline characterised by tundra, barrens and desert-like vegetation.

arctic (vegetation): vegetation confined to the Arctic zone.

Atlantic (biogeography): western regions of the temperate zone extending along the Atlantic Ocean, under the influence of an oceanic climate characterised by mild winters, abundant precipitation, as well as small diurnal and seasonal temperature amplitudes.

Auverno-Pyreneean (biogeography): region encompassing the French piedmonts of the Central Pyrenees (Midi-Pyrénées).

azonal (vegetation): plant communities and their complexes occurring across several zonal (macro)habitats (such as latitudinal zones or altitudinal belts) that are primarily shaped by soil (substrate) and hydrological extreme conditions (including flooding, high salinity, high heavy-metal content, extremely low

nutrient-status of soils) rather than by macroclimate.

Betic (biogeography): referring to the Southern Iberian Peninsula, south of the Guadalquivir River and including the Sierra Nevada Mts. (Spain).

basiphilous (organism, vegetation): limited to or favouring base-rich (usually calcareous) substrates.

beard lichen: growth-form of lichen resembling a beard; occurring especially in fog-rich environments.

benthic (habitat): attached to substrate (e.g. plants, stones, etc.) or living on the bottom of water bodies.

bog (habitat, vegetation): permanent wetland with low amount of calcium and nutrients available to plants; bogs are fed by mineral-poor, acidic water, either by ground water (in regions formed by acidic, mineral-poor bedrocks) or by precipitation water (see ombrotrophic bog).

boreal (vegetation, biome): bioclimatic zone bordering on the arctic zone in the North and temperate zone in the South; in Europe it covers extensive areas in Fennoscandia and northern Russia; the predominant vegetation is coniferous forest (taiga), with significant occurrence of mires.

boreo-atlantic (geography): pertaining to the boreal coasts of the North Sea and Atlantic Ocean.

brackish (habitat): aquatic or wetland environment characterised by mixing of freshwater and seawater (such as in estuaries).

brezal (vegetation; orig. from Castilian): scrub dominated by 'brezo' (*Erica*: *E. arborea*, *E. canariensis*, *E. scoparia*, *E. umbellata*, etc.).

Britannian (geography): pertaining to the coast of Brittany (France).

calicioid lichen: special growth-form of lichens with often pin-like fruiting bodies, of which the spore-bearing layer disintegrates into a powdery mass.

cantuesal (vegetation; orig. from Castilian): silicicolous scrub dominated by 'cantueso' (*Lavandula*).

cardonal (vegetation): succulent scrub dominated by columnar *Euphorbia canariensis* that might reach a height of 2–3 m; it forms species-rich coastal communities in Macaronesia and the western coast of Morocco; it is bioclimatically confined to the inframediterranean and thermomediterranean belts.

carr (vegetation): type of forest or woodland characteristic of waterlogged organic soils that are base-rich and moderately rich in nutrients.

Calabro-Sicilian (biogeography): a region comprising Calabria (southern part of the Apennine Peninsula and Sicilia (Italy).

Cantabrian (geography): region comprising the Cantabrian Mts. (northern Iberian Peninsula; Spain) in broad sense.

Cantabro-Atlantic (biogeography): biogeographical unit (subprovince) of the Atlantic Province and comprising the Iberian seabords of the Cantabrian Sea.

Cantabro-Francoatlantic (geography): pertaining to the coastal regions of the Bay of Biscay (Spain and France).

Castilian-Oroiberian (biogeography): biogeographical unit of the Castilian and Sistema Ibérico (Spain).

Cantabro-Pyreneean (biogeography): biogeographical unit matching the Low Aragonese Subprovince, belonging to Mediterranean Central Iberian Province and comprising regions of southern Pyrenees and Ebro River valley (Spain).

Catalano-Valencian (biogeography): Iberian biogeographic unit comprising the coastal Catalonia and the region of Valencia (Spain).

chernozem (soil): very fertile soil type characterised by a deep humus horizon that developed in post-glacial era under the climate of the steppe zone.

chamaephytic (vegetation): dominated by chamaephytes, i.e. perennial plants, especially dwarf shrubs, having overwintering buds located up to about 25 cm above the soil surface – hence typically protected by snow during winter.

chasmophytic (organism, vegetation): growing in rocky crevices of cliffs and rock faces.

chionophilous (organism, vegetation): thriving in habitats experiencing extended snow cover protecting the plants/vegetation against destructive effects of wind and extremely low temperatures in winter.

chionophobic (organism, vegetation): thriving in habitats without snow cover or experiencing only reduced periods under snow cover (e.g. steep slopes or wind-exposed ridges).

chomophytic (organism, vegetation): growing as cushions and mats rooting in shallow soils an underlying hard surface of bedrock.

circalittoral (habitat): zone of the sublittoral below the infralittoral zone.

circum-arctic (organism, vegetation): distributed all around the Arctic zone.

circum-mediterranean (organism, vegetation): distributed all around the Mediterranean Basin.

congelifracted (soils): developing from bedrock subject to shattering or splitting of the rocks as a result of freezing-and-thawing cycles.

coastal foredunes (habitat): substantial accumulations of wind-blown sand landwards of embryonic dunes; the sand accumulation (hence dune growth) is encouraged by vigorous grasses (such as *Ammophila arenaria*) that stabilise the dunes, which are typically mobile and, initially at least, have relatively low vegetation cover; also known as 'yellow dunes'.

coastal hinddunes (habitat): increasingly stable accumulations of sand developed behind coastal foredunes, in which pioneer grasses become moribund, but where an extensive carpet of grasses, forbs, bryophytes and lichens covers the surface; also known 'grey dunes'.

coenon (vegetation typology; pl. 'coena'): abstract vegetation type, normally referring to 'complete plant communities' – those plant communities where all synusiae (phanerogams, bryophytes, and lichens were considered); this term is more or less synonymous with 'syntaxon' (of the Braun-Blanquet approach). The term 'coenosis' refers to the actual vegetation stand.

colline (vegetation belt): altitudinal belt at low elevations of the temperate zone, usually associated with hilly landscapes and the piedmonts of the mountain ranges above the planar belt; it is characterised by short periods of frost during winters, suitable for the cultivation of vine, corn and chestnut, and supporting oak and hornbeam deciduous forests.

colluvial (habitat, soil): pertaining to colluvium – accumulation of debris on slopes and at the foot of mountains; colluvial soils are usually mixtures of soil particles of various size, without well-developed soil horizons.

CORINE: Coordination of Information on the Environment (an early environmental programme of the European Union); associated with the creation of early versions of a unified habitat system for the European Union (http://en.wikipedia.org/wiki/Coordination_of_Information_on_the_Environment).

crustose lichen: growth-form of lichen that is firmly attached to the substrate and resembles a surface crust.

cryomediterranean (vegetation belt): the highest bioclimatic belt of the mountain ranges embedded within the Mediterranean region; it is a region above the Mediterranean tree-line and is characterised by natural grasslands, low heath, and the absence of trees; equivalent to the alpine belt of the temperate mountain ranges.

cryophytic (vegetation): found on and in permanent snow and glaciers.

cryoturbated (soil): subjected to the process of cryoturbation, i.e. the mixing of various soil layers as a consequence of periodical freezing and thawing. It is typical of high-mountain altitudes and the High Arctic.

cryoxerophytic (vegetation): preferring habitats characterised by extremely dry climate in cold regions of the Subarctic and Arctic.

C4 (plant): those plants using the C4-photosynthetic strategy to assimilate carbon dioxide (see Sage et al. 2011).

dealpine (organism, vegetation): occurring in relict, post-glacial habitats, usually at lower altitudes at the periphery of high mountain ranges, retaining certain microclimatic features reminiscent of high-altitude (usually subalpine and alpine) habitats; the dealpine vegetation is considered a relic of the pleniglacial vegetation patterns when the cold-loving vegetation of high-altitude descended to lower altitudes.

dolina (topography): typical karst depression of relatively small size and roughly circular, which is common on limestone plateaus.

EEA: European Environment Agency (www.eea.europa.eu) – a major administrative body of the European Union.

embryonic dunes (habitat): small accumulations of wind-blown sand developed above the strandline, progressing to (coastal) foredunes where colonisation by pioneer grasses encourages further deposition and upward growth, but vulnerable to repeated setback by unusually high tides.

endolithic (lichen, vegetation): growing in the outer part of rock.

ephemeral (organism, vegetation): having very short life cycles, usually several weeks up to several months (for species) or appearing (vegetation) only for short periods of time; typical in habitats experiencing water and/or nutrients pulses.

ephemeroid (organism): perennial plant surviving the larger part of the year in the form of underground organs (e.g. bulbs) and forming vegetative above-ground organs and flowers only for short period of the year; in terms of Raunkiaer's system of life-forms, ephemeroids are invariably geophytes.

epigaeic (organism, vegetation): growing on the surface of soil; synonymous with 'terricolous'.

epilithic (organism, vegetation): growing on the surface of rock.

epiphyllous (organism, vegetation): growing on leaves of other plants – a special type of epiphytic plant.

epiphytic (organism, vegetation): growing on other plants (e.g. on branches or trunks of trees and shrubs).

eremean (habitat): pertaining to desert environments.

ericoid (plant): plants having small-size, leathery leaves, usually with enrolled margin such as those often found *Erica* and *Empetrum* (both *Ericaceae*).

escobonal (vegetation; orig. from Castilian: 'escoba' means 'broom'): generic name used for any plant community on the Iberian Peninsula dominated by leguminose broomy shrubs).

eulittoral (habitat): corresponds to the intertidal zone.

EUNIS: European Nature Information System – a database collecting data on habitats, species, habitats types and sites of the European Union (www.Eunis.eea.europa.eu).

Euxinic (biogeography): pertaining to the Black Sea (= *Pontus Euxinus*).

EVS: European Vegetation Survey (www.euroveg.org) – a working group of the International Association for Vegetation Science.

fellfield (habitat): a complex habitat beyond the latitudinal tree line characterized by heterogeneous, open, and patchy vegetation cover dominated by chamaephytes and hemicryptophytes.

fen (habitat, vegetation): type of permanent wetland, usually poor in nutrients (or of poor nutrient availability) yet considerably rich in calcium; fens are fed by neutral to basic ground water; the calcium-rich fens are characterized by absence of *Sphagnum* mosses but can be rich in other wetland mosses.

fen meadow (vegetation): meadow occurring on fen substrate.

fjeld (landscape, habitat): a high rocky plateau with little vegetation in Scandinavian countries.

foliose lichen: growth-form of lichen characterised by horizontal spread and which tend to be somewhat loosely attached to the substrate; they take their name from the fact they often resemble leaves.

forest (vegetation): vegetation dominated by trees the crowns of which touch and thus characterised by more or less closed canopy.

forest-steppe (biome, vegetation): transitional zone (sub-zone) between the temperate (nemoral) or boreal forest and steppe, formed of patchy mosaic of forests and steppic grasslands; in Europe it occurs from the Carpathian (Pannonian) Basin through the Danube river valley and Ukraine to the South Urals; also known as 'lesostep' (orig. from Russian).

fruticose lichen: growth-form of lichens formed of cylindrical or strap shaped parts resembling a tiny shrub or pendulous plant.

fumarole (habitat): volcanic vent emitting steam and gases.

garrigue (vegetation; orig. from French): Mediterranean scrub formation dominated by drought-tolerant shrubs of the genera *Calicotome*, *Cistus*, *Coridothymus*, *Rosmarinus*, etc.; often this scrub is considered to be a degradation stage of macchia thickets and Mediterranean woodlands.

geophyte (species): a Raunkiaer life-form category; perennial plant surviving unsuitable period of the year (e.g. summer drought or winter low temperatures) in underground organs (e.g. rhizomes, bulbs).

gorse (species): the spiny shrubs of the genus *Ulex* (*Fabaceae*).

graminoid (plant): grass-like plant (characterised by tufted narrow leaves, inconspicuous flowers and often forming tussocks); the term encompasses all representative of the family Poaceae (Gramineae) as well as sedges (Cyperaceae), rushes (Juncaceae) and the like (e.g. Isoëtaceae, Juncaginaceae).

grassland (vegetation): formation dominated by grasses (or graminoids) usually with a single-layered structure and sometimes (in case of wooded savannas or savannoid vegetation) with an open, woody plant cover (modified after Rutherford et al. 2006).

grey dunes (habitat): coastal hind dunes.

Guadarramean (biogeography): biogeographical unit (sector) that comprises the Sierra de Guadarrama between Madrid and Segovia (Spain).

gypsophilous (organism, vegetation): limited to or favouring calcium sulphate-

rich (gypsum-rich) substrates.

gypsum (geology): a mineral rich in calcium and sulphur; it originates mainly through crystallization from saline water.

halo-nitrophilous (organism, vegetation): limited to or favouring habitats with high content of nitrates and soluble salts.

halophilous (species, vegetation): limited to or preferring saline habitats characterised by high content of soluble salts in water and/or soil.

halophyte (species): plant or fungus that grows on saline soils.

halo-tolerant (species, vegetation): tolerating increased (higher than usual) content of soluble salts in water and/or soil.

hayedo (vegetation; orig. from Castilian): forest of 'haya' (*Fagus sylvatica*).

heath (vegetation): plant formation dominated by dwarf or low shrubs with fine evergreen sclerophyllous leaves, mainly belonging to the family Ericaceae.

hellenic (geography): pertaining to Greece (Hellas).

heliophilous (species, vegetation): favouring sunny habitats.

Hellas (geography; from 'Ελλάδα' in Greek): Greece, officially: Ελληνική Δημοκρατία (the Hellenic Republic); we prefer using the name 'Hellas' to the well-known name Greece.

hemerophilous (species, vegetation): favouring habitats modified (disturbed) by zoo-anthropogenic actions.

hemicryptophytic (vegetation): plant communities dominated by hemicryptophytes, i.e. perennial plant species with overwintering buds located at soil surface level (often grasses and graminoids, but also many herbs).

herbland (vegetation): structural vegetation type dominated by herbs (after Rutherford et al. 2006b).

hypersaline (habitat, soil): referring to habitats and soil characterised by extremely high content of soluble salts (e.g. NaCl, MgSO₄), rendering the environment toxic for the majority of plants.

hygrophilous (species, vegetation): limited to or favouring water-saturated habitats.

IAVS: International Association for Vegetation Science (www.iavs.org).

Ibero-Tingitan (biogeography): referring to the southern-most regions of Spain and adjacent North Africa.

iberoatlantic (geography): referring to the Iberian seabords of the Atlantic Ocean.

Ibero-Levantine (biogeography): eastern regions of the Central Iberian Province (see Rivas-Martínez et al. 2002).

infralittoral (habitat): zone below the eulittoral or intertidal zone, the upper zone of the sublittoral.

inframediterranean (vegetation belt): related to a bioclimatic belt including the lowest altitudes and latitudes of the Mediterranean region; characterised by a warm (average minimum of the coldest month $> 7^{\circ}\text{C}$) and arid climate; it is developed in only a small part of the Mediterranean region, for instance in southwestern Morocco and on Canary Islands (here called 'inframacaronesian').

intratidal (habitat): tidal zone located between the lowest and the average high tidal limit (excluding supratidal habitats).

intrazonal (vegetation): type of vegetation developing in azonal habitat conditions, and showing affiliation to a particular zonal macrohabitat (latitudinal zone, altitudinal belt).

jara (vegetation; from Castilian): low scrub dominated by 'jara' (*Cistus*).

jelly lichen: growth-form of lichens with a cyanobacterial photosynthetic partner; it has a jelly consistency when in a wet state.

karst (topography, geology; orig. from 'kras' in Croatian): landscape composed of highly-weathered calcareous bedrock forming various phenomena such as dolinae, poljes, limestone pavements and especially caves.

kastanozem (soil): humus-rich and calcareous zonal soils of brown colour developed under short-grass steppe vegetation in precipitation-poor regions of Eastern European steppe zone.

kermes oak (plant): *Quercus coccifera*.

krummholz (vegetation; orig. from German): gnarled, stunted and ascending or prostrate scrub vegetation, typically found between the upper limit of the forest (the timberline) and the extreme upper limit of tree growth (the tree-line) in the

temperate-European mountains; it descends to low altitudes in the boreal and subarctic zone of Northern Europe.

laurisilva (vegetation): vernacular term for evergreen warm-temperate forests; the term comes from *Laurus* (and other genera of Lauraceae).

lapiés (topography; orig. from French): weathered, rugged limestone surface found in karst regions that consists of more or less deep straight grooves incised by rain water; largely synonymous with 'karren'.

leprose lichen: a growth form of lichen forming a powdery crust.

Ligurian (geography): related to the northern Italian region of Liguria (Northern Italy) as well as the seaboard of the Ligurian Sea.

lithosol (soil): substrate characterised by very shallow and skeletal humus-rich horizon with parent bedrock often protruding to the surface.

littoral (habitat): in the broadest sense, the part of a water body or sea close to the shore. It can be divided into several sub-zones: the main divisions include *supralittoral* (also called *supratidal*, i.e. seashore-zone above the *mesolittoral*, the spray zone), *mesolittoral* (also called *eulittoral*, i.e. *tidal zone*, which is periodically subjected to falling and rising tides), and *infralittoral* (also called *sublittoral*, i.e. the photophytic zone below the *mesolittoral* with continuous submersion); the dark, permanently submerged zone below the *infralittoral* is called *circalittoral*. In other water bodies, the littoral is defined as zone of shallow water up to about 1 m deep characterised by the occurrence of reed and sedge vegetation. The so-called *epilittoral* includes the zone that is flooded only during spring tides when tidal flux is greatest (i.e. during full and new moon) and might be in larger measure fed by underground water. *Eulittoral* in water bodies is characterised by high water level fluctuation during the year and, dependent on precipitation, it can be submerged or exposed. *Sublittoral* is flooded throughout the year and its upper border is marked by lowest water level in summer.

loess (geology): poorly-stabilised sediment formed by accumulation of wind-born particles (mainly siliceous, with admixture of calcium carbonate); loess usually develops in vegetation-free areas, for instance in Europe much accumulated following glacial retreat; steppe grasslands are often associated with loess habitats.

Lusitano-Andalusian (biogeography): comprising coastal regions of western Andalusia (Spain) and south-central Portugal.

Lusitano-Extremadurean (biogeography): biogeographical unit (subprovince) belonging to the West Iberian Province and comprising southern Western Iberian plateau regions from the Sistema Central to Guadaluquivir River (Spain).

Macaronesian (biogeography): the region comprising the Canary Islands, Madeira and the Azores; characterised by several endemic genera of plants, frequent occurrence of relic vegetation types such as succulent scrub formations and laurisilva forests.

macchia (vegetation; orig. from Italian): typical Mediterranean scrub dominated by tall, evergreen leathery-leaved shrubs; often forming dense and impenetrable thickets; called maquis in French and matorral in Castilian.

Maghreb (geography): western part of North Africa.

Maghrebinian (biogeography): biogeographic unit pertaining to the western part of North Africa.

magnesitic (soils): derived from magnesite-rich (MgCO_3 -rich) substrates usually associated with dolomitic and ultramafic rocks (such as peridotites).

maquis (vegetation; orig. from French): equivalent to macchia (in Italian) and matorral (in Castilian).

macrolichen: those lichenised fungi possessing foliose and fruticose lichen growth-forms.

Madeirean (biogeography): biogeographical unit that comprises Madeira and close island groups.

mantle (vegetation): scrub made of heliophilous shrub species favouring the forest edge.

matorral (vegetation; orig. from Castilian): equivalent to macchia (in Italian) and maquis (in French).

meadow (vegetation): plant formation dominated by grasses (or other graminoids) and herbs usually found in humid to mesic habitats; most European meadows are of anthropogenic origin, dependent on regular management such as mowing.

mediterranean (vegetation): vegetation typical of the Mediterranean Region: sclerophyllous scrub, tall evergreen thickets and woodlands, extensive annual grasslands and herblands in disturbed habitats etc.

Mediterranean (biogeography, geography): phytogeographic unit (floristic region) around the Mediterranean Sea characterized by warm and dry summers as well as wet, cool-to-mild winters; often used as a vernacular name for the Mediterranean Sea.

Mediterranean-Iberoatlantic (biogeography): biogeographical unit comprising the Western Iberian regions of Spain and Portugal, which are dominated by siliceous geology.

meridional (region): informal term designating regions of southern Europe (especially for the mountain ranges like the Dinarides and the Pyrenees).

mesomediterranean (vegetation belt): bioclimatic belt in the Mediterranean region characterized by warm summers and mild winters with almost no frost, suitable for the cultivation of the olive tree; the native vegetation of this belt is evergreen oak forest.

mesophilous (organism): preferring mesic habitats, hence those located around the middle of an environmental moisture gradient.

meso-xerophilous (organism): preferring mesic and dry habitats, hence those located around the middle and at the dry end of environmental moisture gradient.

mesophytic (vegetation): dominated by mesophilous plants, hence those preferring habitats located in the middle of the environmental moisture gradient.

meso-xerophytic (vegetation): dominated by mesic and xerophilous plants, hence plants preferring habitats around the middle or at the dry end of environmental moisture gradient.

microcoenon (vegetation; pl. 'microcoena'): cryptogam-dominated small-scale phytocoena or synusia.

minerotrophic mire (habitat): a type of mire that is fed exclusively or to a large extent by groundwater; this group of mires is comprised of fens and transitional mires.

mire (habitat): type of permanent wetland, usually poor to moderately rich in nutrients and often characterised by accumulation of peat; mires are usually divided into fens, transitional mires, and bogs; in some alternative systems, the fens are excluded and only transitional mires and bogs are understood as mires.

montane (vegetation belt): an altitudinal belt in the mountains of the temperate (nemoral) zone; the montane vegetation belt is the region at mid-elevations, located above the colline belt; in the submediterranean regions of southern Europe this belt is sometimes called 'supratemperate'.

mud flat (habitat): the term is usually used for seashore wetland habitats formed by accumulations of mud as a result of tidal action (tidal flats); in a broader sense, it is sometimes used for similar habitats of periodically-exposed muddy

sediments in rivers, lakes and ponds; the mud flats characterised by the occurrence of habitat specialists adapted to frequent water-level changes.

Murcian-Almerian (biogeography): biogeographical unit (province) comprising southeastern regions of Murcia and Almería (Spain).

mylonite (geology): a generic name for fine-grained, hard, metamorphic rock of varying mineral composition; in the process of formation of mylonites, the parent rock is nearly completely pulverised and the original minerals are broken and re-crystallized as smaller grains.

nemoral (vegetation zone): the mid-latitude zone (of Eurasia) dominated by broad-leaved, deciduous forests; it is equivalent to the forested portion of the temperate bioclimatic zone.

neophyte (plant): alien (non-native) plant species that arrived in Europe after 1492 (the year of the 'discovery' of America by Christopher Columbus).

nitrophilous (organism, vegetation): favouring habitats rich in nitrogen (usually in the form of nitrates).

nival (vegetation belt): altitudinal belt influenced by permanent snow cover, and obviously the highest natural altitudinal belt of nemoral and boreal mountain ranges of Europe; in the polar and sub-polar regions it frequently extends to sea level; the landscapes of the nival belt typically combine snow fields and glaciers with cliffs and talus slopes.

oligotrophic (habitat): nutrient-poor.

oligo-mesotrophic (habitat): relatively poor in nutrients (in comparison to mesotrophic and eutrophic habitats), however, slightly more nutrient-rich than oligotrophic; spanning oligotrophic and mesotrophic conditions.

ombrophilous (species, vegetation): Tolerant to and generally preferring habitats with much rain.

ombrophobic (species, vegetation): growing in habitats that are protected from rain.

ombrotrophic bog (habitat, vegetation): type of bog that is water-fed by precipitation water; this type of bog develops in precipitation-rich regions, including at high altitudes of mountains.

ophiolithic (geology): term used to indicate a type of substrate characterized by the dominance of ophiolites, a type of ultramafic rocks forming part of the former under-sea crust that has been uplifted and exposed.

ornithocoprophilous (species, vegetation): growing in habitats fertilised by bird guano.

Oroiberian (biogeography): biogeographical unit (subprovince) comprising the Sistema Ibérico mountain ranges.

Orocantabrian (biogeography): biogeographical unit (subprovince) comprising the Cantabrian range.

orocantabro-atlantic (biogeography): pertaining to the region encompassing the Cantabrian Mts. and the adjacent Atlantic seabords.

Orocantabro-Bercian (biogeography): biogeographical unit (sector) comprising the Cantabrian range and El Bierzo region (Spain).

oromediterranean (vegetation belt): bioclimatic belt in the mountain ranges embedded within the Mediterranean region; the oromediterranean belt occurs below treeline and it is characterized by coniferous heaths and forests with junipers and pines; it is equivalent to the montane belt of the temperate mountain ranges.

palaeodune (habitat): old dune usually of Pleistocene age.

Pannonian (biogeography): related to the region occupying the eastern part of the Carpathian (= Pannonian) Basin, characterised by sub-continental climate and forest-steppe vegetation.

pasture (vegetation): open plant formation (mainly grasslands) consisting of grasses (or other graminoids) and herbs on dry to wet (sometimes briefly flooded) habitats. Similarly to meadow, it is mainly of anthropogenic origin, and is dependent on regular grazing, mainly of livestock, sheep, goats or horses.

peat (soil): accumulation of organic sediment originating from dead biomass of mosses of the genus *Sphagnum* and/or vascular plants, especially *Carex*; particularly in the *Sphagnum*-dominated habitats, the peat layer can be up to several metres deep as a result of poor decomposition of the dead organic matter due to permanent saturation of the habitat with water, lack of oxygen, low nutrient availability, poor microbial activity and in some regions also a cold climate that slows down the decomposition processes; peat is a typical substrate of mires.

permafrost (soil): permanently-frozen subsurface layer of soil, chiefly ground in Arctic regions where temperatures below freezing point have persisted for at least two consecutive winters and the intervening summer.

photophilous (organism, vegetation): favouring well sun-lit habitats not exposed to direct sun radiation.

phrygana (vegetation; orig. from Greek): a vegetation type of low, hemispherical, usually spiny, and often aromatic dwarf shrubs, resistant to drought and browsing; the term phrygana is sometimes identified with low-grown garrigue, yet it is distinct in terms of physiognomy, origin and constituent plant strategies.

pine (plant): member of the genus *Pinus*.

piornal (vegetation; orig. from Castilian): generic name used for any community of 'piorno', designating usually *Cytisus*.

planar (vegetation belt): pertaining to the lowest altitudinal belt of the temperate zone, synonymous with 'lowland belt'.

planktic (organism): free-floating in a water column (equivalent to the less correct term 'planctonic').

pleniglacial (stratigraphy): full glacial period – the cold and dry period of a glacial cycle.

polje (topography; orig. from Croatian): one of the most prominent karst features; it is a relatively large basin (at least 0.5 km wide) with a flat bottom that might be suitable for agricultural use.

Pre-Pyrenean (geography): region encompassing the piedmonts (in our use, those of Spanish macro-slope) of the Pyrenees.

psammophilous (species, vegetation): limited to or favouring sandy substrates.

pseudomaquis (vegetation; orig. from French): formation that occurs at the transition between the typical mediterranean evergreen macchia/maquis scrub and continental deciduous šibljak scrub; pseudomaquis is secondary vegetation developing after clearance of submediterranean oak woodlands (e.g. *Quercus pubescens*) or by degradation through intensive woodland grazing; both evergreen (e.g. *Juniperus excels*, *Quercus coccifera*) and deciduous (e.g. *Carpinus orientalis*, *Fraxinus ornus*, *Jasminum fruticans*) elements appear in this vegetation.

pseudosteppe (vegetation): steppe-like grasslands outside the steppe zone; usually controlled by local edaphic conditions or considered remnants (relicts) of the past climates resembling the current steppe climate patterns; we use this term also to refer to secondary grasslands replacing various Mediterranean scrub (maquis, garrigue).

psorid lichen: growth form of lichens in the form of squamules.

psychrophilous (species, vegetation): cold-loving or cold-tolerating.

raised bog (habitat, vegetation): a type of bog that in a hydrosere replaces minerotrophic mires; it usually develops during succession where the preceding mires are fed by the mineral rich lake water and later, due to continued peat accumulation, the upper layers of the mire become finally disconnected from the lake water and subsequently fed only by rain water; these bogs function as ombrotrophic bogs.

ravine forest (vegetation): forest type occurring on slopes, the foot of slopes, in sinkholes, gorges and hollows with colluvial, skeletal and primarily unstable soil.

refugial (biogeography, vegetation): a type of vegetation (e.g. some beech forests in Europe) surviving in glacial refugia (mainly in Southern Europe but also in some parts of Central Europe), i.e. the regions not affected directly by glaciation or associated climate change; refugial forests should be richer in species and relicts.

regosol (soil): a type of raw soil consisting of unconsolidated material from freshly-deposited alluvium or sand.

retamal (vegetation; orig. from Castilian): communities of 'retama' (usually referring to *Retama sphaerocarpa*).

retamoid (plant): plants having broom-like appearance.

riparian (habitat, vegetation): pertaining to habitats and vegetation associated with rivers (both flowing and intermittent).

romeral (vegetation; orig. from Castilian): scrub dominated by rosemary (romero; *Rosmarinus officinalis*).

ruderal (species, vegetation): preferring or limited to man-made or heavily disturbed habitats such as ruins, roadsides, trampled places; these habitats have relative low competitive stress and usually high nutrient status (either because disturbance can promote quick mineralisation of organic matter, or because of land-use activities).

rupicolous (species, vegetation): plants and vegetation growing on or among rocks, including cliffs and stony walls (here in crevices, clefts or sticking to the rocky surface). The organisms are adapted to special environmental conditions, such as extreme changes of temperature and moisture, a limited nutrient pool and space to grow; equivalent to 'saxicolous' though the latter is sometimes narrower in that it is not as frequently applied to solid rock as opposed to stones.

sabinar (vegetation; orig. from Castilian): communities dominated by junipers with imbricated leaves (e.g. *Juniperus thurifera*, *J. sabina*).

saline (habitat): soils or water having high content of soluble salts (e.g. NaCl, MgSO₄), making the environment toxic for the majority of common (hence ecologically not specialized) species; these habitats support facultative or obligate halophytes.

salt-pan (habitat): occasionally or periodically flooded flat-bottomed depression supporting intermittent water body, accumulating high concentration of soil-borne and also air-borne salt and often supporting halophyte-dominated vegetation.

salviar (vegetation): scrub dominated by aromatic *Salvia* (Lamiaceae) species.

Sarmatian (biogeography): related to the eastern part of nemoral zone and including a large part of European Russia, Belarus, Ukraine and some neighbouring countries; unlike the western part of temperate zone, it is characterised by a quite continental climate; characteristic of this region are, besides the coniferous and broad-leaved forests, steppes and forest-steppes.

sclerophyllous (plant): plant possessing tissue with high body mass to water ratios (making the leaves for instance appear leathery and tough).

sclerophyllous (vegetation): plant communities characterized by the dominance of species with small leathery evergreen leaves that allow them to tolerate the summer-drought stress; Mediterranean scrub woodlands are prevailingly sclerophyllous.

sciophilous (species, vegetation): limited to or favouring shady habitats.

seaboard (geography): region bordering on a sea or ocean.

segetal (species, vegetation): favouring or limited to arable fields with cereals or tuber crops, vineyards, young fallows, etc.; many of the segetal (weedy) species and communities show a specific relationship to particular cropping technique.

seral (vegetation): referring to an intermediate stage in a successional series.

schor (habitat: pl. 'schorren'; orig. from Dutch): coastal habitats under influence of high spring-tides; more or less corresponding to supratidal habitats.

šibljak (vegetation; orig. from Serbian and Croatian): distinct scrub formation dominated by heliophilous (mainly deciduous) shrubs of the genera *Corylus*, *Crataegus*, *Juniperus Paliurus*, *Rhamnus* etc.; they are a result of degradation of

original warm-temperate deciduous oak and oak-hornbeam forests and rarely also develop as primary scrub in edaphically extreme habitats.

siderotrophic (habitat): characterised by high level of dissolved iron.

silicicolous (species, vegetation): limited to or favouring siliceous bedrocks.

slik (habitat; spl. 'slikken'; orig. from Dutch): habitats regularly (twice a day) inundated by the sea; equivalent to intra-tidal mud-flat habitats.

snow beds (habitat): depressions or sheltered slopes characterised by prolonged snow cover, supporting mainly hygrophilous plant communities.

solifluction (soil): very slow movement of water-saturated or supersaturated soil driven by gravity and typically associated with freeze-thaw activity and often with permafrost.

soligenous mire (habitat): type of mire fed mainly by streaming ground water and developing, for instance, along valley margins.

solonchak (soil): type of saline soil with the highest content of soluble salts in the surface horizon; solonchak usually develops under a continental climate and in habitats exposed to flooding or waterlogging for some part of the year; intensive evaporation during the dry season transports the salts from the salt-containing parent bedrock (e.g. marine sands, loams or gravels) to the soil surface and in places 'salt flower' may form.

solonetz (soil): type of saline soil with a high content of soluble salts in the sub-surface sodium horizon; it develops under continental, semi-arid or arid climate on relatively dry habitats where the movement of salts from parent bedrock to soil surface is limited; typically these saline soils support saline steppes.

steppe (vegetation, biome): a zonal plant formation dominated by perennial grasses under a continental climate.

steppic (vegetation): grasslands physiognomically reminiscent of true steppes (see above), yet found in zones outside the steppe – usually under specific edaphic conditions that limit water availability (e.g. rocky steppic grasslands, sandy steppic vegetation).

strandline (habitat): narrow band on beach recognisable by deposition of sea-borne debris (wrack) by wave action (after Rutherford et al. 2006b).

stratocenon (vegetation typology; pl. 'stratocoena'): abstract type of a partial community (merocoenon) delimited according to vegetation layers/strata.

stonewort (species): member of the family *Characeae*.

sub-aerohaline (habitat, vegetation): partially under the influence of air-borne sea-salt spray brought by the onshore winds.

subalpine (vegetation belt): an altitudinal belt located directly above the tree-line in the temperate mountain ranges; in Europe this term is mostly used to indicate the altitudinal belt dominated by the dwarf scrub or krummholz vegetation with *Juniperus alpina*, *Rhododendron*, *Pinus mugo*, *Vaccinium myrtillus* etc.. In the submediterranean regions of southern Europe this belt is sometimes called 'orotemperate'.

sublittoral (habitat): part of littoral (flooded habitat close to the sea or lake shore or river bank) flooded for the whole year; its upper limit is marked by lowest water level in summer.

submediterranean (biogeography): bioclimatic region that, although included in the temperate zone, exhibits some climatic (temperature and rainfall) features typical of the mediterranean zone; some authors define as 'submediterranean' that climate which exhibits at least one of the three summer months showing a $T/P < 2.5$ (using the mean monthly values of temperature T and precipitation P).

submontane (vegetation belt): an altitudinal belt in temperate-zone mountains; it is located directly between the montane and colline belt, and typically supports mesophilous mixed deciduous woodlands.

submontane-montane (vegetation belt): both in submontane and montane vegetation belts.

sub-saline (species, vegetation): favouring slightly saline habitats but often growing also on other mineral-rich (e.g. lime-rich) habitats; for species, the terms 'sub-halophyte' or 'facultative halophyte' are more or less equivalent.

subnival (vegetation belt): an altitudinal belt usually developed in the highest zone where vegetation typically exists; this area is determined by the frequent frosts that restrict extensive plant colonization; much of this vegetation belt is covered by patchy grassland, sedges and cushion plants typical of the arctic zones.

summer pool (habitat): see temporary pool, of which this is a subset defined by temporary inundation occurring in the summer months.

summer-annual (vegetation): plant formation composed of short-lived species (usually therophytes) that germinate usually in spring or early summer and finalise their life cycles during the same growing season; this vegetation can only occur in regions with a sufficient sum of precipitation during the first half of

growing season, enabling the germination of seeds and early development of seedlings.

supralittoral (habitat): equivalent of supratidal in coastal habitats, but also the zone of freshwater lakes submerged in wet season and located above the water level in dry season.

supramediterranean (vegetation belt): mediterranean altitudinal belt located between the oromediterranean (upper) and mesomediterranean (lower) and dominated by broad-leaved deciduous forests.

supramontane (vegetation belt): an altitudinal belt in the temperate-zone mountains developed between the montane beech forests and alpine timberline; synonymous with 'upper montane', sometimes (although not correctly) used as a synonym for the subalpine belt.

supratidal (habitat): coastal habitats slightly elevated above the intratidal flats and experiencing tidal influence only occasionally (high spring tides); the airborne salt and salt precipitating from ascending ground water as a result of desiccation of the surface in dry seasons may contribute to an increase of ambient salinity in supratidal habitats.

synusia (vegetation; pl. 'synusiae'): in original sense an abstract partial community (merocoenon) of species that share the same microhabitat (microcoenon), stratum (stratocoenon) or periodicity (chronocoenon); nowadays synusia is used in a wider sense for any type of abstract partial community, including taxocoena, microcoena, stratocoena, chronocoena or any combination of these, hence as a synonym of merocoenon; in the narrow sense this is term used for abstract partial biotic communities that share the same microhabitat, stratum, periodicity and/or life-form; occasionally 'synusia' is also used to designate a small-scale cryptogam phytocoenon.

tabaibal (vegetation): low succulent scrub dominated by different species of *Euphorbia* endemic or native to Macaronesian archipelago; true tabaibal is only present in the Canaries and the Madeira archipelago.

taiga (vegetation; orig. from Turkic or Mongolian, used in contemporary Russian): the predominantly coniferous forest located in the boreal zone of the Northern Hemisphere; the open northern portion of the boreal forest composed of open woodland of coniferous trees; this term is sometimes used in a regional sense to designate the 'subarctic zone'.

tamuja (vegetation; orig. from Castilian): scrub vegetation dominated by 'tamujo' (*Flueggea tinctoria*).

tardiglacial steppe (habitat, vegetation): referring to the cold and dry steppe formation found in Central and Southern Europe during the last glacial period.

taxocoenon (vegetation typology; pl. 'taxocoena'): abstract type of a partial community (merocoenon) delimited taxonomically; for example, one could split a complete plant community type (phytocoenon) into taxocoena of vascular plants, bryophytes and lichens.

temperate (vegetation zone): bioclimatic zone which extends over the major part of the European continent between the boreal zone in the north and Mediterranean zone in the south; it is characterized by the predominance of broad-leaved deciduous forests as potential natural vegetation.

temporary pool (habitat): small and shallow water body characterized by large water level fluctuations during the year and periodic drying out; it is typical of, but not confined to, regions with a highly uneven distribution of precipitation and regular periods of drought (e.g. in the Mediterranean region or semi-deserts around the Caspian Sea); time of flooding can be used to distinguish vernal pools (flooded in spring, after the winter precipitations) from summer pools (flooded by summer rains or showing prolonged inundation throughout the year).

terra rossa (soil): clayey soil with low humus content, rich in lime and iron oxides giving a bright red colour to this soil; terra rossa soils arise as a residual deposit after weathering of limestone, typical of the Mediterranean, but can also be found (as relic soils) elsewhere.

thallophyte (species): informal term for any organism formerly considered as member of the Kingdom Plantae (including the algae, fungi, and lichens) that shows no differentiation into stem, root, or leaf.

thermo-atlantic (biogeography): related to the southern part of the Atlantic region characterized by mild winter and with warm summers, extended from the Aquitaine (France) to Atlantic seabords of Galicia and northern Portugal.

thermomediterranean (vegetation belt): bioclimatic belt (usually close to the coast) that exhibits a relatively long-lasting summer drought-stress period (average ranging between 3–5 months) and that is characterized by potential vegetation dominated by the evergreen sclerophyllous scrub.

thermo-supramediterranean (vegetation belt): pertaining both to the thermomediterranean and supramediterranean belts.

therophyte (species): usually annual plant species, surviving unsuitable conditions (e.g. low winter temperatures or summer drought) as seeds in soil.

tidal zone (habitat): the stretch of the coast that experiences a daily tidal regime.

tidal flat (habitat): see mud flat.

tomillar (vegetation; orig. from Castilian): Spanish term to designate a low garrigue with dwarf shrubs, especially thyme species; to an extent analogous to 'phrygana' in Hellas.

toxitolerant (species, vegetation): tolerating high levels of ambient poisons, such as sulphur dioxide and nitrogen oxides in the air or high concentration of heavy metals in soil.

tragacanthic (vegetation): scrub formation dominated by hemisphaeric (cushion-forming) shrubs in the oromediterranean belt of Eurasia; the term comes from *Astragalus* section *Tragacantha* commonly represented in this type of vegetation.

transitional mire (habitat): type of permanent wetland fed by mineral-poor to medium-rich, slightly- or medium-acidic groundwater; also called 'poor fens'.

tundra (vegetation, biome): cold-climate biome characteristic of Subarctic and Arctic regions consisting of grasslands, heathlands, scrub, lichen- and bryophyte dominated vegetation, sometimes including areas with very sparse vegetation otherwise referred to as polar desert.

Tyrrhenian (geography): pertaining to the seaboard and archipelago in the Tyrrhenian Sea.

umbilicate (lichen): growth-form of foliose lichens attached to rock only with one holdfast.

ultramafic (geology): with a high content of mafic minerals (= dark coloured minerals with high Fe and Mg content). For most plant species, such a condition is toxic (due to the Ca:Mg ratio and increased contents of heavy metals) and therefore it is generally colonized only by habitat specialists. Also called 'ultrabasic', the best-known examples are serpentinite, peridotite and harzburgite.

vallicar (vegetation; orig. from Castilian): grasslands dominated by 'vallico' or 'ballico' (*Agrostis castellana*).

woodland (vegetation): open-canopy forest, usually with grassy undergrowth.

white dunes (habitat): coastal foredunes.

winter-annual (vegetation): dominated by short-lived therophytes that germinate usually in autumn and develop optimally in winter (rainfall-rich period).

xeric (habitat): dry.

xerophilous (organism): preferring habitats characterised by (at least temporarily or locally) dry meso- and microclimate.

xero-thermophilous (plant, vegetation): preferring habitats characterised by (at least temporarily or locally) dry soil and warm meso- and microclimate.

xerophytic (vegetation): dominated by xerophilous plants, hence preferring habitats on the dry end of the environmental water gradient.

yaila (habitat): summer pasture in the Crimean mountains.

zonal (biogeography, vegetation): zonal vegetation occupies zonal (macro)habitats that are primarily under control of macroclimate (also controlling formation of zonal soil patterns) over long time scales; large-scale, natural disturbance factors such as heavy animal grazing and recurrent fire also contribute as important drivers of the zonal vegetation physiognomy (defined by typical combination of plant functional types), typical of particular (zono)biome; for further details see Walter (1976), Walter & Box (1976) and Rutherford et al. (2006a).

zoogenic (habitat, vegetation): result of activity of animals (e.g. mechanical disturbance of soil, grazing); usually linked to places where high densities of animal populations occur (e.g. surroundings of mammal burrows, nesting sites of birds).

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