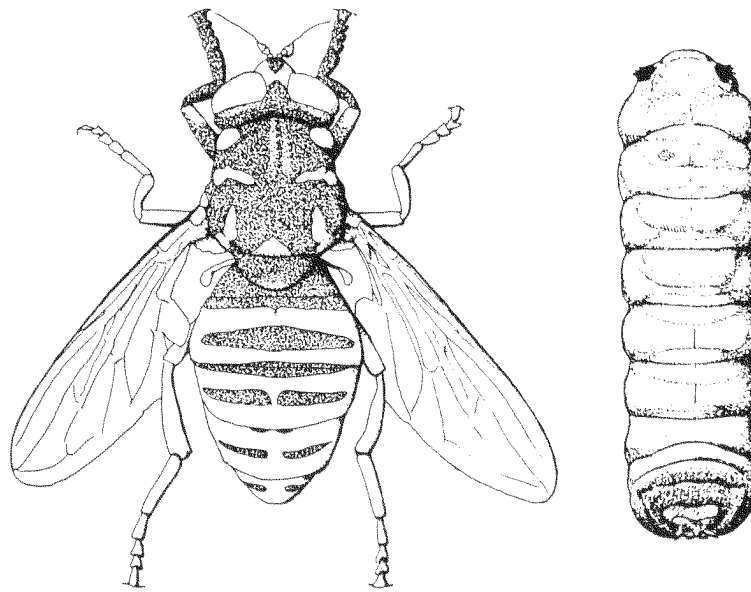


StN CONTENT AND GLOSSARY OF TERMS 2020

M.C.D.Speight & E.Castella



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Chapter 1: INTRODUCTION

The StN (Syrph the Net) database comprises a set of text files and spreadsheets. The first column of each spreadsheet is the database species list, which includes the names of all of the species of Syrphidae recorded from Europe and Turkey – so far as the editors are aware! The same species list is used for all the spreadsheets of one issue of the database, but the species listed vary from one issue of the database to another, dependent upon nomenclatural change, addition of species newly recorded for Europe, etc. Effort is made to ensure the content of the StN database species list is up-to-date, but nomenclatural acts not already published elsewhere are not undertaken in the database. Users of the database who encounter omissions or errors in either the database species list, or other parts of the spreadsheets, are invited to inform the editors, at speightm@gmail.com.

The Content and Glossary file indicates how the Macrohabitats, Microhabitats, Range and Status and Traits categories are coded and defines the categories used. The publications referred to in the various parts of the Content and Glossary file have been brought together to form a single References section, which terminates the volume.

Three levels of coverage are provided by the database. The lowest level of coverage is listing of a species in the spreadsheets, without either a species account having been compiled for that species or it being coded into all of the spreadsheets. At this lowest level the only information provided is the name of the species and (in the Range and Status categories) coding of the taxonomic status of the species plus coding of the part(s) of Europe from it was described and, if relevant, coding in the “species added 2020” column.

The intermediate level of coverage is listing of a species in the spreadsheets, plus coding of it in the same spreadsheet columns as are used at the lowest level of coverage, plus provision of a species account for it, plus coding in the “all other sheets” spreadsheet, but without coding of any macrohabitat categories for that species. These species are not coded for any macrohabitat categories due to either lack of sufficient information about them or about the habitat types from which they are known. The species accounts in the StN Species Accounts volume should be consulted for whatever information is available for these species.

The highest level of coverage provided for a species is listing in the spreadsheets, plus provision of a species account, plus coding into all of the database spreadsheet sections, including at least one macrohabitat category. More than 800 species are now coded into all the database spreadsheet sections. They are listed in the “habitat covered 2020” column.

Chapter 2: MACROHABITAT CATEGORIES

2.1. Macrohabitat category coding

The Macrohabitats spreadsheet provides, in coded form, data on the macrohabitat preferences of the species of Syrphidae covered by the database. The coding system used is as follows:

3 = maximally preferred macrohabitat, the presence of the species would be expected in this macrohabitat/predicted for this macrohabitat

2 = preferred macrohabitat, the presence of the species would be predicted for this macrohabitat

1 = the species can occur in this macrohabitat under certain circumstances (e.g. if an appropriate supplementary habitat is also present), but would not generally be predicted for this macrohabitat (e.g. in the absence of any appropriate supplementary habitat)

blank = the species does not occur in this macrohabitat.

2.2. Macrohabitat classification

Each macrohabitat category recognised is treated in a separate column and defined in the alphabetised Glossary given in this volume. It is important to consult the glossary in order to understand the precise interpretation to be put upon the terms used. In cases where a macrohabitat category recognised here co-incides with a "habitat" category used in the CORINE "habitat" classification system, the relevant CORINE (see Devillers *et al*, 1991) code for that macrohabitat category is given in the Glossary, with its definition. An attempt has been made to maximise the use of the CORINE habitat classification system in the Macrohabitats spreadsheets, but the CORINE system did not prove as generally applicable as had been hoped - see Speight *et al* (1997). The CORINE categories are only comprehensive for western and central Europe, but through the EUNIS system the CORINE approach to "habitat" characterisation has now been extended to cover the entire continent. Rodwell *et al* (2002) list the categories of the pan-European habitat classification system. The EUNIS habitat category numbers are also given in the Glossary, where applicable.

The names used for a small number of Macrohabitat categories are the same as are used for certain Microsite Feature categories. In these cases, the coding of species depends on the definition of the category provided in the Glossary and the function of the category in the part of the spreadsheets where it is used. For instance, "dung" appears as a supplementary habitat category in the Macrohabitats spreadsheets and as a ground-surface debris category in the Microsite Features spreadsheet. Dung-associated species are coded "1" in that category in the Macrohabitats spreadsheets, but may receive scores of "2" or "3" in the corresponding category in the Microsite Features spreadsheet. Thus, although these categories may have the same names in different spreadsheets, their content is not interchangeable.

To aid in certain analytical processes, each macrohabitat category has been given a unique code number, which appears at the head of each column, beneath the name of the category. To help familiarise the user with the organisation of the Macrohabitats spreadsheet, a summary table of the category names, showing the order in which they appear in the spreadsheet, their hierarchical relationships and their respective code numbers, is given below.

2.3. Use of the supplementary habitat categories

1. The habitat categories in the Macrohabitats spreadsheets are subdivided into broad, general groupings, Forest Macrohabitats, Open Ground Macrohabitats, Culture Macrohabitats, Wetland Macrohabitats and Brackish Macrohabitats. Preceding each of these general groupings (except Brackish Macrohabitats) a set of supplementary habitat categories is given to use with them. The supplementary habitat categories have been set up to refine the prediction procedure, once it was recognised that over-prediction of species was occurring if, for instance, species associated with streams occurring in heathland were coded simply under the categories "streams" and "heathland", rather than in some way which accommodated their requirement for the presence of both habitat categories.

2. Species which occur in association with a given Macrohabitat category (e.g. "heathland") only when a particular supplementary habitat (e.g. "stream") is also present are now coded with a "1" in the

respective Macrohabitat column and with a “1” in the relevant supplementary habitat column, so that their presence would not be predicted on a site where only one of these two habitat components occurred.

3. The basic list of species predicted to occur in association with a particular category of Macrohabitat is given by the species coded either “2” or “3” in the relevant Macrohabitat column. So the basic list of species predicted for lowland heathland can be derived directly from the “lowland heath” column. However, that basic list will not now include species associated with the occurrence of a supplementary habitat and Macrohabitat together, such as the edge of a stream in heathland. In order to augment the species predicted for a site to include the species associated with such habitat combinations it is necessary to follow a simple procedure. This procedure is illustrated here for a site on which the combination “stream in lowland heathland” occurs:

- a) copy the “lowland heath” column to a new file,
- b) copy the open ground supplementary habitat column “brook/river edge in open” to the new file,
- c) replace the codings “2” and “3” in the “lowland heath” column by blanks (so that the only level of species-association remaining coded is level “1”)
- d) in a separate column of the new file, sum the coding for each species in the “lowland heath” column with its corresponding coding in the “brook/river edge in open” column, so that codes for the combination “brook/river edge in lowland heath” are produced.

4. Once this is done, some species will show a coding of “2” in the column for the combination “brook/river edge in lowland heath”, enabling these species to be predicted for the site. In situations where a number of supplementary habitats occur in conjunction with a Macrohabitat, a single column, containing all of the supplementary predicted species, can be derived by using the “max” function to show the maximum level of coding obtained for each species from the Macrohabitat/ supplementary habitat combinations represented. In the same way, this column of supplementary predicted species can then be combined with the column containing the basic list of species predicted for “lowland heath”, to give an overall predicted list.

5. The same procedure should be followed for each Macrohabitat category that is accompanied by supplementary habitat categories on a site.

2.4. Use of the Macrohabitat categories in on-site habitat survey

Prediction of species-lists and their use are outlined in the volume “Past, present and future of the database”. An integral feature of the predictive procedure for a site fauna is information about the macrohabitats occurring on the target site. On-site habitat survey requires the following adjuncts:

- a) a printed-out copy of the “Summary table of habitat categories used in the MacrohabitatsTable”, which forms part of the present text file
- b) availability of the “GLOSSARY OF MACROHABITAT CATEGORIES”, which also forms part of the present text file
- c) printed-out copies of the “Habitat survey form”, a copy of which is included at the end of this text-file, for convenience.

2.5. The Freshwater Macrohabitat categories

Freshwater habitat categories have become supplementary in the Macrohabitats spreadsheets. In order to provide general freshwater categories, in which, for instance, all of the species associated with “permanent pool edge” may be coded into one category, a separate spreadsheet of Freshwater Macrohabitat categories has been provided. This Table is NOT for use in predicting site faunas, but may be used in other applications of the database files. A summary table showing the categories used in the Freshwater Macrohabitats spreadsheet is provided here, following the summary table of Macrohabitat categories.

2.6. Summary table of Macrohabitat categories

CATEGORY	NUMBER
Forest supplementary habitats	
Tall herb clearing/tracksides	211f
Grassy clearing/tracksides	234f
Edge, permanent pool under canopy	7462f
Temporary pool under canopy	713f
Spring in forest	731f, 732f
Flush in forest	733f
Small open area with flush in forest	7331f
Drainage ditch in forest	734f
Drainage ditch along track in plantation	735f
Seasonal brook in forest	7332f
Brook edge in forest	7442f
River edge under canopy	7441f
Cow dung in forest	7131f
Rock outcrops in forest	75f
Opuntia thickets	76f
Asphodel clumps	77f
FOREST MACROHABITATS gen.)	1
Deciduous forest (gen.)	11
Dry (gen.)	111
Thermophilous Quercus (gen.)	1111
overmature	11111
mature	11112
saplings	11113
Western Quercus pubescens	11114
overmature	111141
mature	111142
saplings	111143
Western Q. pubescens on clay	111144
overmature	1111441
mature	1111442
saplings	1111443
Western karstic Q. pubescens savanna	111145
overmature	1111451
mature	1111452
saplings	1111453
Eastern thermophilous Quercus (gen.)	11115
overmature	111151
mature	111152
saplings	111153
Spanish Quercus faginea	11116
overmature	111161
mature	111162
saplings	111163
Castanea forest	11117
overmature	111171
mature	111172
saplings	111173
Humid/mesophilous (gen.)	112
Fagus (gen.)	1120
overmature	11201
mature	11202
saplings	11203

Mesophilous Fagus (gen.)		11211
	overmature	112111
	mature	112112
	saplings	112113
Humid Fagus (gen.)		11212
	overmature	112121
	mature	112122
	saplings	112123
Quercus/Carpinus/Ulmus (gen.)		1122
	overmature	11221
	mature	11222
	saplings	11223
Acidophilous Quercus (gen.)		1123
	overmature	11231
	mature	11232
	saplings	11233
Fraxinus (gen.)		1124
	overmature	11241
	mature	11242
	saplings	11243
Betula (gen.)		1125
	overmature	11251
	mature	11252
	saplings	11253
Alnus (gen.)		1126
	overmature	11261
	mature	11262
	saplings	11263
Quercus pyrenaica (gen.)		1127
	overmature	11271
	mature	11272
	saplings	11273
Mediterranean riparian Fraxinus		1128
	overmature	11281
	mature	11282
	saplings	11283
Rhithral riparian Alnus/Fraxinus		1129
	overmature	11291
	mature	11292
	saplings	11293
Alluvial forest (gen.)		113
Salix alba/Populus (gen.)		1131
	overmature	11311
	mature	11312
	saplings	11313
Salix alba/Populus gallery (gen.)		11314
	overmature	113141
	mature	113142
	saplings	113143
Hardwood alluvial (gen.)		1132
	overmature	11321
	mature	11322
	saplings	11323
Alnus glutinosa/Fraxinus excelsior (gen.)		11324
	overmature	113241
	mature	113242

	saplings	113243
Quercus/Ulmus/Fraxinus (gen.)		11325
	overmature	113251
	mature	113252
	saplings	113253
Brook floodplain (gen.)		1133
	overmature	11331
	mature	11332
	saplings	11333
Alnus incana (gen.)		1134
	overmature	11341
	mature	11342
	saplings	11343
Deciduous plantation (gen.)		12
Fraxinus		121
Populus (gen.)		122
	flooded	1221
	not flooded	1222
Salix (gen.)		123
	flooded	1231
	not flooded	1232
Wet woods (gen.)		13
Betula/Pinus swamp (gen.)		131
	overmature	1311
	mature	1312
	saplings	1313
Alnus swamp (gen.)		132
	overmature	1321
	mature	1322
	saplings	1323
Salix swamp (gen.)		133
	overmature	1331
	mature	1332
	saplings	1333
Broad-leaved, evergreen forest		15
Quercus ilex (gen.)		151
	overmature	1511
	mature	1512
	saplings	1513
Quercus suber (gen.)		152
	overmature	1521
	mature	1522
	saplings	1523
<i>Quercus rotundifolia</i>		153
	overmature	1531
	mature	1532
	saplings	1533
Laurisilva forest (gen.)		155
	Madeiran Laurisilva (gen.)	1551
Scrub/thickets (gen.)		16
Atlantic/Medio-European (gen.)		161
	Ulex thickets	1612
	Corylus thickets	1613
	Cytisus thickets	1614
Dry		162

Matorral (gen.)		163
	broad-leaved evergreen	1631
	Pinus	1632
Maquis (gen.)		164
	high maquis	1641
	low maquis	1642
	Eastern Med. maquis	1643
Mediterranean shrub formations		165
Garrigue		166
Subalpine (gen.)		167
	Alnus	1671
	Pinus	1672
Coniferous forest (gen.)		17
Abies (gen.)		1710
	overmature	17101
	mature	17102
	saplings	17103
Picea (gen.)		1711
	overmature	17111
	mature	17112
	saplings	17113
Acidophilous Picea (gen.)		1712
	overmature	17121
	mature	17122
	saplings	17123
Mesophilous/calciophilous Picea (gen.)		1713
	overmature	17131
	mature	17132
	saplings	17133
Mediterranean pine		176
	overmature	1761
	mature	1762
	saplings	1763
Black pine (general)		177
Salzmann's pine (general)		1771
	overmature	17711
	mature	17712
	saplings	17713
Pinus halepensis (gen.)		178
Pinus brutia (gen.)		1781
Pinus sylvestris (gen.)		1720
	overmature	17201
	mature	17202
	saplings	17203
Dry Pinus sylvestris (gen.)		1721
	overmature	17211
	mature	17212
	saplings	17213
Humid Pinus sylvestris (gen.)		1722
	overmature	17221
	mature	17222
	saplings	17223
Caledonian forest		17224
	overmature	172241
	mature	172242
	saplings	172243

Mountain pine (gen.)		175
	overmature	1751
	mature	1752
	saplings	1753
Non-calcareous mountain pine (gen.)		1754
	overmature	17541
	mature	17542
	saplings	17543
Karstic mountain pine savanna (gen.)		1755
	overmature	17551
	mature	17552
	saplings	17553
Larix/Pinus cembra (gen.)		173
	overmature	1731
	mature	1732
	saplings	1733
Western taiga		174
	overmature	1741
	mature	1742
	saplings	1743
Conifer plantation (gen.)		18
Abies/Larix/Picea		181
	mature	1811
	saplings	1812
Pinus sylvestris		182
	mature	1821
	saplings	1822
Scattered trees in open ground (gen.)		19
Deciduous (gen.)		190
	overmature	1901
	mature	1902
Fagus		1911
	overmature	19111
	mature	19112
Quercus		1912
	overmature	19121
	mature	19122
Fraxinus		1913
	overmature	19131
	mature	19132
other hardwoods		1914
	overmature	19141
	mature	19142
Populus		1915
	overmature	19151
	mature	19152
Salix		1916
	overmature	19161
	mature	19162
Conifers	(gen.)	192
	overmature	1921
	mature	1922
Open ground supplementary habitats		
Brook edge in open		7442o
Spring in open		731o, 732o
Flush in open		733o

Seasonal brook in open	7332o
Drainage ditch in open	734o
Temporary pool in open	713o
Permanent pool in open	712o
Edge permanent pool in open	7462o
cow dung in open	7131o
temp pool/edge perm.pool with cow dung, in open	71311o
rock outcrops in open	75o
Opuntia thickets	76o
Asphodel clumps	77o
Rumex alpinus stands	78o
OPEN GROUND MACROHABITATS (gen.)	2
Tall herb communities (general)	21
Lowland	211
Montane/subalpine	212
Thermophilous forest fringe	22
Grassland (gen.)	23
Unimproved grassland (gen.)	231
Lowland unimproved grassland (gen.)	2311
Xeric/semi-arid (gen.)	23111
	open
	closed
Very dry	231111
	231112
	23115
	acidophilous
	calcareous
Dry (general)	231151
	231152
	23112
	acidophilous
	calcareous
Humid (gen.)	231121
	231122
	23113
	eutrophic/mesotrophic
	oligotrophic
Alluvial	231131
	231132
	23114
Montane unimproved grassland (gen.)	2312
Acidophilous	23121
Calcareous	23122
Subalpine/alpine unimproved grassland (gen.)	2313
Acidophilous	23131
Calcareous	23132
Improved grassland (gen.)	232
Lowland improved grassland (gen.)	2321
Lightly grazed	23211
Heavily grazed	23212
	cattle
	sheep
	232121
	232122
Hay	23213
Montane improved grassland	2322
Intensive grassland	233
Moor	24
Heath	25
lowland	251
subalpine	252
Mediterranean	253
Hedgehog heath	254
Aegean phrygana	26
Coastal beaches & dunes (gen.)	27
Coastal beach (gen.)	271

	shingle	2711
Coastal dunes (gen.)		272
	Ammophila dunes	2721
	grey dunes/dune scrub	2722
	Machair	2723
	dune slack	2724
Inland sand dunes		273
Moraine and scree (gen.)		28
	calcareous	281
	non-calcareous	282
Tundra		29
DEHESA (general)		3
Quercus rotundifolia/Q. suber dehesa (general)		31
Culture supplementary habitats		
	Brook edge	7442c
	Seasonal brook	7332c
	Drainage ditch	734c
	Edge perm. pool	7462c
	Allium stands	791c
	Artemisia stands	792c
	Narcissus stands	793c
CULTURE MACROHABITATS (general)		5
Rural (general)		501
Crops		51
	Cereals	511
	Maize	5111
Fallow		515
Orchard		52
	Almond orchard	521
Vineyards (general)		53
Field margin/hedge (general)		54
	Permanent field margin	541
	New field margin	542
	Hedge	543
	Hedge plus field margin	544
	Old field wall	545
Farmyard organic waste		57
Urban (general)		502
Urban parks (general)		55
	Lawn	551
	Flower meadow (gen)	558
	cut flower meadow	5581
	partly cut flower meadow	5582
	Flower bed (general)	552
	seasonal flower bed	5521
	semi-perm. flower bed	5522
	rockery	5523
	Shrubbery/hedge	553
	Understorey trees	554
	Canopy trees (gen)	555
	Mature canopy trees (gen)	5551
	deciduous (gen)	55511
	Picea	55512
	Pinus sylvestris	55513
	Overmature canopy trees (gen)	5552

	Fagus	55521
	Fraxinus	55522
	Populus nigra	55523
	Quercus	55524
Water feature (general)		556
	veg. water feature	5561
	unveg. water feature	5562
Compost heap		557
Gardens, ornamental		56
Wetland supplementary habitats		
brook edge in wetland		7442w
Spring in wetland		731w, 732w
Flush in wetland		733w
Drainage ditch in wetland		734w
Permanent pool in wetland		712w
Edge permanent pool in wetland		7462w
WETLAND MACROHABITATS (gen.)		6
Fen (gen.)		61
	Rich fen/fen-sedge bed	611
	Acid fen	612
	Fen carr	613
	Montane/subalpine fen	614
Transition mire		62
Bog (gen.)		63
	Raised bog	631
	Blanket bog	632
	Cutover bog	633
Aapa mire		634
Palsa mire		635
Reed/tall sedge beds (gen.)		64
	Reed	641
	Tall sedge	642
	Cane	643
Marsh		65
BRACKISH MACROHABITATS (gen.)		67
Lagoon		672
Salt marsh (gen.)		673
	Spartina bed	6732
	Atlantic salt meadow	6733
	Continental salt meadow	6734

FRESHWATER MACROHABITATS (gen.)		7
Standing (gen.)		71
Permanent pool		712
Temporary pool		713
Running (gen.)		72
River (gen.)		721
Brook		722
Seasonal brook		723
Springs/flushes (gen.)		73
	rheocrene	731
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	helocrene	733
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Running, edge (gen.)		744
	river bank (gen.)	7441
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	brook edge	7442
	canal edge	7443
Standing, edge (gen.)		746
	Lake edge	7461
	Perm.pool edge	7462

2.7. Glossary of Macrohabitat categories

This glossary includes repeatedly reference to numbered CORINE “habitat” categories. For explanation, see the entry under “**corine**”.

(**gen.**): abbreviation for in general; referring to a general category also treated as two or more sub-categories in this database

aapa mire, wetlands: boreal string-mire complexes, with attenuated ridges alternating with linear pools, or flarks, the outer (marginal) ridges usually dominated by *Pinus sylvestris*, *Alnus*, *Betula*, *Calluna* and *Empetrum*, the flarks by *Eriophorum*, *Menyanthes*, *Utricularia*, *Rhynchospora* etc. The central parts of the complexes are characterised by minerotrophic fen vegetation, in which poor *Sphagnum* fens are most common, but brown moss fens can be frequent in some regions. The category includes the sloping fens typical of eastern Finland and parts of Lapland. Habitats Directive, Natura 2000 code: 7310. EUNIS D3.2

Abies (gen.), coniferous forests: forests dominated by firs (*Abies spp.*) with stands of overmature, mature and young (saplings/scrub) trees. CORINE 42.1. EUNIS G3.12, EUNIS G3.13
CORINE 42.1: FIR FOREST; conifer forests dominated by firs (*Abies spp.*)

Abies/Larix/Picea, conifer plantations: plantations of fir, larch or spruce: CORINE 83.3111:
EUROPEAN FIR, SPRUCE, LARCH PLANTATIONS. EUNIS G3.F1

acid fen, fen: CORINE 54.4: ACIDIC FENS; *Caricetalia fuscae*, *Caricion fuscae*. Topogenous or soligenous valley, basin or spring mire systems fed by waters poor in bases. As in the rich fens, the water level is at or near the surface of the substratum and peat formation is infra-aquatic. The mire communities themselves, dominated by small sedges and brown mosses or *Sphagnum*, belong to the *Caricetalia fuscae*, but, in large fen systems, they are accompanied by acidocline wet grasslands (*Molinietalia caeruleae*), large sedge beds (*Magnocaricion*) and reed or related communities (*Phragmition*). *Sphagnum* hummocks (51.11) from locally and transition mires (54.5) or aquatic (22.3), amphibian (22.2) and spring (54.1) communities colonise small depressions. Thus, codes from all the above categories may need to be used in conjunction to completely describe the fen. The general category in any case includes, as understood here, beside strict mire communities, their transitions to humid grasslands; and groupings phytosociologically affiliated with *Molinia* associations, but rich in species of the *Caricion fuscae*, provided they are integrated in a fen system. Acidic fen communities also occur on small surfaces or within mosaics in other ecosystems, in particular in typical humid grasslands (37), humid woodlands and thickets (44), decalcified dune slacks (16.3) and spring systems (54.1). Their presence can be indicated by codes from this unit used in conjunction with the relevant main codes. Characteristic species of acidic mire communities are *Carex canescens*, *C. echinata*, *C. nigra*, *Eriophorum angustifolium*, *E. scheuchzeri*, *Scirpus cespitosus*, *Juncus filiformis*, *Agrostis canina*, *Viola palustris*, *Cardamine pratensis*, *Ranunculus flammula* and the mosses *Calliergeon sarmentosum*, *C. stramineum*, *C. cuspidatum*, *Drepanocladus exannulatus*, *D. fluitans*, *Sphagnum recurvum*, *S. auritum*, *S. cuspidatum*, *S. subsecundum*, *S. apiculatum*, *S. papillosum*, *S. russowii*. EUNIS D2.2

acidophilous, dry, lowland unimproved grassland: acidophilous, unimproved grassland usually maintaining by livestock grazing, on freely-draining substrates: CORINE 35.1: ATLANTIC MAT-GRASS SWARDS AND RELATED COMMUNITIES; *Nardetalia*: *Violo-Nardion* (*Nardo-Galion saxatilis*, *Violion caninae*). EUNIS E1.7

acidophilous, montane unimproved grassland: acidophilous, montane, unimproved grassland, usually maintained by livestock grazing: CORINE 35.11, 35.12, 35.13, 36.31, 36.33. EUNIS : E1.71.
CORINE 35.11: Mat-grass swards. *Nardus stricta*-dominated or –rich formations.
CORINE 35.12: *Agrostis-Festuca* grasslands. Closed mesophile grasslands formed by *Agrostis* spp. And *Festuca* spp.; in particular , widespread, sheep-grazed upland pastures of the British Isles, and especially the Scottish Highlands, with abundant *Agrostis capillaris*, *A.canina*, *Festuca ovina* and with *Anthoxanthum odoratum*, *Holcus lanatus*, *Carex pilulifera*, *Alchemilla alpine*, *Galium saxatile*.
CORINE 35.13: *Deschampsia flexuosa* grasslands. Communities dominated by *Deschampsia flexuosa* forming, in particular, as degradation stages of *Calluna* and other heaths.

CORINE 36.31: MAT-GRASS SWARDS AND RELATED COMMUNITIES; closed grasslands of deep, acid soils of the Alps, Pyrenees, northern Apennines, Jura and higher Hercynian ranges, developed mostly and abundantly in the subalpine level, dominated or co-dominated by *Nardus stricta*, *Festuca eskia*, *F.nigrescens*, *F.rubra*, *Alopecurus gerardii*, *Bellardiochloa (Poa) violacea*, *Carex sempervirens*, *Anthoxanthemum odoratum*.

CORINE 36.33: SUBALPINE, THERMOPHILE SILICEOUS GRASSLANDS; *Festucion varieae*, *Festucion eskiae*, *Poion violaceae*, *Festucion spadiceae*. Subalpine thermophile formations on often skeletal soils of the southern Alps, the Pyrenees and, very locally, the Massif Central and the Apennines.

acidophilous Picea, coniferous forests: acidophile forests dominated by spruce (*Picea abies*) with stands of overmature, mature and young (saplings/scrub) trees, on peaty soils or siliceous, crystalline or schistous substrates (including CORINE 42.211, 42.212, 42.213, 42.221, 42.225, 42.231, 42.252). EUNIS G3.1B, G3.1C, G3.1D, G3.1F.

acidophilous Quercus (gen.), deciduous forests: acid oak forest, with stands of overmature, mature and young (saplings/scrub) trees. CORINE 41.5. EUNIS G1.8.

CORINE 41.5: ACIDOPHILOUS OAK FORESTS; *Quercion robori-petraeae*. Forests of *Quercus robur* or *Q. petraea* on acid soils with a herb layer mostly constituted by the ecological groups of *Deschampsia flexuosa*, *Vaccinium myrtillus*, *Pteridium aquilinum*, *Lonicera periclymenum*, *Holcus mollis*, and of *Maianthemum bifolium*, *Convallaria majalis*, *Hieracium sabaudum*, *Hypericum pulchrum*, *Luzula pilosa*, and the mosses *Polytrichum formosum* and *Leucobryum glaucum*.

acidophilous, subalpine/alpine unimproved grassland: acidophilous unimproved subalpine/alpine grassland, developed over crystalline rocks and other lime-deficient substrates: CORINE 36.31, 36.32, 36.34. EUNIS E4.31, EUNIS E4.32, EUNIS E4.34.

CORINE 36.31: MAT-GRASS SWARDS AND RELATED COMMUNITIES; closed grasslands of deep, acid soils of the Alps, Pyrenees, northern Apennines, Jura and higher Hercynian ranges, developed mostly and abundantly in the subalpine level, dominated or co-dominated by *Nardus stricta*, *Festuca eskia*, *F.nigrescens*, *F.rubra*, *Alopecurus gerardii*, *Bellardiochloa (Poa) violacea*, *Carex sempervirens*, *Anthoxanthemum odoratum*.

CORINE 36.32: ORO-CALEDONIAN GRASSLANDS; boreo-alpine formations of the higher summits of Scotland, Cumbria, northern England and northern Wales with *Juncus trifidus*, *Carex bigelowii*, mosses and lichens.

CORINE 36.34: CROOKED-SEDGE SWARDS AND RELATED COMMUNITIES; *Caricion curvulae*, *Festucion sapinae*. Mostly closed *Carex curvula*, *Festuca* spp., *Oreochloa* spp. or *Juncus trifidus* grasslands on siliceous soils of the alpine level of the Alps and the Pyrenees, with very local outposts in the great Hercynian ranges and the Cantabrian Range. *Androsace obtusifolia*, *A.carnea* ssp.laggeri, *Campanula barbata*, *Juncus jacquinii*, *J.trifidus*, *Silene exscapa*, *Gentiana alpina*, *Achillea erba-rotta*, *Euphrasia minima*, *Luzula lutea*, *L.spicata*, *L.hispanica*, *Lychnis alpina*, *Minuartia recurva*, *M.sedoides*, *Pedicularis kernerii*, *P.pyrenaica*, *Phyteuma globularifolium*, *Ph.hemisphericum*, *Potentilla frigida*, *Armeria alpina*, *Secenio incanus*, *Trifolium alpinum*, *Veronica bellidioides*, *Ranunculus pyrenaicus* are characteristic.

Aegean phrygana: CORINE: 33.3 Low, thorny formations of hemispherical shrubs of the coastal thermo-Mediterranean zone of Aegean islands, of mainland Greece and the Ionian islands, of coastal Anatolia and Crete (up to 1000 m a.s.l.), with *Sarcopoterium spinosum*, *Centaurea spinosa*, *Satureja thymbra*, *Thymus capitatus*, *Genista acanthoclada*, *Anthyllis hermanniae*, *Euphorbia acanthothamnus*, *Stachys spinosa*, *Ballota pseudodictamnus*, *Ballota acetabulosa*, *Erica manipuliflora*, *Rhamnus oleoides*, *Lithospermum hispidulum*, *Fumana arabica*, *Fumana thymifolia*, *Cistus creticus*, *Cistus parviflorus*, *Cistus salvifolius*, *Pistacia lentiscus*, *Teucrium brevifolium*, *Teucrium divaricatum*, *Teucrium polium*, *Calicotome villosa*, *Micromeria graeca*, *Micromeria juliana*, *Micromeria nervosa*, *Salvia triloba*, *Ononis spinosa*, *Helichrysum italicum* ssp. *microphyllum*, *Helichrysum italicum* ssp. *italicum*, *Phagnalon graecum*, *Phlomis fruticosa*; much more widespread and diverse than the western Mediterranean formations. The subunits are based on physiognomically significant dominants. EUNIS S7-21.

Allium stands, Urban supplementary habitats: stands of *Allium* species, including cultivars.

alluvial forest (gen.): deciduous forests of river floodplains, with stands of overmature, mature and young (saplings/scrub) trees. CORINE 44 (44.2, 44.31 excluded). EUNIS G1.1 (except EUNIS G1.12 and EUNIS G1.21).

CORINE 44: ALLUVIAL AND VERY WET FORESTS AND BRUSH; tree and shrub vegetation of flood plains, marshes, fens and bogs.

alluvial, lowland unimproved grassland. Humid grasslands on active floodplains of rivers, or within the inundation zone of lakes with fluctuating water levels, and so subject to periodic inundation. Some types of humid, lowland, unimproved grassland (CORINE 34.324; 37.21, 22, 24) can also occur in alluvial contexts and thus are also referred to here. EUNIS E1.264, EUNIS E3.41, EUNIS E3.42, EUNIS E3.43, EUNIS E3.44.

CORINE 34.324 ALLUVIAL AND HUMID MESOBROMION GRASSLANDS: closed grasslands rich in species of the *Mesobromion* and in particular *Bromus erectus*, developed on calcareous marls, on somewhat elevated expanses of alluvial plains and on other water retentive soils within the range of the grasslands listed under CORINE 34.322. They are transitional to humid grasslands (CORINE 37) and are often marked by the abundance of *Carex flacca*. Among characteristic elements are also *Thalictrum minus* ssp. *majus*, *Peucedanum carvifolia*, *Silaum silaus*, *Festuca arundinacea*. Extensive examples are known in particular from the marls of Lorraine, the Belgian low Meuse and the great rivers of The Netherlands, Westphalia, the alluvial plains of the French Moselle and Meuse, the Rhine valley in Germany and Alsace, various valleys in southern Germany and the valley of the Sarthe.

CORINE 37.21: ATLANTIC AND SUB-ATLANTIC HUMID MEADOWS; *Calthion palustris*, *Bromion racemosi*, *Deschampsia cespitosae*; lightly managed hay meadows and pastures on both basocline and acidocline, nutrient-rich soils of middle European lowlands, hills and low mountains under Atlantic or sub-Atlantic climatic conditions. Among the characteristic plant components of the highly diverse communities forming this unit are *Caltha palustris*, *Cirsium palustre*, *C. rivularis*, *C. oleraceum*, *Epilobium parviflorum*, *Lychnis flos-cuculi*, *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*, *Myosotis palustris*, *Deschampsia cespitosa*, *Angelica sylvestris*, *Oenanthe silaifolia*, *Gratiola officinalis*, *Inula salicina*, *Succisella inflexa*, *Dactylorhiza majalis*, *Ranunculus acris*, *Rumer acetosa*, *Holcus lanatus*, *Alopecurus pratensis*, *Festuca pratensis*, *Juncus effusus*, *J. fliformis*.

CORINE 37.22: SHARP-FLOWERED RUSH MEADOWS; *Juncion acutiflori*; Humid meadows dominated by, or rich in, *Juncus acutiflorus*. They are floristically and phytosociologically very varied and many are as related to the oligorophic *Molinion* communities of 37.3 as to the more eutrophic *Calthion* ones of 37.2. Sharp-flowered rush meadows are particularly characteristic of the oceanic and sub-oceanic regions to the western seaboard of Europe from north-western Iberia to the Low Countries.

CORINE 37.23: SUBCONTINENTAL CNIDION MEADOWS; *Cnidion dubii*; moist-soil, flood-subjected meadows of river valleys under continental or subcontinental climatic conditions, with *Cnidium dubium*, *Viola persicifolia*, *Allium angulosum*, *Iris sibirica*, *Oenanthe lachenalii*, *O. silaifolia*, *Gratiola officinalis*, *Juncus atratus*, *Leucojum aestivum*, *Carex praecox* var. *suzae*, *Lythrum virgatum*.

CORINE 37.24: FLOOD SWARDS AND RELATED COMMUNITIES; *Agropyro-Rumicion crisp* p.; grasslands of occasionally flooded river and lake banks, of depressions where rain water collects, of disturbed humid areas and of pastures submitted to intensive grazing.

almond orchard, orchards: orchards of *Prunus dulcis*.

Alnus, alpine scrub: alpine thickets of *Alnus viridis*: CORINE 31.611. EUNIS F2.31.

CORINE 31.611: alpine green alder scrub, *Alnetum viridis*. Green alder (*Alnus viridis* ssp. *viridis*) dominated formations, rich in tall herbs, of slopes with a good water-holding capacity, mostly on siliceous soils, in the subalpine and lower alpine belts of the Alps.

Alnus (gen.), deciduous forests: alder (*Alnus*) forest, with stands of overmature, mature and young (saplings/scrub) trees. CORINE 41.C. EUNIS G1.B.

CORINE 41.C: ALDERWOODS; non-riparian, non-marshy formations dominated by *Alnus* spp.

Alnus glutinosa/Fraxinus excelsior (gen.), alluvial forests: forests of *Alnus glutinosa*, usually accompanied by *Fraxinus excelsior*, of Western and middle European watercourses, on soils periodically inundated by high water levels, but not permanently water-logged. CORINE 44.33. EUNIS G1.213.

CORINE 44.33: *Pruno-Fraxinetum*, *Ulmo-Fraxinetum*

Central, and locally western, European woods of large valleys of lowland slow and even-flowing rivers, with *Fraxinus excelsior*, *Alnus glutinosa*, *Prunus padus*, *Ulmus laevis*, *Quercus robur*, *Humulus lupulus*, *Rubus idaeus*, *R.caesius*, *Ribes nigrum*, *R.rubrum*, *Sambucus nigra*, *Aegopodium podagraria*, *Peucedanum palustre*, *Glyceria maxima*, *Iris pseudacorus*, *Carex acutiformis*, *C.riparia*, *Phalaris arundinacea*, *Filipendula ulmaria*, *Cirsium oleraceum*, *C.palustre*.

Alnus incana (gen.), deciduous forests: grey alder riparian woods with stands of overmature, mature and young (saplings/scrub) trees. CORINE 44.2. EUNIS G1.12.

CORINE 44.2: *Alnus incanae* (*Alnetum incanae* s.l.); riparian woods of *Alnus incana* of montane and sub-montane rivers of the Alps, the northern Apennines and neighbouring regions.

Alnus swamp (gen.), wet woods: wet alder (*Alnus*) woods, with stands of overmature, mature and young (saplings/scrub) trees. CORINE 44.911, 44.912. EUNIS G1.411, EUNIS G1.412.

CORINE 44.911: ALDER SWAMP WOODS; *Carici elongatae-Alnetum* (*Irido-Alnenion*); mesotrophic and meso-eutrophic *Alnus glutinosa* swamp woods of marshy depressions, with *Carex elongata*, *Thelypteris palustris*, *Dryopteris cristata*, *Osmunda regalis*, *Solanum dulcamara*, *Calystegia sepium*, *Ribes nigrum*, and often, in acidocline variants, *Betula pubescens*. The constancy of *Carex paniculata*, *C.acutiformis*, *C.elata*, often dominates the herb layer in the most humid types.

CORINE 44.912: OLIGOTROPHIC SWAMP ALDER WOODS; *Carici laevigatae-Alnetum* (*Blechno-Alnenion*; *Blechno-Alnetum*, *Sphagno-Alnetum*). Oligotrophic, or meso-oligotrophic, acidocline *Alnus glutinosa* woods of fens and poorly drained banks of brooks or small rivers, mostly characteristic of siliceous regions and Atlantic climates, south to Galicia. *Betula pubescens* and *Frangula alnus* often accompany the alders. The ground layer is usually rich in *Sphagnum* spp. and includes *Carex laevigata*, *Equisetum sylvaticum* and many ferns, including *Oreopteris limbosperma*, *Blechnum spicant*, *Athyrium filix-femina*, *Dryopteris cristatus* and *D. carthusiana*.

Ammophila dunes, coastal dunes: CORINE 16.21, with the exclusion of all Mediterranean, Iberian and Canarian communities. EUNIS B1.3.

CORINE 16.21: SHIFTING DUNES; *Agropyron juncei*, *Ammophilion arenariae*, *Zygophyllion fontanesii*; mobile sands, unvegetated or occupied by open grasslands; they may form tall dune ridges or, particularly along the Mediterranean, be limited to a fairly flat upper beach, still subject in part to inundation.

arctic-alpine, tundra: upland tundra with vegetation often dominated by single species, e.g. *Dryas octopetala*, *Silene acaulis*, *Diapensia lapponica*, *Juncus trifidus*, but with an admixture of dwarf ericaceous shrubs such as *Arctostaphylos*, *Loiseleuria*, *Phyllodoce* and *Empetrum*.

Artemisia stands, Culture supplementary habitats : stands of *Artemisia vulgaris*.

asphodel clumps, forest supplementary habitat; open ground supplementary habitat: clusters of *Asphodelus albus*, *A. ramosus* or other large *Asphodelus* spp., which may occur in open patches in various forest types and in various open ground habitats.

atlantic salt meadow, saltmarsh: coastal salt meadows belonging phytosociologically to the order *Glauco-Puccinellietalia maritimae*. CORINE 15.3. EUNIS A2.541, EUNIS A2 547.

CORINE 15.3: ATLANTIC SALT MEADOWS; *Glauco-Puccinellietalia maritimae*; salt meadows of Baltic, North Sea, Channel and Atlantic shores. *Aster tripolium* can be present or abundant in most subdivisions.

Atlantic/medio-European thickets (gen.) scrub/thickets: CORINE 31.83, 31.841 and 31.85, EUNIS F3.13, EUNIS F3.15.

CORINE 31.83: ATLANTIC POOR SOIL THICKETS; *Prunetalia p.*: *Pruno-Rubion fruticosi p.*: *Frangulo-Rubenion* (*Rubion subatlanticum*; *Franguletalia*); thickets of *Rubus* spp., *Frangula*, *Alnus*, *Sorbus aucuparia*, *Corylus avellana*, *Lonicera periclymenum*, *Cytisus scoparius*, characteristic of forest edges, hedges and (mostly *Quercion*) woodland recolonisation developed on soils relatively poor in nutrients, usually acid, mostly under climates with strong Atlantic influence.

CORINE 31.841: MEDIO-EUROPEAN BROOM FIELDS; *Sarothamnus scoparii* (*Pruno-Rubion-fruticosi*; *Sarothamnenion*).

CORINE 31.85: GORSE THICKETS; *Ulex europaeus* thickets of the Atlantic domain (including British *Ulex europaeus-Rubus fruticosus* scrub p.).

Betula (gen.), deciduous forests: birch (*Betula*) forests, with stands of overmature, mature and young (saplings/scrub) trees. CORINE 41.B. EUNIS G1.91.

CORINE 41.B: BIRCH WOODS; Formations dominated by *Betula pendula*, *B. pubescens*, or their allies, on non-marshy terrain.

Betula/Pinus swamp (gen.), wet woods: bog woodland of pine and birch with stands of overmature, mature and young (saplings/scrub) trees. CORINE 44.A1 – A3. EUNIS G1.51, EUNIS G3.E. Habitats Directive, Natura 2000 code: 91D0.

CORINE 44.A2: scots pine mire woods, *Ledo-Pinetum* (*Vaccinio uliginosae-Pinetum sylvestris*)

CORINE 44.A3: mountain pine bog woods, *Vaccinio uliginosae-Pinetum rotundatae* (*Sphagno-Mugetum*, *Pino rotundatae-Sphagnetum* p)

black pine forest, conifer forest: CORINE 42.6, forests dominated by pines of the *Pinus nigra* group. EUNIS G3.5.

blanket bog: CORINE 52.1: LOWLAND BLANKET BOGS; *Sphagnetalia magellanici*: *Pleurozio purpureae-Ericetum tetralicis*; *Scheuchzerietalia palustris* p., *Caricetalia fuscae* p., *Utricularietalia intermedio-minoris* p., *Littorelletalia*, *Potamogetonetalia*; hyper-Atlantic blanket bogs of the western coastlands of Ireland, western Scotland and its islands, Cumberland, northern Wales and Devon, developed under very high rainfall climates. The main vascular plants are *Molinia caerulea*, *Eriophorum angustifolium*, *E. vaginatum*, *Scirpus cespitosus*, *Schoenus nigricans*, *Rhynchospora alba*, *Narthecium ossifragum*, *Carex panicea*, *Calluna vulgaris*, *Erica tetralix*, *Myrica gale*, *Pedicularis sylvatica*, *Potentilla erecta*, *Polygala serpyllifolia*, *Pinguicula lusitanica*, *Drosera rotundifolia*. The colourful mucinal layer comprises the black and crimson liverwort *Pleurozia purpurea*, the black and gold moss *Campylopus atrovirens*, the woolly fringe moss *Rhacomitrium lanuginosum*; it is often dominated by sphagnums (*Sphagnum auriculatum*, *S. magellanicum*, *S. compactum*, *S. papillosum*, *S. nemoreum*, *S. rubellum*, *S. tenellum*, *S. subnitens*), or, particularly in parts of western Ireland, mucilaginous algal deposits (*Zygogonium*). Some of the distinctive features of the blanket bog can be, as in 52.1, individualised by the codes below.

CORINE 52.2: UPLAND BLANKET BOGS; *Sphagnetalia magellanici*: *Vaccinio-Ericetum tetralicis*; *Ericion tetralicis* p., *Scheuchzerietalia palustris* p., *Caricetalia fuscae* p., *Utricularietalia intermedio-minoris* p., *Littorelletalia*, *Potamogetonetalia*; Blanket bogs of high ground, hills and mountains in Scotland, Ireland, western England and Wales. Characteristic species are *Eriophorum vaginatum*, *Calluna vulgaris*, *Erica tetralix*, *Rubus chamaemorus*, *Narthecium ossifragum*, *Scirpus cespitosus*, *Drosera rotundifolia*, *Rhacomitrium lanuginosum* and abundant sphagnum mosses. Habitats Directive, Natura 2000 code: 7130.

EUNIS D1.21, EUNIS D1.22.

bog (gen.), wetlands: peatlands with a permanently water-logged ground surface, where the water is retained by the water-holding capacity of the vegetation and derived directly from rainfall, i.e. the vegetation is above the influence of the groundwater: CORINE 51.1, 52.1, 52.2. EUNIS D1.11, EUNIS D1.21, EUNIS D1.22

CORINE 51.1: NEAR-NATURAL RAISED BOGS; undisturbed, or little disturbed, peat-forming bogs, often taking the shape of a convex lens. Such intact or nearly intact systems have become very rare or even exceptional. They are composed of a number of communities, which form and occupy the topological features of the bog. These communities are interrelated and function as a unit, so that they cannot be regarded as separate subhabitats; their presence and combination, however, characterize the various types of bogs. Simultaneous use of an appropriate selection of the sub-units below can thus contribute to a description of individual bog systems.

CORINE 52.1: LOWLAND BLANKET BOGS; *Sphagnetalia magellanici*: *Pleurozio purpureae-Ericetum tetralicis*; *Scheuchzerietalia palustris* p., *Caricetalia fuscae* p., *Utricularietalia intermedio-minoris* p., *Littorelletalia*, *Potamogetonetalia*; Hyper-Atlantic blanket bogs of the western coastlands of Ireland, western Scotland and its islands, Cumberland, northern Wales and Devon, developed under very high rainfall climates. The main vascular plants are *Molinia caerulea*, *Eriophorum angustifolium*, *E. vaginatum*, *Scirpus cespitosus*, *Schoenus nigricans*, *Rhynchospora alba*, *Narthecium ossifragum*, *Carex panicea*, *Calluna vulgaris*, *Erica tetralix*, *Myrica gale*, *Pedicularis sylvatica*, *Potentilla erecta*, *Polygala serpyllifolia*, *Pinguicula lusitanica*, *Drosera rotundifolia*. The colourful mucinal layer comprises the black and crimson liverwort *Pleurozia purpurea*, the black and gold moss *Campylopus*

atrovirens, the woolly fringe moss *Rhacomitrium lanuginosum*; it is often dominated by sphagnums (*Sphagnum auriculatum*, *S. magellanicum*, *S. compactum*, *S. papillosum*, *S. nemoreum*, *S. rubellum*, *S. tenellum*, *S. subnitens*), or, particularly in parts of western Ireland, mucilaginous algal deposits (*Zygogonium*). Some of the distinctive features of the blanket bog can be, as in 52.1, individualized by the codes below.

CORINE 52.2: UPLAND BLANKET BOGS; *Sphagnetalia magellanici*: *Vaccinio-Ericetum tetralicis*; *Ericion tetralicis* p., *Scheuchzerietalia palustris* p., *Caricetalia fuscae* p., *Utricularietalia intermedio-minoris* p., *Littorelletalia*, *Potamogetonetalia*; Blanket bogs of high ground, hills and mountains in Scotland, Ireland, western England and Wales. Characteristic species are *Eriophorum vaginatum*, *Calluna vulgaris*, *Erica tetralix*, *Rubus chamaemorus*, *Narthecium ossifragum*, *Scirpus cespitosus*, *Drosera rotundifolia*, *Rhacomitrium lanuginosum* and abundant sphagnum mosses.

brackish macrohabitats: habitat categories where the surface water varies in character from being entirely fresh to partially, or entirely, salt at different stages of the tide or periods of the year.

broad-leaved, evergreen forests: Mediterranean forests dominated by broad-leaved, evergreen trees: CORINE 45.2, 45.3. EUNIS G2.11, EUNIS G2.12.

CORINE 45.2: cork-oak forests: western Mediterranean silicolous forests dominated by *Quercus suber*, usually more thermophile and hygrophile than 45.3.

CORINE 45.3: meso- and supra-Mediterranean holm-oak forests: *Quercion ilicis*; evergreen oak forests dominated by *Quercus ilex* or *Q. rotundifolia*, often, but not necessarily, calcicolous.

broad-leaved, evergreen, matorral, scrub/thickets: evergreen oak and olive/lentisc matorral: CORINE 3211, 3212. EUNIS F5.11, EUNIS F5.12.

CORINE 3211: meso-mediterranean arborescent matorral organised around evergreen oaks; dense, low, coppice-like woods of evergreen oaks (see also under *Quercus ilex* forests).

CORINE 3212: olive/lentisc matorral: thermo-mediterranean arborescent matorral with *Olea europaea* ssp. *sylvestris*, *O. europaea* ssp. *cerasiformis*, *Ceratonia siliqua*, *Pistacia lentiscus*, *P. atlantica* or *Myrrus communis*.

brook, running freshwater: the bottom and aquatic vegetation of small, permanently running, freshwater bodies with a channel sufficiently narrow that the marginal bushes or herb layer vegetation can form a closed canopy above the water. Included in this category are both natural brooks and permanently flowing drainage ditches. See also "brook edge".

brook edge, culture supplementary habitat: the banks and immediate environs of small, freshwater, running water bodies within cultures

brook edge, edge of running freshwater: the banks of small, freshwater, running water bodies, i.e. that part of a brook channel not permanently submerged in water. and its immediate environs.

brook edge in forest, forest supplementary habitat: the banks and immediate environs of small, freshwater, running water bodies within forest.

brook edge in wetland, wetland supplementary habitat: the banks and immediate environs of small, freshwater, running water bodies occurring in wetlands.

brook floodplain, alluvial forest: Ash-Alder woods of brooks and springs

CORINE 44.31: *Carici remotae-Fraxinetum*, *Equiseto telmateiae-Fraxinetum*, *Ribeso sylvestris-Fraxinetum* *Fraxinus excelsior-Alnus glutinosa* formations of springs and small streams of Atlantic, sub-Atlantic and subcontinental middle Europe, with *Carex remota*, *C. pendula*, *C. strigosa*, *Equisetum telmateia*, *Rumex sanguineus*, *Lysimachia nemorum*, *Cardamine amara*, *Chrysosplenium oppositifolium*, *C. alternifolium*, *Impatiens noli-tangere*, *Ribes rubrum*. EUNIS G1.211.

brook/river edge in open, open ground supplementary habitats: the banks and immediate environs of running freshwater bodies in open ground.

calcareous, dry, lowland unimproved grassland: calcareous, unimproved grassland on freely-draining substrates: CORINE 34.2, 34.321. EUNIS E1.B, EUNIS E1.261.

CORINE 34.2: LOWLAND HEAVY METAL GRASSLANDS; 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, boreo-montane or steppic species.

CORINE 34.321: north-western, semi-dry calcareous grasslands; *Mesobromion* grasslands of Denmark and the British Isles (maintained by livestock grazing).

calcareous, montane unimproved grassland: calcareous, montane, unimproved grassland, normally maintained by livestock grazing: CORINE 36.41, 36.51, 38.3. EUNIS E4.41, EUNIS E4.51, EUNIS E2.3.

CORINE 36.41: Rusty sedge meadows and related communities. *Caricion ferrugineae*, *Primulion intricatae*, *Laserpitio-Ranunculion thorae*, *Caricion austroalpinae*, *Armerion cantabricae*. Mesophile, mostly closed, vigorous, often grazed or mowed, grasslands on deep soils of the subalpine and lower alpine levels of the Alps, the Pyrenees and, locally, of the Apennines and the Jura. CORINE 36.51: Subalpine yellow oatgrass hay meadows. *Polygono-Trisetion* p. *Trisetum flavescens*-dominated grasslands of the subalpine level. CORINE 38.3: Mountain hay meadows. *Polygono-Trisetion* (*Trisetum-Polygonion bistorti*). Species-rich mesophile hay meadows of the montane and subalpine levels usually dominated by *Trisetum flavescens* and with *Heracleum spondylium*, *Viola cornuta*, *Astrantia major*, *Carum carvi*, *Crepis mollis*, *C. pyrenaica*, *Polygonum bistorta*, *Silene dioica*, *S. vulgaris*, *Campanula glomerata*, *Salvia pratensis*, *Centaurea nemoralis*, *Anthoxanthum odoratum*, *Crocus albiflorus*, *Geranium phaeum*, *G. sylvaticum*, *Narcissus poeticus*, *Malva moschata*, *Valeriana repens*, *Trollius europaeus*, *Pimpinella major*, *Muscari botryoides*, *Lilium bulbiferum*, *Thlaspi caerulescens*, *Viola tricolor* ssp. *subalpina*, *Phyteuma halleri*, *P. orbiculare*, *Primula elatior*, *Chaerophyllum hirsutum* and many others.

calcareous, subalpine/alpine unimproved grassland: unimproved calciphilous grassland of the subalpine/alpine zone: CORINE 36.42, 36.431, 36.433, 36.434, 36.44. EUNIS E4.42, EUNIS E4.431, EUNIS E4.433, EUNIS E4.434, EUNIS E1.B5.

CORINE 36.42, 36.44: ALPINE AND SUB-ALPINE CALCIPHILOUS GRASSLANDS; *Elyno-Seslerietea*. Alpine and sub-alpine grasslands of base-rich soils with *Dryas octopetala*, *Gentiana nivalis*, *G. campestris*, *Alchemilla hoppeana*, *A. conjuncta*, *A. flabellata*, *Anthyllis vulneraria*, *Astragalus alpinus*, *Aster alpinus*, *Draba azoides*, *Globularia nudicaulis*, *Helianthemum nummularium* ssp. *grandiflorum*, *H. alpestre*, *Pulsatilla alpine* ssp. *alpina*, *Phyteuma orbiculare*, *Astrantia major*, *Polygala alpestris*.

CORINE 36.42: wind-edge naked rush swards; *Oxytropo-Elynon*.

CORINE 36.431: blue moorgrass-evergreen sedge slopes; *Seslerion albicantis* p.

CORINE 36.433: cushion-sedge carpets; *Seslerion caeruleae*: *Caricetum firmae* (*Firmetum*).

CORINE 36.434: *Festuca airoides* grasslands; *Festucion supinae*: *Pumilieto-Festucetorum supinae*, *Luzulo-Festucetum supinae*. Low, fairly dry swards of the alpine zone of the eastern Pyrenees dominated by *Festuca airoides* (*F. supina*).

CORINE 26.44: alpine heavy metal communities; *Violetalia calaminariae*: *Galio anisophylli* - *Minuartion verna* i.a.

calcareous, very dry, lowland unimproved grassland: CORINE 34.326; 34.33. EUNIS E1.266, EUNIS E1.27.

CORINE 34.326 Sub-Mediterranean *Mesobromion*

Closed mesophile grasslands, usually rich in *Bromus erectus* and orchids, of the periphery of the Mediterranean basin in Catalonia, the eastern Pyrenees, the Corbières, the Causses, Provence, the south-western Alps and the northern Apennines.

CORINE 34.33: SUB-ATLANTIC VERY DRY CALCAREOUS GRASSLANDS *Xerobromion* (*Seslerio-Xerobromion*). Xerophile, open formations dominated by perennial, tuft-forming grasses, often rich in chamaephytes, colonizing superficial calcareous soils, often on steep slopes, clifftops or hilltops, in the sub-Atlantic domain of the *Quercion pubescenti-petraeae* and its northern irradiations and in the sub-Mediterranean mountains of the northern Italian peninsula, with *Bromus erectus*, *Sesleria albicans*, *Koeleria vallesiana*, *Melica ciliata*, *Stipa pennata*, *S. bavarica*, *S. capillata*, *S. pulcherrima*, *Phleum phleoides*, *Brachypodium pinnatum*, *Carex humilis*, *Fumana procumbens*, *Globularia punctata*, *Ononis pusilla*, *Helianthemum apenninum*, *H. canum*, *H. nummularium*, *Linum tenuifolium*, *Teucrium chamaedris*, *Allium sphaerocephalon*, *Arabis hirsuta*, *Anthericum liliago*, *Aster linosyris*, *Pulsatilla vulgaris*, *Biscutella laevigata*, *Orobancha teucarii*, *Artemisia alba*, *Sedum album*, *S. acre*, *Acinos arvensis*, *Hippocrepis comosa*, *Sanguisorba minor*, *Potentilla neumanniana*, *Scabiosa*

columbaria, *Astragalus monspessulanus*, *Teucrium pyrenaicum*, *Ononis spinosa*, *O. natrix*.

calc., moraine and scree: moraine and scree derived from calcareous rock and with some pioneer vegetation, including *Drabion hoppeanae*, *Petasition parradoxi*, *Thlaspion rotundifolii* (Delarze et al, 1998), but excluding thermophilous scree.

Caledonian forest, humid *Pinus sylvestris*, coniferous forest: relict, indigenous pine forests of *Pinus sylvestris* var. *scotica*, endemic in the central and north-eastern Grampians and the northern and western Highlands of Scotland. CORINE 42.51. EUNIS G3.41.

These forests frequently have associated *Betula* and *Juniperus*. The species coding for Caledonian forest does not take into account the associated *Betula*. In using the Macrohabitats Table, Caledonian forest sites exhibiting significant quantities of *Betula* should also be regarded as *Betula* forest.

CORINE 42.51: mostly open *Pinus sylvestris* forests with a ground layer rich in ericaceous species and bryophytes, in particular *Hylocomium splendens*, and often harbouring abundant *Deschampsia flexuosa*, *Goodyera repens*, *Listera cordata*, *Corallorhiza trifida*, *Linnaea borealis*, *Trientalis europaea*, *Pyrola minor*, *Moneses uniflora* and *Orthilia secunda*. Accompanying dominant trees are *Sorbus aucuparia*, *Betula pubescens*, *B. pendula*, *Juniperus communis*, *Ilex aquifolium* and *Populus tremula*. (EU Habitats Directive, Natura 2000 code: 91C0).

canal edge, edge of running freshwater: land-water interface of slow-moving artificial waterways, unfaced with stone. CORINE 89.21.

CORINE 89.21: NAVIGABLE CANALS

cane, reed/tall sedge beds: southern European cane beds of temporary water courses and intermittent high ground-water level: CORINE 53.61-62. EUNIS C3.3, EUNIS C3.32.

CORINE 53.61: Ravenna cane communities; Mediterranean tall cane formations of temporary water courses, formed by *Imperata cylindrica*, *Saccharum (Erianthus) ravennae*, *S. strictum*, *Arundo plinii*.

CORINE 53.62: Provence cane beds; very tall formations of the long-introduced *Arundo donax* along water courses.

canopy trees (general), urban park: stands of mature/overmature, European canopy trees, often with ornamental flowers (e.g. *Aesculus*, *Castanea*, *Tilia*), or contrasting growth forms and foliage (e.g. *Cupressus*, *Fraxinus*, *Pinus*, *Populus*, *Taxus*). CORINE 85.11: Park woodlots. EUNIS G5.2 + G5.3 + G5.4 + G5.5.

Castanea forest, dry forest: CORINE 41.9: *Castanea sativa* dominated formations, with stands of overmature, mature and young (saplings/scrub) trees (including the naturalised *Castanea* forests of western Europe). EUNIS G1.7D.

cattle, heavily-grazed improved grassland: cropping of ground vegetation by cattle, resulting in reduction in general sward height to less than 5cm

cereals, crops: monoculturally sown stands of species of *Avena*, *Hordeum*, *Secale*, *Triticum* or *Zea* produced as grain crops and involving seeding into cultivated (or stubble) ground, control of weeds, diseases and pests by chemical, mechanical and/or cultural methods, nutrient application in the form of inorganic fertiliser or organic manures, harvesting at grain maturation **and post-harvest recultivation**.

cliff and rock (gen.): cliffs and expanses of rock, including horizontal surfaces, bare or vegetated, weathered or unweathered.

closed, xeric/semi-arid, unimproved grassland: unimproved dry grassland with a dense sward and no exposed rock/loose stones. CORINE 34.3 (except 34.321). EUNIS E1.1.

CORINE 34.3: DENSE PERENNIAL GRASSLANDS AND MIDDLE EUROPEAN STEPPES; *Festuco-Brometea*; Dry closed thermophilous grasslands of middle European or Mediterranean lowlands and hills, up to the montane zone, dominated by perennial grasses; steppic grasslands of continental middle European affinities.

coastal beach (gen.): CORINE 16.1, 17.1, 17.2, 17.3. EUNIS A2.1, EUNIS B2.1, EUNIS B2.2.

CORINE 16.1: SAND BEACHES: gently sloping sand-covered shorelines fashioned by wave action.

CORINE 17.1: UNVEGETATED SHINGLE BEACHES: Shingle beaches devoid of phanerogamic vegetation. Mediollittoral (intertidal) and supralittoral invertebrate communities can be used to define subdivisions.

CORINE 17.2: SHINGLE BEACH DRIFT LINES; *Cakiletea maritima* p.; Formations of annuals occupying accumulations of drift material and gravels rich in nitrogenous organic matter; characteristic are *Cakile maritima*, *Salsola kali*, *Atriplex* spp. (particularly *A. glabriuscula*), *Polygonum* spp., *Euphorbia peplis*, *Mertensia maritima*, *Glaucium flavum*, *Matthiola sinuata*.

CORINE 17.3: SEA KALE COMMUNITIES; *Honkenyo-Crambion*; Halo-nitrophilous perennial vegetation of the upper beach formed by *Crambe maritima*, *Honkenya peploides* and species characteristic of the regional communities as indicated below.

coastal beaches and dunes (gen.): CORINE 16, 17.1, 17.2, 17.3, 1A, with the exclusion of all mediterranean, iberian and canarian communities. EUNIS B1, EUNIS A2.1, EUNIS B2.1, EUNIS B2.2, EUNIS B1.9.

CORINE 16: COASTAL SAND-DUNES AND SAND BEACHES; sand-covered shorelines in general, but in particular, onshore areas of sand created by the action of wind and often colonized and stabilized by communities of coarse maritime grasses.

CORINE 17.1: UNVEGETATED SHINGLE BEACHES: Shingle beaches devoid of phanerogamic vegetation. Mediollittoral (intertidal) and supralittoral invertebrate communities can be used to define subdivisions.

CORINE 17.2: SHINGLE BEACH DRIFT LINES; *Cakiletea maritima* p.; Formations of annuals occupying accumulations of drift material and gravels rich in nitrogenous organic matter; characteristic are *Cakile maritima*, *Salsola kali*, *Atriplex* spp. (particularly *A. glabriuscula*), *Polygonum* spp., *Euphorbia peplis*, *Mertensia maritima*, *Glaucium flavum*, *Matthiola sinuata*.

CORINE 17.3: SEA KALE COMMUNITIES; *Honkenyo-Crambion*; Halo-nitrophilous perennial vegetation of the upper beach formed by *Crambe maritima*, *Honkenya peploides* and species characteristic of the regional communities as indicated below.

CORINE 1 A: MACHAIR: Plains behind dunes especially characteristic of the western seaboard of the Outer Hebrides. Wind-blown calcareous sands deposited on peat 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*, *Thymus drucei*, *Bellis perennis*, *Prunella vulgaris*, *Erodium cicutarium*, *Tripolium* spp., *Euphrasia* spp. and many orchids, among which *Dactylorhiza fuchsii* spp. *hebridensis*, *D. 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* spp. *hebridensis* are endemic. Other elements of the ecosystem, such as pools and fallow fields, can be noted by addition of codes from other units (22, 16.2, 34, 37, 53, 54, 82, 87). 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 European population of the threatened corncrake *Crex crex*.

coastal dunes (gen.): CORINE 16.2, 16.3, 1A, with the exclusion of all Mediterranean, Iberian and Canarian communities. EUNIS B1.3 to EUNIS B1.9.

CORINE 16.2: DUNES; onshore wind-carried sand deposits arranged in cordons of ridges parallel to the coast.

CORINE 16.3: HUMID DUNE-SLACKS; humid depressions of the dunal systems. The most important habitats are included in the following units. If the divisions proposed are not sufficient, appropriate codes from 22.4, 22.3, 54.2, 54.4, 53 can be used in conjunction with them. Humid dune-slacks are extremely rich and specialized habitats very threatened by the lowering of water tables.

CORINE 1 A: MACHAIR; plains behind dunes especially characteristic of the western seaboard of the Outer Hebrides. Wind-blown calcareous sands deposited on peat 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*, *Thymus drucei*, *Bellis perennis*, *Prunella vulgaris*, *Erodium cicutarium*, *Tripolium* spp., *Euphrasia* spp. and many orchids, among which *Dactylorhiza fuchsii* spp. *hebridensis*, *D. 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* spp. *hebridensis* are endemic. Other elements of the ecosystem, such as pools and fallow fields, can be noted by

addition of codes from other units (22, 16.2, 34, 37, 53, 54, 82, 87). 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 European population of the threatened corncrake *Crex crex*).

compost heap, urban park: stored accumulations of rotting debris of herbaceous vegetation resultant from management operations, including grass cuttings and fallen leaves.

coniferous forest (gen.): forest and woodland of native coniferous trees other than floodplain and mire woods and with stands of overmature, mature and young (saplings/scrub) trees; formations dominated by coniferous trees, but including broad-leaved evergreen trees, are included. CORINE 42. EUNIS G3. CORINE 42: CONIFEROUS WOODLANDS; forests and woodlands of native coniferous trees other than floodplain and mire woods; formations dominated by coniferous trees, but comprising broad-leaved evergreen trees, are included.

conifer plantation (gen.): planted, uniformly-aged, usually single-species stands of coniferous trees. CORINE 83.31. EUNIS G3.F.
CORINE 83.31: CONIFER PLANTATIONS

conifers, scattered trees in open ground: see scattered trees in open ground (gen.).

continental salt meadow, saltmarsh: continental salt meadows belonging phytosociologically to the order *Puccinellietalia distantis*. CORINE 15.4. EUNIS D6.1.

CORINE 15.4: CONTINENTAL SALT MEADOWS; *Puccinellietalia distantis*; Salt meadows of salt basins of interior middle Europe. Continental saltmarshes are remarkable, extremely threatened communities occurring in a few isolated stations of Saxony and Lower Saxony, Schleswig-Holstein, Thuringe, Hesse, Lorraine, Auvergne and the Midlands. They comprise this unit and continental glasswort swards (15.112). Habitats Directive, Natura 2000 code: 1340.

corine: the CORINE "habitats" classification system; a hierarchical, numerical categorisation of "habitat" categories, each of which is defined in the "CORINE Biotopes Manual, Data specifications", Part 2, published by the Office for Official publications of the European Communities, 1991. (ISBN 92-826-3211-3). Most CORINE "habitat" categories are defined entirely in terms of flowering-plant communities. Macrohabitat categories which co-incide with numbered CORINE "habitat" categories have their corresponding CORINE code numbers given in this glossary, followed, word for word, by the definitions of those CORINE categories as provided in the CORINE Biotopes Manual mentioned above. The references provided in the CORINE Biotopes Manual, to published sources of information on the different CORINE categories, are not included here. A French language version of the CORINE Biotopes Manual, restricted in its coverage to the CORINE habitat types known to occur in France, is also available- see Bissardon and Guibal (1998). The extension of the CORINE system to cover most of Europe has been achieved through the EUNIS system, into which CORINE is now incorporated. References made to northern European categories here follow Romau (1996).

Corylus thickets, Atlantic scrub: thickets of *Corylus avellanae*. CORINE 31.8C. EUNIS D6.1.

cow dung, forest, open ground and wetland supplementary habitat: dung of cows/cattle, produced in situ, by grazing livestock (this does not include manure, imported from elsewhere and spread mechanically, as fertiliser).

crop (gen.): CORINE 82: Crops; fields of cereals, beets, sunflowers, leguminous fodder, potatoes and other annually harvested plants. Faunal and floral quality and diversity depend on the intensity of agricultural use. If a tree layer is present, it can be indicated by simultaneous use of a code of 83 or 84 with the present one. EUNIS I1.

culture macrohabitats: anthropogenic landscape features. CORINE 8. EUNIS I and J.
CORINE 8: Cultivated or built-up areas under the overwhelming influence of human activity; the natural vegetation cover has been totally replaced as a result of agricultural practices, urbanisation or industrialisation. A natural flora and fauna subsists mainly in areas of extensive and traditional

cultivation and dwelling. Wild plants may grow among crops, in hedges, along roads, on walls and in fallow fields.

cut flower meadow, urban parks: flowering meadow mechanically cut once each year, in the autumn.

cutover bog, bog: areas of valley bog (raised bog) or blanket bog which have been exploited for peat-cutting in the past, leaving an uneven and lowered land surface incorporating pools, regenerating bog and (usually) patches of birch/willow (*Betula/Salix*) scrub.

Cytisus thickets, Atlantic/Medio-European thickets: CORINE 31.841: MEDIO-EUROPEAN BROOM FIELDS; *Sarrothamnus scoparii* (*Pruno-Rubion-fruticosi*: *Sarrothamnion*).

deciduous forests(gen.): natural/semi-natural tree formations of deciduous species, with stands of overmature, mature and young (saplings/scrub) trees.

deciduous (gen), mature canopy trees, urban parks: stands of mature European deciduous trees (e.g. *Acer*, *Aesculus*, *Castanea*, *Fagus*, *Fraxinus*, *Populus*, *Quercus*).

deciduous plantations (gen.): planted areas of deciduous trees, usually of uniform age and single species. CORINE 83.32. EUNIS G1.C.
CORINE 83.32: PLANTATIONS OF BROAD-LEAVES TREES.

deciduous trees, scattered trees in open ground: see scattered trees in open ground (gen.).

Dehesa (general): EUNIS E7.3

Characteristic savanna landscapes of the Iberian peninsula in which crops, pasture land and Mediterranean scrub occur in combination with an open canopy of native oaks: *Quercus suber*, *Quercus rotundifolia*, *Quercus pyrenaica*, *Quercus faginea*. The savanna character of these landscapes has been maintained by a combination of aridity/geological factors and man's management. Dehesa is an important habitat of raptors, including the threatened Iberian endemic eagle *Aquila adalberti*, of the crane *Grus grus*, of saproxylic insects and of the endangered Iberian lynx, *Lynx pardinus*.

drainage ditch, culture supplementary habitat: intermittently-flooded, man-made drainage channels dug in cultures.

drainage ditch along trackside in plantation, forest supplementary habitat: intermittently-flooded, man-made drainage channel dug alongside a track in a plantation of conifers or deciduous trees.

drainage ditch in forest, forest supplementary habitat: intermittently-flooded, man-made drainage channels dug in forest or plantation.

drainage/irrigation ditch in open, open ground supplementary habitats: intermittently-flooded, man-made drainage or irrigation channels dug in open ground.

drainage ditch in wetland, wetland supplementary habitat: intermittently-flooded, man-made drainage channels dug in wetlands.

dry (gen.), deciduous forests: dry forest formations, with stands of overmature, mature and young (saplings/scrub) trees, belonging to the phytosociological units of thermophilous mixed oak woods, *Quercetalia pubescentis-petraeae*. CORINE 41.7. EUNIS G1.7
CORINE 41.7: THERMOPHILOUS AND SUPRA-MEDITERRANEAN OAK WOODS; *Quercetalia pubescenti-petraeae*; forests or woods of sub-Mediterranean climate regions and supra-Mediterranean altitudinal levels, dominated by deciduous or semi-deciduous thermophilous oak species; they may, under local microclimatic or edaphic conditions, replace the evergreen oak forests in meso-Mediterranean or thermo-Mediterranean areas, and radiate far north into medio-European or sub-Atlantic regions.

dry (general), lowland unimproved grassland: lowland unimproved grassland usually maintained by management (grazing by livestock), on freely-draining substrates: CORINE 34.2, 34.321-23. EUNIS E1.B, EUNIS E1.261, EUNIS E1.262, EUNIS E1.263.

CORINE 34.2: Lowland heavy-metal grasslands.

CORINE 34.321: North-western semi-dry calcareous grasslands *Mesobromion* grasslands of Denmark and the British Isles.

CORINE 34.322: Middle European *Bromus erectus* semi-dry grasslands

Mesophile and meso-xerophile calcareous grasslands of the sub-Atlantic domain in the Low Countries, Germany, northern, central and western France and north-western Spain. They are faunistically and floristically rich and the highly discontinuous nature of their distribution gives rise to a considerable geographical variation in the composition of plant communities, marked by the occurrence of numerous species of local or disjunct occurrence in addition to the basic cortège common to most of them. Besides this geographical variation, the nature of these grasslands also depends, to a great extent, on hydrology, substrate characteristics and agro-pastoral treatment, notably on whether they are mowed or grazed and how intensively. In particular, the relative abundance of the main constituent grass species, *Bromus erectus*, *Brachypodium pinnatum* s.l., *Sesleria albicans* and *Koeleria pyramidata* varies both geographically with climatic conditions and locally with topography and agro-pastoral regime.

CORINE 34.323: Middle European *Brachypodium*-dominated semi-dry grasslands

Brachypodium pinnatum ssp. *pinnatum* or *B. pinnatum* ssp. *rupestre* faciès of 34.322. *Brachypodium*-dominated faciès may form in all the regional types of grasslands inventoried in CORINE 34.322 as a result of nitrification or of dominance of grazing over mowing. Such processes are accompanied by a drastic reduction in species diversity. South-western grasslands are, however, generally rich in *Brachypodium* even in the apparent absence of degradation.

dry *Pinus sylvestris* (gen.), coniferous forests: dry coniferous forests dominated by scots pine (*Pinus sylvestris*), with stands of overmature, mature and young (saplings/scrub) trees. CORINE 42.52. EUNIS G3.42.

CORINE 42.52: MIDDLE EUROPEAN SCOTS PINE FORESTS; indigenous *Pinus sylvestris* forests of the lowlands of northern and middle Europe and of the mountain level of the central Europe hercynian ranges.

dry, scrub/thickets: CORINE 31.81. EUNIS F3.11.

CORINE 31.81: MEDIO-EUROPEAN RICH-SOIL THICKETS; *Prunetalia: Pruno-Rubion fruticosi* p., *Berberidion*; thickets of *Prunus spinosa*, *P. mahaleb*, *Rosa* spp. *Cornus mas*, *C. sanguinea*, *Sorbus aria*, *Crataegus* spp., *Lonicera xylosteum*, *Rhamnus catharticus*, *R. alpinus*, *Clematis vitalba*, *Ligustrum vulgare*, *Viburnum lantana*, *V. opulus*, *Rubus* spp., *Amelanchier ovalis*, *Cotoneaster integerrimus*, *C. nebrodensis*, *Pyrus pyraster*, *Malus sylvestris*, *Euenymus europaeus*, *Corylus avellana*, *Ulmus minor*, *Acer campestre*, *A. monspessulanum*, *Carpinus betulus* characteristic of forest edges, hedges and (mostly *Carpinion* or *Quercion pubescenti-petraeae*) woodland recolonisation, developed on soils relatively rich in nutrients, neutral or calcareous.

dune slack, coastal dunes: CORINE 16.3. EUNIS B1.8.

CORINE 16.3: HUMID DUNE-SLACKS; humid depressions of the dunal systems. The most important habitats are included in the following units. If the divisions proposed are not sufficient, appropriate codes from 22.4, 22.3, 54.2, 54.4, 53 can be used in conjunction with them. Humid dune-slacks are extremely rich and specialized habitats very threatened by the lowering of water tables.

dwarf *Betula*/*Salix* scrub, tundra: dwarf birch (*Betula nana*) and willow (*Salix glauca*, *S. lanata*) scrub, with a ground vegetation of *Arctostaphylos* spp., *Phyllodoce*, *Rubus chamaemorus* and *Vaccinium* spp., developed on mineral-poor soils.

dwarf-heath, tundra: stunted and creeping shrub formations (rarely more than 25cm. high). On sandy soils ericaceous species (e.g. *Arctostaphylos*, *Phyllodoce*, *Rhododendron*, *Vaccinium*) often predominate, together with dwarf *Salix* (*S. glauca*, *S. lanata*), cloud berry (*Rubus chamaemorus*) and stone bramble (*Rubus saxatile*). On neutral, or alkaline soils *Dryas* heaths are characteristic, with a more diverse ground flora, including such species as *Draba nivalis*, *Potentilla nivea*, *Campanula uniflora* and *Arnica alpina*.

Eastern Med. maquis: CORINE 32.313, Eastern Mediterranean maquis of Greece and the Balkan peninsula, with *Erica arborea*, *Arbutus unedo*, *Arbutus andrachne*, *Myrtus communis*, *Pistacia*

terebinthus, *Phillyrea latifolia*, *Juniperus oxycedrus*, *Quercus coccifera*, *Quercus ilex*. EUNIS F5.213.

Eastern thermophilous Quercus forest, deciduous forest: thermophilous oak forests of the eastern Mediterranean, with stands of overmature, mature and young (saplings/scrub) trees. This category includes both forests in which *Q.pubescens* is dominant (CORINE 41.73) and those (CORINE 41.76) where other oaks, e.g. *Q.frainetto* are more prevalent, because these forest types can occur so interdigitated as to be impractical to separate. EUNIS G1.73, EUNIS G1.76.

CORINE 41.73: EASTERN WHITE OAK WOODS, *Ostryo-Carpinion* p., *Cyclamico-Quercion brachyphyllae* p. Often varied forests of the supra-Mediterranean (mostly lower supra-Mediterranean) and occasionally meso- or thermo-Mediterranean, levels of Greece and Italy, in which *Quercus pubescens* or its allies are the dominant deciduous oaks, usually associated with *Ostrya carpinifolia*, *Carpinus orientalis*, *C.betulus*, *Fraxinus ornus* and other species.

CORINE 41.76: BALKANIC THERMOPHILOUS OAK WOODS, *Quercion frainetto*; *Q.frainetto*, *Q.cerris* and other deciduous oak forests of the supra-Mediterranean level of continental Greece, except the extreme south.

edge, perm. pool, culture supplementary habitat: the land/water ecotone of small, permanently flooded, standing-water bodies in cultures (including man-made ponds).

edge, perm. pool in open ground, open ground supplementary habitats: the land/water ecotone of small, permanently flooded, standing-water bodies in open ground.

edge, perm. pool in wetland, wetland supplementary habitat: the land/water ecotone of small, permanently flooded, standing-water bodies in wetlands.

edge, perm. pool under canopy, forest supplementary habitat: the land/water ecotone of small, permanently flooded, standing-water bodies in forests, overshadowed by the tree canopy.

eutrophic/mesotrophic, humid, lowland unimproved grassland . CORINE 37.21, CORINE 37.22, CORINE 37.24. EUNIS E3.41, EUNIS E3.42, EUNIS E3.44.

CORINE 37.21: ATLANTIC AND SUB-ATLANTIC HUMID MEADOWS; *Calthion palustris*, *Bromion racemosi*, *Deschampsion cespitosae*; lightly managed hay meadows and pastures on both basocline and acidocline, nutrient-rich soils of middle European lowlands, hills and low mountains under Atlantic or sub-Atlantic climatic conditions. Among the characteristic plant components of the highly diverse communities forming this unit are *Caltha palustris*, *Cirsium palustre*, *C. rivularis*, *C. oleraceum*, *Epilobium parviflorum*, *Lychnis flos-cuculi*, *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*, *Myosotis palustris*, *Deschampsia cespitosa*, *Angelica sylvestris*, *Oenanthe silaifolia*, *Gratiola officinalis*, *Inula salicina*, *Succisella inflexa*, *Dactylorhiza majalis*, *Ranunculus acris*, *Rumer acetosa*, *Holcus lanatus*, *Alopecurus pratensis*, *Festuca pratensis*, *Juncus effusus*, *J.fliformis*.

CORINE 37.22: SHARP-FLOWERED RUSH MEADOWS; *Juncion acutiflori*; Humid meadows dominated by, or rich in, *Juncus acutiflorus*. They are floristically and phytosociologically very varied and many are as related to the oligotrophic *Molinion* communities of 37.3 as to the more eutrophic *Calthion* ones of 37.2. Sharp-flowered rush meadows are particularly characteristic of the oceanic and sub-oceanic regions to the western seaboard of Europe from north-western Iberia to the Low Countries. CORINE 37.24: FLOOD SWARDS AND RELATED COMMUNITIES; *Agropyro-Rumicion crisp* p.; grasslands of occasionally flooded river and lake banks, of depressions where rain water collects, of disturbed humid areas and of pastures submitted to intensive grazing.

Fagus (gen.), deciduous forests: beech (*Fagus*) forests, with stands of overmature, mature and young (saplings/scrub) trees. CORINE 41.1. EUNIS E3.41, EUNIS E3.42, EUNIS E3.44.

CORINE 41.1: BEECH FORESTS; forests dominated by *Fagus sylvatica* or, in Greece, *F.orientalis* or *F.moesica*. Many montane formations are beech-fir or beech-fir-spruce forests, to be noted as 43 (mixed forests), but with the suffixes below; they are discussed with the corresponding deciduous forests.

Fagus, overmature canopy trees, urban parks: ten or more overmature trees of *Fagus*.

Fagus, scattered trees in open ground: see scattered trees in open ground (gen.).

fallow, culture macrohabitat: farmland in its first year (or at most second year) after cultivation that has been left unsown with any crop (including grass-crops) for the duration of at least one growing season. Fallowing is normally carried out as part of an arable rotation system and as defined here includes unsown "setaside" land (employed within the EU as a standard mechanism for crop production control).

farmyard organic waste, culture macrohabitat: accumulations of solid farmyard livestock waste (manure) and/or seepages of either slurry (liquid livestock waste) or silage (preserved grassland vegetation) from holding facilities

fen (gen.), wetlands: peatlands in which the ground surface is permanently water-logged and subject to periodic flooding by groundwater, rather than rain water.

fen carr: *Salix* dominated formations of fen and transition mire: CORINE 44.92. EUNIS F9.2.

This same CORINE category is used to define "Salix swamp woods" in this database. There are significant differences between the habitats represented in *Salix* woods on fen and along lake shores, this being the reason for separating the two situations here. CORINE does not distinguish between these situations.

CORINE 44.92: MIRE WILLOW SCRUB; *Salicion cinereae* (*Frangulo-Salicion auritae*); willow-dominated formations with *Salix aurita*, *S. cinerea*, *S. atrocinerea*, *S. pentandra*, *Frangula alnus*, *Betula humilis*, of fens, marshy floodplains and fringes of lakes and ponds.

field margin/hedge bank (general): uncultivated, linear strip of land along the boundary of a cropland or intensive grassland, that has been in place for at least 5 years, is at least 1.5m wide and covered in herbaceous vegetation in which grasses predominate. Coding of this habitat category assumes there is an electric fence separating the field margin from the field itself, in fields used for stock grazing. There is otherwise no definable field margin in fields used for stock grazing (field margins that have been in place for less than 5 years are treated under setaside).

flooded, *Populus*, deciduous plantations: *Populus* plantations subject to periodic flooding

flooded, *Salix*, deciduous plantations: *Salix* plantations subject to periodic flooding

flower bed (general), urban park: area of rotovated, or otherwise maintained bare ground, or area of natural or introduced bare rock (when constructed, rather than natural, normally composed of large stones/boulders grouped or cemented together), planted with herbaceous plants with decorative flowers or foliage or with small shrubs. CORINE 85.14: Park flower beds, arbors and shrubbery.

flower meadow, urban parks: open grassy areas cut mechanically once each autumn to sustain flowering plants of lowland hay meadow, based on either existing unimproved/improved grassland areas or modified (e.g. nutrient-deprived by topsoil stripping) lawn areas resown with flowering meadow seed mixes.

flush in forest, forest supplementary habitat: helocrene water sources emerging on the forest floor.

flush in open, open ground supplementary habitats: helocrene water sources emerging in open ground.

flush in wetland: helocrene water sources emerging in wetlands.

Forest macrohabitats: natural or semi-natural formations of trees, incorporating stands of overmature, mature and young (saplings/scrub) trees, used in contradistinction to plantations, hedges and scattered trees.

Fraxinus, deciduous plantations: mature plantations of *Fraxinus*. CORINE 83.325: OTHER BROAD-LEAVED TREE PLANTATIONS. EUNIS G1.C4.

Fraxinus (gen.), deciduous forests: ash (*Fraxinus*) forests, with stands of overmature, mature and young (saplings/scrub) trees. CORINE 41.3. EUNIS G1.A2.

CORINE 41.3: ASH FORESTS; *Carpinion betuli* (*Fraxino-Carpinion*): *Corylo-Fraxinetum p.*, *Polysticho setiferi-Fraxinetum excelsioris p.*, *Mercurialidi perennis-Fraxinetum excelsioris p.*, *Isopyro-Quercetum roboris*, *Adoxo-Aceretum*; Non-alluvial Atlantic or sub-Atlantic forests dominated by *Fraxinus excelsior*, particularly characteristic of Britain, of the north-western Iberian peninsula and of the Baltic moraine hills of Mecklenburg. Secondary formations pioneering on abandoned cultivated land (e.g. Belgian Condroz) are included.

Fraxinus, overmature canopy trees, urban parks: ten or more overmature trees of *Fraxinus*.

Fraxinus, scattered trees in open ground: see scattered trees in open ground (gen.).

freshwater macrohabitats: bodies of running or standing freshwater, permanent or temporary, large or small.

garden, ornamental, culture macrohabitats: plots of land, usually urban/suburban, attached to residential dwellings, or maintained by public authorities etc, planted with a miscellany of indigenous and exotic flowering plants, shrubs and trees for recreation, rather than for food production or forestry purposes.

CORINE 85.31: ORNAMENTAL GARDENS. EUNIS I2.21.

garrigue, scrub/thickets: shrubby formations of the Mediterranean zone, often formed as a degradation stage of thermophile deciduous forests: CORINE 32.4, 32.5, 32.6. EUNIS F6.1, EUNIS F6.2, EUNIS F6.6.

CORINE 32.4: WESTERN MESO-MEDITERRANEAN CALCICOLOIJS GARRIGUES

Rosmarinetalia: *Rosmarino-Ericion*, *Aphyllanthion p.*

Shrubby formations, often low, on mostly calcareous soils of the meso- Mediterranean zone of the Iberian peninsula, France, Italy and the large western Mediterranean islands. Included here are those formations that reach their optimal development within the meso-Mediterranean zone although they often enter the thermo- or supra-Mediterranean levels..

CORINE 32.5: EASTERN GARRIGUES *Micromerietea p.*

Shrubby formations, often low, of the meso-, thermo- and occasionally supra-Mediterranean zones of Greece. Included here are all sclerophyllous formations, regardless of substrate, except those with conspicuous cushion structure (*phryganas s.s.*, listed in 33, and hedgehog-heaths, listed in 31.7), those with abundant *Pistacia lentiscus*, *Myrtus communis* or other thermo-Mediterranean brush elements (*Phillyrea spp.*, *Erica manipulifloru*, *Styrax officinalis*, *Genista fasselata*, *Euphorbia dendroides*, *Calicotome vil/osa*, *Sarcopoterium spinosum*) listed in 32.2 and high maquis with *Erica arborea* and *Arbutus spp.*, listed in 32.3.

CORINE 32.6: SUPRA-MEDITERRANEAN GARRIGUES

Ononidion striatae p. *Aphyllanthion p.*, *Lavandulo-Genistion boissieri*

Low shrub formations with pronounced Mediterranean affinities formed as a degradation stage of thermophile deciduous forests (*Quercion pubeccentis*, *Ostryo-Carpinion*) or sometimes of *Quercus rotundifolia* forests in the supra-Mediterranean belt. Included here are only those formations that are characteristic of the supra-Mediterranean level; formations, particularly of the lower supra-Mediterranean that are closely related to meso-Mediterranean communities have been included under 32.4 and 32.5.

grassland (gen.): sparsely to densely-vegetated open ground over which grasses are a dominant component, whether natural (climatic or physiographic) or maintained primarily by the action of grazing animals, domestic or wild, or by mechanical harvesting regimes.

grassy clearing/tracksides, forest supplementary habitat: open areas within forest carrying a grassy herb layer vegetation which cannot survive under closed canopy conditions, with or without some shrub vegetation (e.g. *Rubus fruticosus*, *Prunus spinosus*, *Corylus*) and often with patches of bare ground. This category may contain elements of CORINE category 31.87 but tends to be less transitory, being largely maintained by grazing. It may also occur in conjunction with elements of CORINE category 34.4 (thermophilous forest fringes).

grey dunes/dune scrub, coastal dunes: fixed dunes, with the exclusion of all mediterranean, iberian and canarian communities. CORINE 16.22, 16.25. EUNIS B1.4, EUNIS B1.6.

CORINE 16.22: GREY DUNES; fixed dunes, stabilised and colonized by more or less closed perennial grasslands. Habitats Directive, Natura 2000 code: 2130.

CORINE 16.25: DUNE THICKETS; *Prunetalia spinosae* p. (*Ligustro-Hippophaeion rhamnoidis*, *Lonicerion periclymeni*, *Pruno-Rubion ulmifolii* p., *Sambuco-Berberidion*); Dense formations of large shrubs including sea-buckthorn, privet, elder, willow, gorse or broom, often festooned with creepers such as honeysuckle (*Lonicera*) or white bryony. Codes of 31.8 can be used, in addition to 16.252, to specify the habitat.

hardwood (gen.), alluvial forests: lower and higher zones of hardwood forests with stands of overmature, mature and young (saplings/scrub) trees, of the formations *Pruno-Fraxinetum* and *Ulmo-Fraxinetum* on the floodplains of great rivers. CORINE 44.33, 44.4. EUNIS G1.213, EUNIS G1.22.

CORINE 44.33: ASH-ALDER WOODS OF SLOW RIVERS; *Pruno-Fraxinetum*, *Ulmo-Fraxinetum*; central, and locally western, European woods of large valleys of lowland slow and even-flowing rivers, with *Fraxinus excelsior*, *Alnus glutinosa*, *Prunus padus*, *Ulmus laevis*, *Quercus robur*, *Humulus lupulus*, *Rubus idaeus*, *R. caesius*, *Ribes nigrum*, *R. rubrum*, *Sambucus nigra*, *Aegopodium podagraria*, *Peucedanum palustre*, *Glyceria maxima*, *Iris pseudacorus*, *Carex acutiformis*, *C. riparia*, *Phalaris arundinacea*, *Filipendula ulmaria*, *Cirsium oleraceum*, *C. palustre*.

CORINE 44.4: MIXED OAK-ELM-ASH FORESTS OF GREAT RIVERS; *Ulmion minoris*; diverse riparian forests of the middle courses of great rivers, inundated only by large floods.

hay, improved grassland: CORINE 38.2. EUNIS E2.2.

Lowland hay meadows. Improved grassland where the vegetation is mechanically cut when leaf growth has finished and flowering of the dominant grasses is occurring (but before seed formation), followed by in-situ drying of the cut crop and its subsequent removal once dry.

CORINE 38.2: Mesophile hay meadows of low altitudes, fertilised and well-drained, with *Arrhenatherum elatius*, *Trisetum flavescens*, *Anthriscus sylvestris*, *Heracleum sphondylium*, *Daucus carota*, *Crepis biennis*, *Knautia arvensis*, *Luecanthemum vulgare*, *Pimpinella major*, *Trifolium dubium*, *Geranium pratense*; they are most characteristic of the Euro-Siberian zone, but extend to Atlantic Iberia, the Cordillera Central and Montseny, to the Apennines and to the supra-Mediterranean zone of Greece.

heath: CORINE 31.22, 31.23, 31.4 with the exclusion of all mediterranean and iberian communities. EUNIS F4.22, EUNIS F4.23, EUNIS F2.2.

CORINE 31.22: SUB-ATLANTIC *CALLUNA-GENISTA* HEATHS; *Calluno-Genistion pilosae* p.; Low *Calluna* heaths often rich in *Genista*, mostly of the North Sea lowlands. Similar formations occurring in British upland areas, montane zones of high mountains of the western Mediterranean basin and high rainfall influenced Adriatic areas are most conveniently listed here.

CORINE 31.23: ATLANTIC *ERICA-ULEX* HEATHS; *Ulicenion minoris*; *Daboecenion cantabricae* p.; *Ulicion maritimae*; heaths rich in gorse (*Ulex*) of Atlantic margins.

CORINE 31.4: small, dwarf or prostrate shrub formations of the alpine and subalpine belts, dominated by ericaceous species, *Dryas* or dwarf junipers. Habitats Directive: Natura 2000 code: 4060.

hedge, culture macrohabitats: linear strips of deciduous trees and/or shrubs, planted along field edges, roadsides etc., frequently spinose (e.g. *Crataegus*, *Prunus spinosus*) and maintained, usually by mechanical cutting, to regulate height and width, so forming a dense and continuous band of woody vegetation a few metres high, with an associated herb layer and, frequently, isolated, emergent trees at irregular intervals.

CORINE 84.2: HEDGEROWS. EUNIS FA.

Hedgehog heath, heath.

CORINE 31.7: primary cushion heaths of the high, dry mountains of the Mediterranean region, with low, cushion-forming, often spiny shrubs, such as *Acantholimon*, *Astragalus*, *Erinacea*, *Vella*, *Bupleuron*, *Ptilotrichum*, *Genista*, *Echinopartum*, *Anthyllis* and various composites and labiates; secondary, zoogenic cushion heaths of the same regions, either downslope extensions of the oro-Mediterranean formations, and dominated by the same species, or specifically montane, often *Genista*-dominated. EUNIS F7.

hedge plus field margin, culture macrohabitats: a hedge occurring together with a field margin (see definitions for hedge and field margin)

helocrene, spring/flush: groundwater outflows emerging over a diffuse area to produce seepages or flushes.

high maquis, maquis, scrub/thickets: western mediterranean high maquis: CORINE 32311. EUNIS F5.211.

CORINE 32311: *Ericenion arboreae: Phillyrea angustifoliae-Arbutetum unedi, Phillyrea rodriguezi-Arbutetum unedi, Erica arboreae-Arbutetum unedi*. Formations with *Erica arborea, Arbutus unedo, Quercus ilex, Phillyrea angustifolia, P.media, Viburnum tinus, Rhamnus alaternus, Juniperus oxycedrus, Fraxinus ornus*.

humid *Fagus* (beech) forest: CORINE 41.11, 41.12, 41.13, 41.15, except 41.122. EUNIS G1.61, EUNIS G1.62, EUNIS G1.63, EUNIS G1.65.

Forests dominated by *Fagus sylvatica*. Many montane formations are beech-fir or beech-fir-spruce (*Fagus/Abies/Picea*) forests, noted in the CORINE system as category 43 (mixed forests), which is not used in the Macrohabitats file. Syrphids associated with *Fagus* in montane mixed forests are treated under the humid *Fagus* forest category. Syrphids associated with *Abies* or *Picea* in montane mixed forests are treated under the *Abies/Picea* forest category. Syrphids that may occur in association with *Fagus* or *Abies/Picea* in montane mixed forests are treated under both humid *Fagus* and *Abies/Picea* forest categories.

CORINE 41.11: CENTRAL EUROPEAN ACIDOPHILOUS BEECH FORESTS WITH WOODRUSH; *Luzulo-Fagenion*. Medio-European beech and, in higher mountains, beech-fir or beech-fir-spruce forests on acid soils, with *Luzula luzuloides, Polytrichum formosum*, and often *Deschampsia flexuosa, Vaccinium myrtillus, Pteridium aquilinum*.

CORINE 41.12: ATLANTIC ACIDOPHILOUS BEECH FORESTS, *Ilici-Fagenion*. Atlantic forests on acid soils, differing from 41.11 by the absence of *Luzula luzuloides* and a greater abundance of *Ilex aquifolium*.

CORINE 41.13: NEUTROPHILOUS BEECH FORESTS, *Asperulo-Fagenion*. Medio-European and Atlantic forests, on neutral or near-neutral soils, with mull humus, characterised by a strong representation of species belonging to the ecological groups of *Anemone nemorosa*, of *Lamium galeobdolon*, of *Galium odoratum* and *Melica uniflora* and, in mountains, various *Dentaria*, forming a richer and more abundant herb layer than in 41.11 and 41.12.

CORINE 41.15: SUBALPINE BEECH WOODS, *Aceri-Fagenion*. Woods usually composed of low, low-branching trees, with much *Acer pseudoplatanus*, situated near the tree limit, mostly in low mountains with oceanic climate (Vosges, Schwarzwald, Rhön, Jura, outer Alps, Massif Central, Pyrenees). The herb layer is similar to that of 41.13 or locally 41.11 and with elements of adjacent open grasslands.

humid (general), lowland unimproved grassland. Humid, lowland unimproved grasslands not normally subject to flooding (though temporary pools may be present at times of high rainfall and temporary seepages and streams can occur during periods of high groundwater levels). This category overlaps with the alluvial, lowland, unimproved grassland category and shares with it several (CORINE 37.21, 22, 24) grassland types.

humid/mesophilous (gen.), deciduous forests: acidophilous/mesophilous beech forests (*Eu-Fagion* - CORINE 41.1) including Central European acidophilous beech forest with woodrush (*Luzulo-Fagenion* - CORINE 41.11); humid types of oak-hornbeam forests (*Carpinion betuli* - CORINE 41.2) and in particular ash forest dominated by *Fraxinus excelsior* (CORINE 41.3) and humid/ mesophilous acidophilous oak forest (*Quercus robori-petraeae* - CORINE 41.5), all with stands of overmature, mature and young (saplings/scrub) trees.

CORINE 41.1: BEECH FORESTS; forests dominated by *Fagus sylvatica* or, in Greece, *F.orientalis* or *F.moesica*. Many montane formations are beech-fir or beech-fir-spruce forests, to be noted as 43 (mixed forests), but with the suffixes below; they are discussed with the corresponding deciduous forests.

CORINE 41.11: CENTRAL EUROPEAN ACIDOPHILOUS BEECH FORESTS WITH WOODRUSH *LUZULO-FAGENION*, Medio-European beech and, in higher mountains, beech-fir or beech-fir-spruce forests on acid soils, with *Luzula luzuloides, Polytrichum formosum*, and often *Deschampsia flexuosa, Vaccinium myrtillus, Pteridium aquilinum*.

CORINE 41.2: OAK-HORNBEAM FORESTS; *Carpinion betuli*; Atlantic and medio-European forests dominated by *Quercus robur* or *Q. 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 forestry practices favouring oaks.

CORINE 41.3: ASH FORESTS; *Carpinion betuli* (*Fraxino-Carpinion*): *Corylo-Fraxinetum* p., *Polysticho setiferi-Fraxinetum excelsioris* p., *Mercurialidi perennis-Fraxinetum excelsioris* p., *Isopyro-Quercetum roboris*, *Adoxo-Aceretum*; non-alluvial Atlantic or sub-Atlantic forests dominated by *Fraxinus excelsior*, particularly characteristic of Britain, of the north-western Iberian peninsula and of the Baltic moraine hills of Mecklenburg. Secondary formations pioneering on abandoned cultivated land (e.g. Belgian Condroz) are included.

CORINE 41.5: ACIDOPHILOUS OAK FORESTS; *Quercion robori-petraeae*; Forests of *Quercus robur* or *Q. petraea* on acid soils with a herb layer mostly constituted by the ecological groups of *Deschampsia flexuosa*, *Vaccinium myrtillus*, *Pteridium aquilinum*, *Lonicera periclymenum*, *Holcus mollis*, and of *Maianthemum bifolium*, *Convallaria majalis*, *Hieracium sabaudum*, *Hypericum pulchrum*, *Luzula pilosa*, and the mosses *Polytrichum formosum* and *Leucobryum glaucum*.

EUNIS G1.6, EUNIS G1.61, EUNIS G1.A1, EUNIS G1.A2, EUNIS G1.8.

humid *Pinus sylvestris* (gen.), coniferous forests: wet coniferous forests dominated by *Pinus sylvestris*, with stands of overmature, mature and young (saplings/scrub) trees: CORINE 42.51 and boreal *Pinus* forest. EUNIS G3.41.

CORINE 42.51: CALEDONIAN FOREST; relict, indigenous Scots pine forests of endemic *Pinus sylvestris* var. *scotica*, limited to the central and north-eastern Grampians of Scotland. They are mostly open and have a ground layer usually rich in ericaceous species and mosses, in particular, *Hylocomium splendens*, and often arbouring, together with abundant *Deschampsia flexuosa*, *Goodyera repens*, *Listera cordata*, *Corallorhiza trifida*, *Linnaea borealis*, *Trientalis europeae*, *Pyrola minor*, *Moneses uniflora*, *Orthilia secunda*. Accompanying, dominated, tree species include *Juniperus communis*, *Scorbus aucuparia*, *Betula pubescens*, *B. pendula*, *Ilex aquifolium*, *Populus tremula*.

improved grassland (gen.), grassland: improved pasture and meadow. CORINE 38.1, 38.2, 36.52. EUNIS E2.1, EUNIS E2.2, EUNIS E4.52.

inland sand dunes: CORINE 64. EUNIS H5.

CORINE 64: INLAND SAND-DUNES; Sand bodies of eolian origin, possessing constructional relief and separated from the coast and its dune cordons by non-dunal habitats. They support vegetation which differs markedly from coastal sand-dune communities.

intensive grassland: intensively used pasture and meadow. CORINE 81. EUNIS E2.6.

CORINE 81: IMPROVED GRASSLANDS; heavily fertilised or reseeded grasslands, subjected to periodic cultivation and frequently alternated with crops in rotational systems; sometimes treated by selective herbicides and with very impoverished flora and fauna.

karstic mountain pine savanna, mountain pine forest: natural savanna (i.e. geologically and climatically induced and maintained savanna, sensu Grove and Rackham, 2005) of *Pinus uncinata*, with an incomplete cover of overmature, mature and young (saplings/scrub) trees. CORINE 42.411. EUNIS G3.311.

CORINE 42.411: outer alpine alpenrose mountain pine forests. *Rhododendro ferruginei-Pinetum uncinatae*. *Pinus mugo* ssp. *uncinata* forests occupying hard limestone plateaux of the outer Alps, in the Chablais, the Aravis, the Bauges, the Chartreuse, the Vercors, the Dévoluy, in which the almost pure calcareous bedrock is patchily covered by a layer of raw humus derived from fallen pine needles and supporting an acidophilous undergrowth dominated by *Rhododendron ferrugineum*, *Vaccinium myrtillus*, *V. vitis-idaea* and *V. uliginosum*, accompanied by *Empetrum hermaphroditum*, *Huperzia selago*, *Selaginella spinosa*, *Cladonia rangifera*, *Homogyne alpine*, *Bartsia alpine*, *Astrantia minor*.

lagoon, brackish macrohabitats: coastal pools of standing, brackish or salt water, with a restricted and intermittent inflow of sea water and with freshwater inputs. CORINE 21. EUNIS X02.

CORINE 21: LAGOONS; saline or hypersaline coastal waters, often formed from sea inlets by silting and cut off from the sea by sand or mud banks. The presence of vegetation can be indicated by addition of codes 23.21 or 23.22. Habitats Directive, Natura 2000 code: 1150.

lake edge, standing, edge, water's edge: vegetated and unvegetated shores/beaches of lakes.

Larix/Pinus cembra (gen.), coniferous forests: CORINE 42.31, 42.32. EUNIS G3.2.

CORINE 42.31: EASTERN SILICEOUS LARCH AND AROLLA FORESTS; *Larici-Cembrion*. Subalpine *Larix decidua*, *Pinus cembra*, or *Larix decidua*-*Pinus cembra* forests of the eastern and central Alps, mostly of the inner ranges, mostly on siliceous substrates, with an often species-poor undergrowth comprising *Vaccinium myrtillus*, *Rhododendron ferrugineum*, *Calamagrostis vollosa*, *Luzula albida*.

CORINE 42.32: EASTERN CALCICOLOUS LARCH AND AROLLA FORESTS; *Laricetum*, *Larici-Cembretum rhododendretosum hirsuti*. Subalpine and montane *Larix decidua*, *Larix decidua*-*Picea abies*, *Pinus cembra* or *Larix decidua*-*Pinus cembra* forests of the eastern and central Alps, mostly of the outer ranges, on calcareous substrates, with a usually species-rich undergrowth including *Erica herbacea*, *Polygala chamaebuxus*, *Rhododendron hirsutum* or *Pinus mugo*.

Laurisilva forests, Broad-leaved evergreen forests: CORINE 45.6. EUNIS G2.3.

CORINE 45.6: *Pruno-Laurelalia*: humid to hyper-humid, mist-bound, luxuriant, evergreen, lauriphyllous forests of the cloud belt of the Macaroncsian islands, extremely rich in floral and faunal species, among which many are restricted to these communities. Genera such as *Picconia*, *Semele*, *Gesnouinia*, *Lactucosonchus*, *Ixanthus* are entirely endemic to these communities, while others, such as *Isoplexis*, *Visnea* and *Phyllis* reach in them their maximum development; in addition, each of the formations of the various archipelagoes harbours distinctive endemic species. Laurel forests are the most complex and remarkable relict of the humid sub-tropical vegetation of the Miocene-Pliocene late Tertiary of southern Europe. Areas of intact forests have been drastically reduced to a level below which the preservation of their elements could not be sustained.

lawn, urban park: area of planted (and frequently reseeded), dense grass sward, maintained at a height of less than 10cm by frequent mechanical mowing. CORINE 85.12: Park lawns. EUNIS X.23.

lightly-grazed, improved grassland: cropping of ground vegetation, resulting normally in dominance by grasses, inhibition of extensive scrub cover and a sward height greater than 10cm

limestone pavement, cliff and rock: CORINE 63.2. EUNIS H3.5.

regular blocks of limestone known as “clints” with loose flags separated by a network of vertical fissures known as “grykes” or “shattered pavements”, containing more loose limestone rubble. The rock surface is almost devoid of overlying soils (considerably less than 50% cover) except for some patches of shallow skeletal or loessic soils, although more extensive areas of deeper soil occasionally occur. This morphology offers a variety of microclimates allowing the establishment of complex vegetation consisting of a mosaic of different communities. The ecosystem is usually maintained by grazing - without grazing such areas would normally become covered by scrub and then woodland.

In Atlantic parts of Europe the fissures provide a cold, humid microclimate where shade-tolerant vascular plants such as *Geranium robertianum* and *Ceterach officinale* occur, as well as formations of herbaceous species typical of calcareous woodland; the small pockets of soil are occupied by communities of *Mesobromion* (e.g. *Seslerio-Mesobromenion*). Marginal areas of *Geranium sanguineum* may occur. Scrub (e.g. *Corylo-Fraxinetum*, *Prunetalia spinosae*) and patches of heath and moorland vegetation may be present, but should be treated as additional habitats. These pavements may be subject to severe winds, so that isolated shrubs can only there survive in prostrate growth-form (e.g. *Dryas octopetala*, *Juniperus*).

In Sweden, limestone blocks are larger and cracks are smaller. The species composition reflects a more continental, drier and cooler climate. The pavements are mostly exposed with scattered cushions of bryophytes, more seldom covered by a thin layer of soil. The surface is covered by *Sedum album*, *Cerastium pumilum*, *C.semidecandrium*, lichens (*Aspicilia calcarea*, *Thamnolia vermicularis*, *Verrucaria nigrescens*) and bryophytes (*Tortella tortuosa*, *Grimmia pulvinata*). The vegetation in the cracks contains *Gymnocarpium robertianum*, *Asplenium ruta-muraria*, *A.trichomanes* ssp. *quadrivalens* and, occasionally, bushes of *Prunus spinosa*, *Fraxinus excelsior*, *Cotoneaster* spp., *Rosa* spp.

In sub-mediterranean conditions, limestone pavements may carry patches of thermophilous *Quercus* scrub, with an understory of *Buxus* - these can be regarded as separate habitats, or, alternatively, as karstic *Q.pubescens* savanna. The pockets of grassland present are variable in character but would normally be described as xeric, and unimproved (i.e.CORINE 34.5).

limnocrène, spring/flush: springs emerging in small pools. Limnocrènes emerging in larger water bodies such as lakes or dead arms are not covered here.

lowland, heath: CORINE 31.22, with the exclusion of all mediterranean, iberian, and alpine communities; CORINE 31.23. EUNIS F4.22, EUNIS F4.23.

CORINE 31.22: SUB-ATLANTIC *CALLUNA-GENISTA* HEATHS; *Calluno-Genistion pilosae* p.; Low *Calluna* heaths often rich in *Genista*, mostly of the North Sea lowlands. Similar formations occurring in British upland areas are also included here.

CORINE 31.23: ATLANTIC *ERICA-ULEX* HEATHS; *Ulicenion minoris*; *Daboecenion cantabricae* p.; *Ulicion maritimae*; heaths rich in gorse (*Ulex*) of Atlantic margins

lowland improved grassland: improved pasture and meadow occurring at altitudes up to, and including, that of *Fagus* forest: CORINE 38.1, 38.2. EUNIS E2.1, EUNIS E2.2.

CORINE 38.1: MESOPHILE PASTURES; *Cynosurion*; regularly grazed mesophile pastures, fertilised and on well-drained sites, with *Lolium perenne*, *Cynosurus cristatus*, *Poa* ssp., *Festuca* ssp., *Trifolium repens*, *Leontodon autumnalis*, *Bellis perennis*, *Ranunculus repens*, *R. acris*, *Cardamine pratensis*; they are most characteristic of the Euro-Siberian zone, but extend to Atlantic Iberia and the Cordillera Central, the Apennines and the supra-Mediterranean zone of Greece.

CORINE 38.2: LOWLAND HAY MEADOWS; *Arrhenatherion*, *Brachypodio-Centaureion nemoralis*; mesophile hay meadows of low altitudes, fertilized and well-drained, with *Arrhenatherion elatius*, *Trisetum flavescens*, *Anthriscus sylvestris*, *Heracleum sphondylium*, *Daucus carota*, *Crepis biennis*, *Knautia arvensis*, *Leucanthemum vulgare*, *Pimpinella major*, *Trifolium dubium*, *Geranium pratense*; they are most characteristic of the Euro-Siberian zone, but extend to Atlantic Iberia, the Cordillera Central and Montseny, to the Apennines and to the supra-Mediterranean zone of Greece.

lowland, tall herb communities: tall-herb communities at altitudes up to, and including, that of *Fagus* forest. CORINE 37.1, 37.7. EUNIS E3.4, EUNIS E5.4.

CORINE 37.1: meadowsweet stands and related communities. *Filipendulion ulmariae* i.a. Hygrophile tall herb strips of fertile alluvial stream banks, often dominated by *Filipendula ulmaria*, and tall herb stands (*F. ulmaria*, *Angelica sylvestris*) colonising humid hay meadows and pastures after more or less long discontinuation of mowing or grazing; characteristic species are *Filipendula ulmaria*, *Angelica sylvestris*, *Achillea ptarmica*, *Cirsium palustre*, *Deschampsia cespitosa*, *Epilobium hirsutum*, *Geranium palustre*, *Veronica longifolia*, *Scutellaria hastifolia*, *Eupatorium cannabinum*, *Lysimachia vulgaris*, *Lythrum salicaria*, *Phalaris arundinacea*, *Polygonum bistorta*, *Valeriana officinalis*.

CORINE 37.7: humid tall herb fringes. *Convolvuletalia sepium*, *Glechometalia hederaceae* p. (*Calystegio-Alliarietalia*). Watercourse veil and shady woodland edge communities.

lowland unimproved grassland (general), unimproved grassland: unimproved grasslands occurring at altitudes up to, and including, that of *Fagus* forest. Used in contradistinction to montane/subalpine unimproved grasslands (unimproved grasslands occurring primarily in the *Abies/Picea/Larix* altitudinal belt) and alpine unimproved grasslands (unimproved grasslands above the tree-line).

low maquis, maquis, scrub/thickets: low *Cistus* maquis. CORINE 3234, 3235. EUNIS F5.24, EUNIS F5.25.

For predominantly ericaceous formations, see under mediterranean heath.

CORINE 3234: western Mediterranean formations of small or medium *Cistus* spp., most characteristic of the siliceous soils of the meso-mediterranean zone, but also widely occurring in the thermo-mediterranean zone and in the siliceous supra-mediterranean zone.

CORINE 3235: low *Cistus-Lavandula stoechas* maquis. Usually varied, western Mediterranean maquis rich in *Lavandula stoechas*, accompanied by *Cistus* spp., *Erica* spp., brooms (*Genista* spp., *Cytiscus* spp.).

machair, coastal dunes: CORINE 1A. EUNIS B1.9.

CORINE 1A: MACHAIR; plains behind dunes especially characteristic of the western seaboard of the Outer Hebrides. Windblown calcareous sands deposited on peat 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*, *Thymus drucei*, *Bellis perennis*, *Prunella vulgaris*, *Erodium cicutarium*, *Trifolium* spp., *Euphrasia* spp. and many orchids, among which *Dactylorhiza fuchsii* spp. *hebridensis*, *D. 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 fuschii* ssp. *hebridensis* are endemic. Other elements of the ecosystem, such as pools and fallow fields, can be noted by addition of codes from the other units (22, 16.2, 34, 37, 53, 54, 82, 87). As a whole, marchair 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 European population of the threatened corncrake *Crex crex*. Habitats Directive, Natura 2000 code: 21A0.

Madeiran Laurisilva (gen.), Laurisilva forests; *Pruno-Lauretalia azoticae*: *Gethro-Laurion azoricae*: CORINE 45.62. EUNIS G2.32.

CORINE 45.62: Lauriphyllous forests of Madeira with *Laurus azorica*, *Persea indica*, *Ocotea foetens*, *Apollonias barbujana*, *Pittosporum coriaceum*, *Clethra arborea*, *Visnea mocanera*, *Picconia excelsa*, *Prunus lusitanica* ssp. *hixa*, *Heberdenia excelsa*, *Vaccinium padifolium*, *Ilex perado* ssp. *perado*, *I. canariensis*, *Myrica faya*, *Erica arborea*, *Hedera canariensis*, *Isolexis canariensis*, *Euphorbia mellifera*, *Sambucus lanceolata*, *Teline maderensis*, *Sonchus fruticosus*, *Senecio auritus*, *Ruscus streptophyllus*, *Rubus bollei*, *Semele androgyna*, *Smilax canariensis*, *Tamus edulis*, *Carex peregrina* and many ferns. These forests, which still occupy a relatively large surface, of the order of 10 000 ha (15% of their former surface), are the habitat of the threatened endemic Madeiran Pigeon, *Columba trocaz*.

maize, crops: monoculturally sown stands of *Zea mays*, known as maize or sweet-corn (or corn in American English) produced as grain crops and involving seeding into cultivated (or stubble) ground, control of weeds, diseases and pests by chemical, mechanical and/or cultural methods, nutrient application in the form of inorganic fertiliser or organic manures, harvesting at grain maturation **and post-harvest recultivation**. This cereal also often requires irrigation.

maquis (gen.), scrub/thickets: shrubby formations, often tall, on mostly siliceous soils of the meso-mediterranean zone of the Iberian peninsula, France, Italy and the large, western Mediterranean islands, degradation stages of evergreen oak forests. CORINE 32311, 3234, 3235. EUNIS F5.21, EUNIS F5.24, EUNIS F5.25.

CORINE 32311: western mediterranean high maquis: *Ericenion arboreae*: *Phillyrea angustifoliae*-*Arbutetum unedi*, *Phillyrea rodriguezi*-*Arbutetum unedi*, *Erica arboreae*-*Arbutetum unedi*. Formations with *Erica arborea*, *Arbutus unedo*, *Quercus ilex*, *Phillyrea angustifolia*, *P. media*, *Viburnum tinus*, *Rhamnus alaternus*, *Juniperus oxycedrus*, *Fraxinus ornus*.

CORINE 3234: low *Cistus* maquis: western Mediterranean formations of small or medium *Cistus* spp., most characteristic of the siliceous soils of the meso-mediterranean zone, but also widely occurring in the thermo-mediterranean zone and in the siliceous supra-mediterranean zone.

CORINE 3235: low *Cistus*-*Lavandula stoechas* maquis. Usually varied, western Mediterranean maquis rich in *Lavandula stoechas*, accompanied by *Cistus* spp., *Erica* spp., brooms (*Genista* spp., *Cytiscus* spp.).

marsh, wetlands: permanently-water-logged ground on mineral soils, subject to flooding by surface water following rain, or periodic high ground-water levels, with a varied vegetation of hydrophilous tall-herb fringe communities, reed and sedge beds, and found from low altitude up to the subalpine zone. EUNIS D4.263 + EUNIS D5.1, EUNIS D5.2, EUNIS E3.4, EUNIS E5.4, EUNIS E5.5.

matorral (gen.), scrub/thickets: pre- or post-forest formations with a more-or-less dense arborescent cover and with a usually thick, high evergreen shrub stratum. They are mostly degradation or reconstitution stages of the broad-leaved evergreen forests or their substitution; intermediate between them and maquis; some are substitution stages of thermophilous *Quercus* or *Pinus* forests. CORINE: 3211, 3212, 3214. EUNIS F5.11, EUNIS F5.12, EUNIS F5.14.

CORINE 3211: evergreen oak matorral: meso-mediterranean arborescent matorral organised around evergreen oaks; dense, low, coppice-like woods of evergreen oaks (see also under *Quercus ilex* forests).

CORINE 3212: olive and lentisc matorral: thermo-mediterranean arborescent matorral with *Olea europaea* ssp. *silvestris*, *O. europaea* ssp. *cerasiformis*, *Ceratonia siliqua*, *Pistacia lentiscus*, *P. atlantica* or *Myrrus communis*.

CORINE 3214: pine matorral: mediterranean and sub-mediterranean sclerophyllous brush and scrub dotted by pines (*Pinus* spp.).

mature canopy trees (gen), canopy trees, urban parks: stands of mature European conifers or deciduous trees.

mature, forest: stands of trees that have reached the age of fructification without yet developing the features described under "overmature forest", but have developed closed canopy conditions.

Mediterranean, heath: low ericaceous maquis: CORINE 3232. EUNIS F5.22.

CORINE 3232: *Erico sporariae-Lavandulo storchidis*; *Ampelodesmo-Ericetum*; *Erico scopariae-Cistetum populifolii*: lower (usually less than 1m high) maquis rich in *Calluna vulgaris*, *Erica scoparia*, *E.cinerea* or sometimes low *E.arborea*; often accompanied by *Cistus* spp., *Lavandula stoechas* and various brooms.

Mediterranean pine, conifer forests: Mediterranean and thermo-Atlantic woods of thermophilous pines, mostly appearing as substitution or paraclimactic stages of forests of the *Quercetalia ilicis* or *Ceratonio-Rhamnetalia*. Long-established plantations of these pines, within their natural area of occurrence, and with an undergrowth basically similar to that of paraclimactic formations, are included. CORINE 42.81, 42.82, 42.84. EUNIS G3.71, EUNIS G3.72, EUNIS G3.74.

CORINE 42.81: maritime pine forests and plantations of *Pinus pinaster* ssp.*atlantica* of south-western France and the western Iberian peninsula.

CORINE 42.82: mesogean pine forests of *Pinus pinaster* ssp. *pinaster* (*Pinus mesogeensis*) of the western Mediterranean, upper meso-Mediterranean and supra-Mediterranean situations of Spain, Corsica, south-eastern France, north-western Italy, Sardinia and Pantelleria.

CORINE 42.84: forests and woods of Aleppo pine, *Pinus halepensis*, a frequent colonist of thermo- and calcicolous meso-Mediterranean scrubs. The distinction between spontaneous forests and long-established formations of artificial origin is often difficult.

Mediterranean riparian Fraxinus, deciduous forests: CORINE 44.63. EUNIS G1.33.

Riparian galleries dominated by tall *Fraxinus angustifolia*, mostly characteristic of less eutrophic soils than elm and poplar gallery forest, and of drier stations, with shorter inundation periods, than those occupied by alluvial poplar woods.

CORINE 44.63: *Fraxino angustifoliae-Ulmetum minoris* p., *Fraxinion angustifoliae*.

med.shrub formations, scrub/thickets: Mediterranean shrub formations. Included here are formations, for the most part indifferent to the siliceous or calcareous nature of the substrate, that reach their greatest extension or optimal development in the thermo-mediterranean zone. CORINE 32214. EUNIS F5.51.

CORINE 32214: lentisc brush: *Pistacia lentiscus*-dominated or -rich formations, widespread and abundant in thermo-mediterranean and coastal meso-mediterranean zones of the entire Mediterranean basin. Locally, similar formations may appear in warm inland meso-mediterranean areas. Often low and sometimes very open, the lentisc brush can, in favourable situations, reach a height of several metres, grading into arborescent matorral.

mesophilous/calciophilous Picea, coniferous forests: mesophilous/calciophilous spruce (*Picea abies*) forests, with stands of overmature, mature and young (saplings/scrub) trees (including CORINE 42.2121, 42.222, 42.223, 42.224, 42.232: EUNIS G3.1B, EUNIS G3.1C, EUNIS G3.1D).

mesophilous Fagus (gen.), deciduous forests: neutrophilous/calciophilous beech (*Fagus*) forests and dry acidophilous forests, with stands of overmature, mature and young (saplings/scrub) trees, CORINE 41.122, 41.16, 41.17. EUNIS G3.1D, EUNIS G1.66, EUNIS G1.67.

CORINE 41.122: SUB-ATLANTIC ACIDOPHILOUS BEECH FORESTS, *Deschampsio-Fagetum*. Transition forests of the Paris basin, the Morvan, the periphery of the Massif Central, the eastern and central Pyrenees.

CORINE 41.16: BEECH FORESTS ON LIMESTONE; *Cephalanthero-Fagenion* ; Xero-thermophile medio-European and Atlantic forests on calcareous, often superficial, soils, usually of steep slopes, with a generally abundant herb and shrub undergrowth, characterized by sedges (*Carex digitata*, *C.flacca*, *C.montana*, *C.alba*), grasses (*Sesleria albicans*, *Bracypodium pinnatum*), orchids (*Cephalanthera* spp., *Neottia nidus-avis*, *Epipactis leptochila*, *E.microphylla*) and thermophile species, transgressive of the *Quercetalia pubescenti-petraeae*. The bush-layer includes several calcicolous species.

CORINE 41.17: SOUTHERN MEDIO-EUROPEAN BEECH FORESTS, *Fagion sylvaticae*. Forests of the southern flanks of the Alps and the western Mediterranean mountains with an often species-rich herb layer composed of an admixture of medio-european, Mediterranean and local endemic species.

montane improved grassland, improved grassland: improved pasture and meadow occurring primarily in the natural *Abies/Picea* forest altitudinal zone, maintained by livestock grazing: CORINE 36.52. EUNIS E4.52.

CORINE 36.52: Rough hawkbit pastures. *Poion alpinae*. Species-poor manured cattle pastures of the subalpine and lower alpine levels, with *Agrostis alpina*, *Phleum alpinum*, *Poa alpina*, *Cerastium fontanum*, *Crepis aurea*, *Leontodon hispidus*, *Trifolium badium*, *T.thalii*.

montane/subalpine fen, fen: fen within the montane/subalpine altitudinal zones, from the level of natural *Picea/Abies* forest upwards.

montane/subalpine, tall herb communities, tall herb communities within the altitudinal zone of natural *Abies/Picea* forest and upwards into alpine grassland: CORINE 37.8. EUNIS E5.5.

CORINE 37.8: subalpine and alpine tall herb communities. Luxuriant tall herb formations of deep, humid soils in the montane to alpine, but mostly subalpine, levels of the higher mountains; Milieux naturels de Suisse (Delarze et al, 2015): *Petasition officinalis*, 5.1.4.

montane unimproved grassland (general): unimproved grasslands occurring primarily in the natural *Abies/Picea* forest altitudinal zone, usually maintained by livestock grazing (or by the grazing activities of other large herbivores). Both *Abies* and *Picea* species have also been planted at lower altitudes, to replace deciduous forest, notably *Fagus*. These lower altitude grasslands are not covered by the "montane unimproved grassland" categories. CORINE: 35.11, 35.12, 35.13, 36.41, 36.51, 38.3. EUNIS E1.71, EUNIS E1.72, EUNIS E1.73, EUNIS E4.41, EUNIS E4.51, EUNIS E2.3.

moor: wet heathland: CORINE 31.1, 31.211, 31.212, 31.45. EUNIS F4.1, EUNIS F4.21, EUNIS F2.25

CORINE 31.1: WET HEATHS; *Ericion tetralicis*; *Ulicion minoris p.*; *Genistion micrantho-anglicae p* ; Humid, peaty or semi-peaty heaths (other than blanket bogs).

CORINE 31.211: NORTHERN ISLES VACCINIUM HEATHS; *Calluna-Empetrum hermaphroditum-Vaccinium vitis-idaea* heaths of the Orkneys and Shetlands.

CORINE 31.212: UPLAND BRITISH VACCINIUM HEATHS; upland *Vaccinium-Empetrum* heaths of northern and western Britain, with *Vaccinium myrtillus* or *V.vitis-idaea* and *Empetrum nigrum* or *E. hermaphroditum*. They can further subdivided as follows :

31.2121: British southern bilberry heaths

31.2122: British chionophilous bilberry heaths

31.2123: British species-rich bilberry heaths

31.2124: British mat-grass-bilberry heaths

31.2125: British mountain crowberry-bilberry heaths

31.2126: British lichen-bilberry heaths

31.2127: British cowberry heaths

31.2128: British ling-liverwort heaths

CORINE 31.45:BOREO-ALPINE SCOTTISH HEATHS; Alpine heaths of the highlands and islands of Scotland, with *Juniperus nana*, *Loiseleuria procumbens*, *Empetrum hermaphroditum*, *Arctostaphylos uva-ursi*, *A.alpina* and elements of Alpine flora.

moraine and scree (gen.), screes and glacial moraines, calcareous and non-calcareous, with some pioneer vegetation (e.g. *Androsacion* and *Sedo-Scleranthion* communities). These habitats are more effectively categorised by Delarze et al (1998) than in the CORINE system.

mountain pine (general), coniferous forests: mostly subalpine forests of the Alps, the Pyrenees and Iberia, dominated by *Pinus mugo* ssp. *uncinata*, usually open and with a very developed shrubby understorey. CORINE: 42.4. EUNIS G3.3

Narcissus stands, Culture supplementary habitats : stands of *Narcissus* species, including cultivars.

new field margin, field margin/hedge bank: uncultivated, linear strip of land along the boundary of a cropland or intensive grassland, that has been in place for at least 5 years, but less than 15 years, is at least 1.5m wide and covered in herbaceous vegetation in which grasses predominate (field margins that have been in place for less than 5 years are treated under setaside).

non-calc., moraine and scree: moraine and scree derived from non-calcareous, primarily siliceous, rock types and with some pioneer vegetation, e.g. *Androsacion alpinae* (Delarze et al, 1998), but excluding thermophilous scree.

non-calcareous mountain pine, mountain pine forest: CORINE 42.413. EUNIS G3.31.

CORINE 42.413: Pyrenean alpenrose mountain pine forests. *Rhododendro ferruginei-Pinetum uncinatae* (*Saxifrago-Rhododendronetum pinetosum*). *Pinus mugo* ssp.*uncinata* forest of ubacs of the Pyrenees developed on siliceous soils, or on decalcified soils in the calcareous ranges, in the more humid and snowy parts of the subalpine level, with a ground layer dominated by *Rhododendron ferrugineum* accompanied by *Vaccinium Myrtillus*, *Homogyne alpine*, *Rosa pendulina*, *Deschampsia flexuosa*, *Oxalis acetosella*, *Juniperus nana*, *Calluna vulgaris*, *Gymnocarpium dryopteris*, *Dryopteris carthusiana spinulosum* and *Solidago virgaurea*.

non-calcareous, very dry, lowland unimproved grassland. CORINE 34.34. EUNIS G3.31.

CORINE 34.34: CALCARO-SILICEOUS GRASSLANDS *Koelerio-Phleion phleoidis* (*Armerion elongatae*, *Sedo-Cerastion* p.)

Low-altitude xerophile, rupicoloussor psammophilous, grasslands of slightly calcareous substrates, with *Festuca heteropachys*, *F. trachyphylla*, *Koeleria macrantha* (= *K. gracilis*), *Phleum phleoides*, *Armeria elongata*, *Artemisia campestris*, *Aster linosyris*, *Lychnis viscaria*, *Silene otites*, *S. nutans*, *Chamaespartium sagittale*, *Campanula patula*, *Potentilla rupestris*, *Helianthemum nummularium* ssp. *obscurum*, *H. apenninum*, *Scleranthus peren-nis*, *Allium senescens* ssp. *montanum*.

not flooded, *Salix*, deciduous plantations: large-willow (*Salix*) plantations not subject to periodic flooding

not flooded, *Populus*, deciduous plantations: poplar (*Populus*) plantations not subject to periodic flooding

old field wall: walls made from blocks of natural rock, that have been in situ long enough to gather a partial covering of vegetation e.g. *Sedum*, *Umbilicus*, thus providing a secondary habitat for some syrphids of moraine and scree.

oligotrophic, humid, lowland unimproved grassland: nutrient-poor, humid, rush and mat-grass grassland. CORINE 37.31, CORINE 37.32, CORINE 51.2. EUNIS E3.51, EUNIS E3.52, EUNIS D1.121.

CORINE 37.31 PURPLE MOORGRASS MEADOWS AND RELATED COMMUNITIES: humid grasslands of soils poor in nutrients, unfertilised and with a fluctuating water level, with *Molinia caerulea*, *Succisa pratensis*, *Deschampsia cespitosa*, *Potentilla erecta*, *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*, *Carex tomentosa*, *C.panicea*, *C.pallescent*, *Parnassia palustris*, *Platanthera bifolia*, *Colchicum autumnale*, *Ophioglossum vulgatum*, *Dactylorhiza maculata*. CORINE 37.32: HEATH RUSH MEADOWS AND HUMID MAT-GRASS SWARDS; *Nardetalia: Juncion squarrosi*; Humid, often peaty or semipeaty swards with *Nardus stricta*, *Juncus squarrosus*, *Festuca ovina*, *Gentiana pneumonanthe*, *Pedicularis sylvatica*, *Scirpus cespitosus* and sometimes *Sphagnum* spp.

CORINE 51.2: PURPLE MOORGRASS BOGS; *Ericion tetralicis* p.; drying, mowed or burned bogs invaded by *Molinia caerulea*.

open, xeric/semi-arid, unimproved grassland: unimproved, thinly-vegetated dry grassland with scattered stones/patches of bare ground/small patches of exposed bedrock. CORINE 34.1; 34.5; 34.71; 34.721. EUNIS E1.1, EUNIS E1.B, EUNIS E1.51, EUNIS E1.52.

CORINE 34.1: MIDDLE EUROPEAN PIONEER SWARDS; *Sedo-Scleranthetea* p; open, thermophile formations of sandy or rocky ground in non-Mediterranean lowland to montane areas.

CORINE 34.5: Mediterranean xeric grasslands. *Thero-Brachypodietea*. 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.

CORINE 34.71: MEDITERRANEO-MONTANE STEPPES; *Ononidion striatae*. Sparse or discontinuous xerophile grasslands of *Stipa pennata*, *Festuca auquiere* (*F.duriscula*), *F.hervieri*, *Koeleria vallesiana* or *Sesleria albicans* var.*elegantissima* with *Helianthemum apenninum*, *H.canum*, *Genista* spp., *Globularia* spp., *Ononis striata*, *Euphorbia seguieriana*, *Potentilla crantzii*, *Thymus dolomiticus*, *Plantago argentea*, *Rosa pimpinellifolia*, *Dianthus sylvestris*, *Lavandula angustifolia*, *Aster alpinus*, *Anthyllis* spp., *Carex humilis*, best developed in the Causses, but also present locally in Provence and Languedoc, for the Alps to Catalonia.

CORINE 34.72: APHYLLANTHUS GRASSLANDS AND SUPRA-MEDITERRANEAN STEPPES *Aphyllanthion* p. Coarse or steppe-like grasslands rich in chamaephytes of pronounced Mediterranean affinities formed as a degradation stage of thermophile deciduous oak forests, or of *Quercus rotundifolia* forests, in the supra-Mediterranean belt of Iberia, southern France and Liguria; grassland facies of the supra-Mediterranean garrigues (32.6) and hedgehog heaths (31.7).

open ground macrohabitats: this term is used in contradistinction to forest, wetland, freshwater and brackish-water habitats: natural/semi-natural unforested land not covered by wetland. This category includes grasslands (whether natural or maintained by grazing animals or mowing), heath, moor and dune systems.

***Opuntia* thickets,** forest supplementary habitats: stands of the introduced *Opuntia ficus-indica*, established within indigenous Mediterranean-zone forest habitats.

***Opuntia* thickets,** open ground supplementary habitats: stands of the introduced *Opuntia ficus-indica*, established within indigenous Mediterranean-zone coastal habitats.

orchard: CORINE 83.1: HIGH-STEM ORCHARDS; tree crops of standards, cultivated for fruit production. EUNIS G1.D.

other hardwoods, scattered trees in open ground: see scattered trees in open ground (gen.).

overmature canopy trees (general), urban parks:

ten or more overmature, deciduous trees of *Fagus*, *Fraxinus*, *Populus nigra* or *Quercus*.

overmat., forest: overmature forest. The term overmature forest is not applied here as in commercial forestry, i.e. a stand of trees which has exceeded the age at which it would normally be harvested. Here overmature/ senescent trees are taken to be those on which microhabitats for saproxylic organisms (i.e. sap runs, rot-holes, trunk cavities, observable areas of dead wood or loose bark) have developed. As a generality, such trees are significantly older than those which would be regarded as overmature by foresters. They may occur in stands or scattered among trees of much younger age, a significant proportion of overmature trees would be approximately 1 to 2 % of the tree cover per ha.

palsa mire, wetlands: arctic hummock mire communities, with bog mosses and lichens dominating on the hummocks (palsas) and dwarf *Betula*/*Salix* scrub occurring on their sides; acid fen with *Potentilla palustre*, *Eriophorum* and *Carex* species in the surrounding watery hollows. Habitats Directive, Natura 2000 code: 7320. EUNIS D3.1.

partly cut flower meadow, urban parks: flowering meadow with one third or more of surface remaining uncut each year, the rest of the surface mechanically cut in the autumn (each sector cut in rotation, so that a different sector remains uncut each year).

permanent field margin, field margin/hedge bank: permanently uncultivated, linear strip of land along the boundary of a cropland or intensive grassland, at least 1.5m wide and covered in herbaceous vegetation in which grasses predominate.

perm. pool, standing freshwater: permanent pool. Small permanent water bodies of natural origin e.g.ox-bows and/or man-made e.g. ponds, with standing water. This term is used here in contradistinction to lakes and temporary pools.

perm. pool edge, standing, edge, water's edge: vegetated and unvegetated margins of permanent pools, either in the open or under a tree canopy.

perm. pool in open ground, open ground supplementary habitats: small permanent water bodies of natural origin e.g.ox-bows and/or man-made e.g. ponds, with standing water and not shaded by a tree canopy.

perm. pool in wetland, wetland supplementary habitat: small, permanently-flooded, standing-water bodies situated in wetlands.

Picea, coniferous, mature canopy trees, urban parks: stands of mature *Picea*.

Picea (gen.), coniferous forests: forests dominated by spruce (*Picea abies*), with stands of overmature, mature and young (saplings/scrub) trees. CORINE 42.2: SPRUCE FORESTS; *Vaccinio-Piceion i.a.*; conifer forests dominated by *Picea abies*. EUNIS G3.1.

Pinus, alpine scrub: dwarf alpine *Pinus mugo* ssp.*mugo* scrub: CORINE 31.5. EUNIS F2.4
CORINE 31.5: DWARF MOUNTAIN PINE SCRUB; *Mugo-Rhodoretum hirsuti*. *Pinus mugo* ssp.*mugo* brushes of well-drained, often calcareous, soils in the Alps and Apennines, frequently accompanied by *Rhododendron hirsutum*, *Erica herbacea*, *Arctostaphylos uva-ursi*, *A.alpina*, *Rhodothamnus chamaecistus*.

Pinus brutia (gen.), coniferous forest
CORINE 42.85; EUNIS G3.75: Aegean pine forests of Crete, the eastern Aegean islands, extreme southeastern continental Europe, Anatolia, Cyprus and the eastern Mediterranean coastal regions not on coastal dunes. Eastern vicariants of *Pinus halepensis* forests, they comprise, however, taller, more luxuriant, and often extensive, formations.

Pinus, matorral, scrub/thickets: pine matorral: CORINE 3214. EUNIS F5.14.
CORINE 3214: mediterranean and sub-mediterranean sclerophyllous brush and scrub dotted by pines (*Pinus* spp.).

Pinus halepensis forest (gen.), coniferous forests: CORINE 42.84. EUNIS G3.74.
CORINE 42.84: woods of Aleppo pine, *Pinus halepensis*, a frequent colonist of thermo- and calcicolous meso-Mediterranean scrubs. The distinction between spontaneous forests and long-established formations of artificial origin is often difficult. The latter are thus included here, while recent, obviously artificial groves are not. Commercially-exploited stands of *P.halepensis* are normally subject to systematic ground vegetation clearance, every 2 or 3 years, to reduce the risk of destruction of the tree cover by fire. This results in absence of a shrub layer and sparse ground-layer vegetation.

Pinus sylvestris (gen.), coniferous forests: forests of scots pine (*Pinus sylvestris*), with stands of overmature, mature and young (saplings/scrub) trees. CORINE 42.5. EUNIS G3.4.
CORINE 42.5: SCOTS PINE FORESTS; forests dominated by *Pinus sylvestris*.

Pinus sylvestris, coniferous, mature canopy trees, urban parks: stands of mature *Pinus sylvestris*.

Pinus sylvestris, conifer plantations: CORINE 83.3112. EUNIS G3.F12.
CORINE 83.3112: EUROPEAN PINE PLANTATIONS.

Populus (gen.), deciduous plantations: CORINE 83.3211. EUNIS G1.C1.
CORINE 83.3211: POPLAR PLANTATIONS WITH MEGAPHORB HERB LAYER; Old poplar plantations with a tall herb-rich undergrowth, substitution habitat for some riparian forest species of plants and animals.

Populus, scattered trees in open ground: see scattered trees in open ground (gen.).

Populus nigra, overmature canopy trees, urban parks: ten or more overmature trees of *Populus nigra*.

Quercus, scattered trees in open ground: see scattered trees in open ground (gen.).

Quercus/Carpinus/Ulmus (gen.), deciduous forests: oak/hornbeam (*Quercus/ Carpinus*) forests, with stands of overmature, mature and young (saplings/scrub) trees: CORINE 41.2. EUNIS G1.A1. CORINE 41.2: OAK-HORNBEAM FORESTS; *Carpinion betuli*; Atlantic and medio-European forests dominated by *Quercus robur* or *Q.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 forestry practices favouring oaks.

Quercus ilex (gen.), broad-leaved, evergreen forests: forest dominated by *Quercus ilex* or *Q.rotundifolia*, with stands of overmature, mature and young (saplings/scrub) trees: CORINE 45.3. EUNIS G2.12. CORINE 45.3: Species associated with *Q.ilex* scrub, which could fall into CORINE 32311 (see under high maquis) are coded in the Macrohabitats table both under *Quercus ilex* saplings (macrohabitat category 1613) and under high maquis (macrohabitat category 12321).

Quercus, overmature canopy trees, urban parks; ten or more overmature trees of deciduous *Quercus* species.

Quercus pyrenaica, (gen.), deciduous forests: *Quercion robori-pyrenaicae*: forests of the Iberian peninsula and, locally, south-western France, dominated by the Pyrenean oak, *Q.pyrenaica*. CORINE 41.6. EUNIS G1.7B

Quercus rotundifolia/Q. suber dehesa, (general), dehesa
Dehesa of evergreen oak savanna in which overmature trees of *Q. rotundifolia* and/or *Q. suber* predominate, maintained by climatic/geological factors and man's management (for livestock rearing: cattle, goats, pigs), incorporating low maquis of *Cistus/Lavandula* (CORINE: 32.35; EUNIS F5.25) and sub-xeric *Tuberarion guttatae* grassland (CORINE 35.3; EUNIS E1.A).

Quercus rotundifolia woodland, broad-leaved, evergreen forests: CORINE 45.34. EUNIS G2.124. CORINE 45.34: Iberian forest communities formed by *Q.rotundifolia* (often regarded as a subspecies of *Quercus ilex*) , with stands of overmature, mature and young (saplings/scrub) trees. Generally, even in mature state, less tall, less luxuriant and drier than the fully developed forests that can be constituted by the closely-related *Q.ilex*. Species characteristic of the undergrowth are *Arbutus unedo*, *Phillyrea angustifolia*, *Rhamnus alaternus*, *Pistacia terebinthus*, *Rubia peregrina*, *Jasminum fruticans*, *Smilax aspera*, *Lonicera etrusca*, *L.implexa*.

Quercus suber (gen.), broad-leaved, evergreen forests: CORINE 45.2. EUNIS G2.11.
western-Mediterranean silicolous forest dominated by *Quercus suber*, with stands of overmature, mature and young (saplings/scrub) trees.
CORINE 45.2; usually more thermophile and hygrophile than *Q.ilex*-dominated forest.

Quercus/Ulmus/Fraxinus, alluvial hardwood forest: diverse riparian forests of the middle courses of great rivers, inundated only by large floods and with stands of overmature, mature and young (saplings/scrub) trees: CORINE 44.41. EUNIS G1.221. CORINE 44.41: MEDIO-EUROPEAN FLUVIAL FORESTS *Querco-Ulmetum minoris*; fully developed, very tall, multilayered, highly diverse riparian forests of oaks, ashes, elms, limes, maples, alders, poplars, cherries, apple, willows of the middle and lower courses of large medio-European river systems, in particular, the Rhine, the Danube, the Ernst, the Elbe, the Saale, the Weser, the Loire, the Rhône-Saône systems. Their highly complex structure is formed of eight strata to which participate up to 50 species of trees and shrubs. The upper arborescent stratum includes *Quercus robur*, *Fraxinus excelsior*, *Ulmus minor*, *U. laevis*, *U. glabra*, *Populus alba*, *P. tremula*, *P. canescens*, *P. nigra*, *Acerpseudoplatanus*, *platanoides*, *Salix alba*, *Alnus glutinosa*, *Prunus avium*, the lower arborescent stratum *Malus sylvestris*, *Tilia cordata*, the sub-arborescent shrub layer *Alnus incana*, *Prunus padus* and *Crataegus monogyna*. There are very varied high and low shrub layers and numerous lianas, *Clematis vitalba*, *Tamus communis*, *Humulus lupulus*, *Hedera helix* and *Vitis vinifera* ssp. *sylvestris*. Most diverse, structurally, floristically and faunistically, of all European ecosystems, and closest in that respect to tropical communities and to the warm temperate forests of the Pleistocene, the great fluvial forests of Europe are reduced to a few highly vulnerable examples, located mainly within the Rhine, Danube and Elbe systems.

raised bog, bog: CORINE 51.1. EUNIS C1.46.

CORINE 51.1: NEAR-NATURAL RAISED BOGS; undisturbed, or little disturbed, peat-forming bogs, often taking the shape of a convex lens. Such intact or nearly intact systems have become very rare or even exceptional. They are composed of a number of communities, which form and occupy the topological features of the bog. These communities are interrelated and function as a unit, so that they cannot be regarded as separate subhabitats; their presence and combination, however, characterise the various types of bogs. Typically, fen/acid fen communities occur round the outer edge of the bog, where its water-supply is maximally influenced by ground-water, pools occur over the bog surface and *Sphagnum* -bog communities occur toward the more-raised centre of the bog, where it is sustained by rain water. The perennial vegetation is dominated by hummock-forming *Sphagna* (*Erico-Sphagnetalia magellanici*, *Scheuchzeritalia palustris* p., *Utricularitalia intermedio-minoris* p., *Caricetalia fuscae* p.). Habitats Directive, Natura 2000 code: 7110.

reed, reed/tall sedge beds: CORINE 53.1. EUNIS D5.1.

CORINE 53.1: REED BEDS; *Phragmiton australis*, *Scirpion maritimi*; Reed bed formations of tall helophytes, usually species-poor and often dominated by one species, growing in stagnant or slowly flowing water of fluctuating depths, and sometimes on waterlogged ground. They can be classified according to the dominant species, which gives them a distinctive appearance.

reed/tall sedge beds (gen.), wetlands: CORINE 53.1, 53.2. EUNIS D5.1, EUNIS D5.2.

Reed beds of the phytosociological categories *Phragmiton australis* and *Scirpion maritimi* (CORINE 53.1) and tall sedge beds of the alliance *Magnocaricion* (CORINE 53.2), on the margin of standing and running waters, fens and marshes, including also patches of *Phalaris arrundinacea* and *Glyceria maxima*.

CORINE 53.1: REED BEDS; *Phragmiton australis*, *Scirpion maritimi*; reed bed formations of tall helophytes, usually species-poor and often dominated by one species, growing in stagnant or slowly flowing water of fluctuating depths, and sometimes on waterlogged ground. They can be classified according to the dominant species, which gives them a distinctive appearance.

CORINE 53.2: LARGE SEDGE COMMUNITIES; *Magnocaricion*; Formations of large Cyperaceae of genera *Carex* or *Cyperus* occupying the edge or the entirety of humid depressions, oligotrophic mires and rich fens, on ground that can be dry for part of the year. They occur, in particular, on the landward side of reedbeds in waterside successions and as colonists of humid depressions on mineral soils, or of acid and alkaline fens.

rheocrene, spring/flush: springs emerging as streams of running water (gushing springs).

rhithral riparian *Alnus*/*Fraxinus*, humid/mesophilous forest: CORINE 44.32 : ash-alder woods of fast-flowing rivers ; *Stellario-Alnetum glutinosae* ; alder, or ash-alder galleries of the banks of fast-flowing rivers and large brooks, replacing the peri-alpine *Alnus incana* galleries in upland areas of western Europe. They are usually co-dominated by *Alnus glutinosa*, *Fraxinus excelsior* and *Acer pseudoplatanus*, accompanied by *Acer platanoides*, *Ulmus glabra*, *U.laevis*. *Prunus padus* is frequent in the undergrowth ; shrubs include *Ribes rubrum*, *R. uva-crispa*, *Corylus avellanae* ; the herb layer comprises *Stellaria nemorum*, *Impatiens noli-tangere*, *Aconitum vulpina*, *Allium ursinum*, *Geum rivale*, *Athyrium filix-femina*, *Dryopteris carthusiana*, *Matteuccia struthiopteris*, *Ranunculus ficaria*, *R. platanifolius*, *Urtica dioica*, *Primula elatior*, *Lamium galeobdolon* or *Filipendula ulmaria*, *Luzula sylvatica*. The gallery may be enclosed within other forest or reduced to a thin line of trees along rivers traversing farmland. EUNIS G1.212

rich fen/fen sedge beds, fen: rich fen/beds of small sedges: CORINE 54.2, 53.3. EUNIS D4.1, EUNIS D5.2.

CORINE 54.2: RICH FENS; *Tofieldietalia* (*Caricetalia davallianae*): *Caricion davallianae*; wetlands mostly or largely occupied by peat-or tufa-producing small sedge and brown moss communities developed on soils permanently waterlogged, with a soligenous or topogenous base-rich, nutrient-poor, often calcareous water supply, and with the water table at, or slightly above or below, the substratum. Peat formation, when it occurs, is infra-aquatic. Calciphile small sedges and other Cyperaceae usually dominate the mire communities, which belong to the *Caricion davallianae*, characterized by a usually prominent "brown moss" carpet formed by *Campylium stellatum*, *Drepanocladus intermedius*, *D.revolvans*, *Cratoneuron commutatum*, *Acrocladium cuspidatum*, *Ctenidium molluscum*, *Fissidens adianthoides*, *Bryum pseudotriquetrum* and others, a grasslike growth of *Schoenus nigricans*, *S. ferrugineous*, *Eriophorum latifolium*, *Carex davalliana*, *C.flava*, *C.lepidocarpa*, *C.hostiana*, *C.panicea*, *Juncus subnodulosus*, *Scirpus cespitosus*, *Eleocharis quinqueflora*, and a very rich flora including

Tofieldia calyculata, *Dactylorhiza incarnata*, *D. traunsteineri*, *D. traunsteinerioides*, *D. russowii*, *D. majalis ssp. brevifolia*, *D. cruenta*, *Liparis loeselii*, *Herminium monorchis*, *Epipactis palustris*, *Pinguicula vulgaris*, *Pedicularis sceptrum-carolinum*, *Primula farinosa*, *Swertia perennis*. Wet grasslands (*Molinietalia caeruleae*, 37), tall sedge beds (*Magnocaricion*, 53.2), reed formations (*Phragmition*, 53.1), fen-sedge beds (*Cladietum mariscae*, 53.3), may form part of the fen system, with communities related to transition mires (54.5, 54.6) and amphibious or aquatic vegetation (22.3, 22.4) or spring communities (54.1) developing in depressions. Outside of rich fen systems, fen communities can occur on small surfaces in dune slack systems (16.3), in transition mires (54.5), in wet grasslands (37), on tufa cones (54.121) and in a few other situations. 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 most. A very few large systems remain, in particular in pre-Alpine Bavaria, in the Italian pre-Alpes, in collinar and montane eastern France, in north-eastern Germany, in the coastal marshes of northern France, in south-eastern and northern England, in Wales and in Ireland.

CORINE 53.3: FEN-SEDGE BEDS; *Cladietum marisci* i.a.; *Cladium mariscus*-dominated formations, mostly limited in the northern part of their range, where they have a distinct relict distribution, to alkaline and sometimes acid fens and to the land-building zone of calcareous lakes, somewhat more widespread in the Mediterranean region as a waterside vegetation. Habitata Directive, Natura 2000 code: 7210.

river (gen.), running freshwater: permanent running-water bodies in which the channel is too broad for herb layer vegetation or bushes to form a closed canopy over the water.

river bank (gen.), water edge: the rising land bordering a river channel, subject to periodic inundation by water.

river edge u. canopy, forest supplementary habitat: river margins beneath a tree canopy

rock outcrops in forest, forest supplementary habitats: exposed rock (small cliffs, outcroppings, pavements, occupying 5% or more of ground surface) with sparse and patchy vegetation of vascular plants (i.e. excluding moss cover)

rock outcrops in open, open ground supplementary habitat: exposed rock (small cliffs, outcroppings, pavements, occupying 5% or more of ground surface) with sparse and patchy vegetation of vascular plants (i.e. excluding moss cover)

rockery (or rock garden), urban park: area of natural or introduced bare rock (when constructed, rather than natural, normally composed of large stones/boulders grouped or cemented together) with soil pockets planted with often tussock-forming, low-growing herbaceous plants (frequently alpine in origin, e.g. *Saxifraga*, *Sedum*, *Sempervivum*) or shrubs (e.g. procumbent *Juniperus*). **CORINE 85.14:** Park flower beds, arbors and shrubbery. **EUNIS X11.**

Rumex alpinus stands, open ground supplementary habitats: **CORINE 37.88:** *Glechometalia hederaceae*: Rumicion alpine; subalpine and montane nitrophilous tall herb formations characteristic of the vicinity of cattle and game resting places, with *Rumex alpinus*, *Senecio alpinus*, *Cirsium spinosissimum*, *Peucedanum ostruthium*.

running (gen.), freshwater: this category includes rivers, brooks, springs and flushes (helocrene, limnocrene and rheocrene forms of spring and flush are all included here, for convenience).

running, edge (gen.), water edge: land/water ecotones of rivers and brooks.

rural (gen.), culture macrohabitats: man-made habitats of the countryside, comprising crops, field margins, fallow, hedges, orchards, vineyards and farmyard organic waste

Salix (gen.), deciduous plantations: substitution habitat for some riparian forest species of plants and animals. **CORINE 83.325.** **EUNIS G1.C4, EUNIS G2.83.**

CORINE 83.325: OTHER BROAD-LEAVED TREE PLANTATIONS

Salix, scattered trees in open ground: see scattered trees in open ground (gen.).

Salix alba/Populus, alluvial forests: formations of *Salicetea purpureae* and *Populetalia albae* subject to periodic flooding, with stands of overmature, mature and young (saplings/scrub) trees. Temporary pools are features intrinsic to this habitat category: CORINE 44.1. EUNIS G1.11.

CORINE 44.1: RIPARIAN WILLOW FORMATIONS; *Salicetea purpureae*; *Populetalia albae* p.; *Salix* spp. brush or arborescent formations, lining flowing water and submitted to periodic flooding. Habitats Directive Natura 2000 code: 91E0 (see also under gallery softwood forest).

Salix alba/Populus gallery, softwood, alluvial forest: residual softwood alluvial forest formation of the potamal section of a river's course, subject to annual flooding; often in an almost linear form of small patches or lines of trees along the river course, with associated patches of understorey and herb layer. CORINE 44.13. EUNIS G1.111.

CORINE 44.13: white willow gallery forests; *Saliciion albae*, *Salicetum albae*, *Salicetum fragilis*; arborescent galleries of *Salix*, sometimes including *Populus nigra*, along medio-European lowland rivers, submitted to regular inundation.. Natura 2000 code: 91E0.

Salix swamp (gen.), wet woods: CORINE 44.92

CORINE 44.92: mire willow scrub; small-willow (*Salix* spp.) dominated wet woodlands of lake edges and seepages/springs on river or brook floodplains, with stands of overmature, mature and young (saplings/scrub) trees (see also under fen carr).

salt marsh (gen.), brackish habitats: CORINE 15. EUNIS A2.5.

CORINE 15: SALT MARSHES, SALT STEPPES AND GYPSUM SCRUBS: Plant communities which are submerged by high tides at some stage of the annual tidal cycle; also continental and coastal halophile and gypsophile communities.

Salzmann's pine forest, conifer forest: *Pinus nigra* v. *salzmanni* forests of southern France: CORINE 42.631. EUNIS G3.531.

CORINE 42.631: Causses Salzmann's pine forest, of the southern edge of the Massif Central, with an undergrowth typical of supra-Mediterranean white oak forest at the upper limit and of evergreen oak forest at lower altitudes; *Buxus sempervirens* is usually abundant. Usually rather open pine forest on very dry, calcareous sites, maintained by occasional fires that the pines survive but other trees do not, so that various deciduous and broadleaved, evergreen species form a maquis-like understorey and there is also a well-developed garrigue vegetation.

sand/gravel, river edge, water edge: sparsely vegetated sandy/gravelly margins of rivers.

saplings, forest: stands of young trees which have not reached maturity or a height to create closed canopy conditions

scattered trees in open (gen.): individual mature or overmature trees, isolated from one another, or occurring only in scattered clumps or lines, or as occasional outstanding trees in hedgerows. These trees mostly require consideration according to their genera so that they appear as a series of categories: *Fagus*, *Quercus*, *Fraxinus*, other hardwood genera, *Populus*, *Salix*, conifers.

scrub/thickets (gen.): thickets encompassing scrub formations of the phytosociological units *Prunetalia* on rich and poor soils: CORINE 31.81, 31.83; gorse thickets with *Ulex europea*: CORINE 31.85 and alpine scrub: CORINE 31.5, 31.611. EUNIS F2.4, EUNIS F2.311, EUNIS F3.11, EUNIS F3.13, EUNIS F3.15.

CORINE 31.5: DWARF MOUNTAIN PINE SCRUB; *Mugo-Rhodoretum hirsuti*. *Pinus mugo* brushes of well-drained, often calcareous, soils in the Alps and Apennines, frequently accompanied by *Rhododendron hirsutum*, *Erica herbacea*, *Arctostaphylos uva-ursi*, *A.alpina*, *Rhodothamnus chamaecistus*.

CORINE 31.611: alpine green alder scrub, *Alnetum viridis*. Green alder (*Alnus viridis* ssp. *viridis*) dominated formations, rich in tall herbs, of slopes with a good water-holding capacity, mostly on siliceous soils, in the subalpine and lower alpine belts of the Alps.

CORINE 31.81: MEDIO-EUROPEAN RICH-SOIL THICKETS; *Prunetalia*: *Pruno-Rubion fruticosi* p., *Berberidion*; Thickets of *Prunus spinosa*, *P. mahaleb*, *Rosa* spp. *Cornus mas*, *C. sanguinea*, *Sorbus aria*, *Crataegus* spp., *Lonicera xylostium*, *Rhamnus catharticus*, *R. alpinus*, *Clematis vitalba*,

Ligustrum vulgare, *Viburnum lantana*, *V. opulus*, *Rubus* spp., *Amelanchier ovalis*, *Cotoneaster integerrimus*, *C. nebrodensis*, *Pyrus pyraister*, *Malus sylvestris*, *Euenymus europaeus*, *Corylus avellana*, *Ulmus minor*, *Acer campestre*, *A. monspessulanum*, *Carpinus betulus* characteristic of forest edges, hedges and (mostly *Carpinion* or *Quercion pubescenti-petraeae*) woodland recolonization, developed on soils relatively rich in nutrients, neutral or calcareous.

CORINE 31.83: ATLANTIC POOR SOIL THICKETS; *Prunetalia* p.: *Pruno-Rubion fruticosi* p.: *Frangulo-Rubion* (*Rubion subatlanticum*; *Franguletalia*) ; Thickets of *Rubus* spp., *Frangula Alnus*, *Sorbus aucuparia*, *Corylus avellana*, *Lonicera periclymenum*, *Cytisus scoparius*, characteristic of forest edges, hedges and (mostly *Quercion*) woodland recolonization developed on soils relatively poor in nutrients, usually acid, mostly under climates with strong Atlantic influence.

CORINE 31.85: GORSE THICKETS; *Ulex europaeus* thickets of the Atlantic domain (including British *Ulex europaeus-Rubus fruticosus* scrub p.)

seasonal brook, running, freshwater: shallow, ground-water fed brooks flowing continuously autumn/spring, when the ground-water levels are high, but only intermittently at other times of the year (presence of these features may be difficult to detect when they are not flowing). This category does not include torrents (temporary streams dependent primarily upon snow melt, that normally flow for only a short period in each year, but with great vigour)

seasonal brook in cultures, cultures supplementary habitat: shallow, ground-water fed brooks flowing autumn/spring, when the ground-water levels are high, but not usually throughout the year (presence of these features may be difficult to detect when they are not flowing). In cultures, seasonal brooks are normally canalised and resemble ditches. They differ from ditches in that they flood from groundwater sources as well as from surface run-off.

seasonal brook in forest, forest supplementary habitat: shallow, ground-water fed brooks flowing in forest autumn/spring, when the ground-water levels are high, but not usually throughout the year (presence of these features may be difficult to detect when they are not flowing)

seasonal brook in open, open ground supplementary habitat: shallow, ground-water fed brooks flowing in open ground autumn/spring, when the ground-water levels are high, but not usually throughout the year (presence of these features may be difficult to detect when they are not flowing)

seasonal flower bed, urban park: area of rotovated, or otherwise maintained bare ground, into which has been planted various herbaceous plants with decorative flowers, the plants usually being replaced a number of times during any one year, in order to maintain a display of flowers for as long a season as possible. CORINE 85.14: Park flower beds, arbors and shrubbery. EUNIS X11.

semi-permanent flower bed, urban park: area of rotovated, or otherwise maintained bare ground, into which has been planted either tall, perennial herbaceous plants (e.g. *Iris*, *Narcissus*) or small shrubs (e.g. *Erica*, *Lavandula*, *Rosa*) that are left in place for more than one year, often acting as an edging or backdrop to a seasonal flower bed, or as a hedge or path border. CORINE 85.14: Park flower beds, arbors and shrubbery. EUNIS X11.

sheep, heavily-grazed improved grassland: cropping of ground vegetation by sheep throughout the growing season, resulting in reduction in general sward height to less than 2cm.

shingle beach, coastal beaches: CORINE 17.1, 17.2, 17.3. EUNIS B2.2, EUNIS B2.1, EUNIS B2.3. CORINE 17.1: UNVEGETATED SHINGLE BEACHES: Shingle beaches devoid of phanerogamic vegetation. Mediolittoral (intertidal) and supralittoral invertebrate communities can be used to define subdivisions.

CORINE 17.2: SHINGLE BEACH DRIFT LINES; *Cakiletea maritimae* p.; Formations of annuals occupying accumulations of drift material and gravels rich in nitrogenous organic matter; characteristic are *Cakile maritima*, *Salsola kali*, *Atriplex* spp. (particularly *A. glabriuscula*), *Polygonum* spp., *Euphorbia peplis*, *Mertensia maritima*, *Glaucium flavum*, *Matthiola sinuata*.

CORINE 17.3: SEA KALE COMMUNITIES; *Honkenyo-Crambion*; Halo-nitrophilous perennial vegetation of the upper beach formed by *Crambe maritima*, *Honkenya peploides* and species characteristic of the regional communities as indicated below.

shrubbery/hedge, urban park: stands or hedges of usually broad-leaved, evergreen, shrubs of 1-3m height, with dense, ornamental foliage and/or ornamental flowers (e.g. *Buxus*, *Ilex*, *Laurus*, *Ligustrum*, *Prunus laurocerasus*, *Rhododendron*, *Viburnum tinus*). CORINE 85.14: Park flower beds, arbors and shrubbery.

small open area with flushes in forest, forest supplementary habitats: glades and small clearings within forest, containing helocrene groundwater outflows and usually with a ground cover of tall-herb communities (see under tall herb communities), though sometimes predominantly grassy with *Juncus* and or *Carex* spp.

Spanish *Quercus faginea*, thermophilous *Quercus* forest: xero-mesophile Portugese oak, *Quercus faginea*, formations of slopes and plateaux of middle elevations of the Spanish Meseta and associated ranges, with stands of overmature, mature and young (saplings/scrub) trees: CORINE 41.771. EUNIS G1.771.

CORINE: 41.771: *Spiraeo obovatae-Quercetum fagineae*, *Cephalanthero longifoliae-Quercetum fagineae*, *Violo wilkommii-Quercetum fagineae*, *Daphno latifoliae-Aceretum granatensis*, *Fraxino orni-Quercetum fagineae*.

***Spartina* bed**, saltmarsh: perennial, pioneer cordgrass (*Spartina*) grasslands of coastal salt muds: CORINE 15.2. EUNIS A2.55.

CORINE 15.2: CORDGRASS SWARDS; *Spartinion maritimae*; perennial pioneer *Spartina* grasslands of coastal salt muds.

spring/flush (gen.), running freshwater: running water outflows at their point of emergence above ground. CORINE 54.1. EUNIS C2.1, EUNIS C2.12.

CORINE 54.1: SPRINGS. For convenience helocrene features (flushes and seepages) are included under this general category, with limnocrène and rheocrène springs. This category includes CORINE 54.12: petrifying springs with tufa formations (Natura 2000 category code 7220).

CORINE 54.1: *Montio-Cardaminetea i.a.*; gushing spring (rheocrenes), springs basins (limnocrenes) and seepages (helocrenes) and the communities closely associated with them and dependent on the peculiar microclimatic and hydrological situation created by the spring. These comprise the specialised spring communities (*Montio-Cardaminetea*) as well as the fen communities (*Caricetalia davallianae*, 54.2, *Caricetalia fuscae*, 54.4) or other communities (*Caricion bicoloris-atrofuscae*, 54.3, *Festuco-Brometea*, 34.3) that are interwoven with them.

CORINE 54.12: Hard water springs with active formation of travertine or tufa. These formations are found in such diverse environments as forests or open countryside. They are generally small (point or linear formations) and dominated by bryophytes (*Cratoneurion commutati*).

spring in forest, forest supplementary habitat: limnocrène and rheocrène springs emerging within forests, under the tree canopy.

spring in open, open ground supplementary habitats: limnocrène and rheocrène springs emerging in open ground.

spring in wetland, wetland supplementary habitat: limnocrène and rheocrène springs emerging within wetlands.

standing (gen.), freshwater: lakes, pools and ponds (reservoirs are not covered), including temporary standing-water bodies (e.g. turloughs): CORINE 22.

CORINE 22: STANDING FRESH WATER; lakes, pools of natural origin, containing fresh (i.e. non-saline) water; man-made fresh water bodies, including ponds, reservoirs and canals.

standing, edge, (gen.), edge of freshwater: land/water ecotones of permanent standing water bodies.

steppic, lowland unimproved grassland CORINE 34.312

Sub-continental steppic grasslands, *Festucetalia valesiacae*. Open grasslands of sub-continental climates with *Festuca valesiaca*, *F. rupicola*, *F. pseudovina*, *F. duvalii*, *F. trachyphylla*, *Stipa capillata*, *S. joannis*, *S. pulcherrima*, *S. tirsia* (= *S. stenophylla*), *S. dasyphylla*, *Chrysopogon gryllus*, *Danthonia alpina*, *Koeleria micrantha*, *Agrostis capillaris*, *Poa bulbosa*, *P. molinerii* (= *P. badensis* var. *xerophila*), *P. perconcinna* (= *P. carniolica*), *Melica ciliata*, *Brachypodium pinnatum*, *Carex*

supina, *C. stenophylla*, *C. humilis* and herbs such as *Adonis vernalis*, *Pulsatilla montana*, *P. pratensis*, *P. grandis*, *P. patens*, *P. pusilla*, *Veronica spicata*, *Allium flavum*, *A. sphaerocephalon*, *Silene otitis*, *Artemisia campestris*, *Achillea collina*, *A. nobilis*, *A. setacea*, *Centaurea rhenana* (*C. stoebe*), *Inula spiraeifolia*, *Verbascum phoenicium*, *Armeria alliacea*, *Kochia prostrata*, *Euphorbia seguieriana*, *E. cyparissias*, *Campanula sibirica*, *Iris pumila*, *I. variegata*, *Linum flavum*, *Onosma taurica*, *O. arenaria*, *Potentilla arenaria*, *P. cinerea*, *Aster rinosyris*, *Onobrychis arenaria*, *Oxytropis pilosa*, *O. halleri*, *Ononis pusilla*, *O. cenisia*, *Astragalus onobrychis*, *A. exscapus*, *A. danicus*, *A. vesicarius*, *A. austriacus*, *A. alopecuroides*, *Eryngium campestre*, *Dianthus carthusianorum*, often of oriental, mostly sarmatic affinities. CORINE 34.312: central European steppic grasslands, Festucion valesiacae, Cirsio-Bracipodion. Dry grasslands, developed in areas with a locally high degree of continentality, of Alsace, the Upper Rhine valley and hills, Franconia, Thuringia, Saxony and Brandenburg. Habitats Directive 6240; EUNIS E1.22

subalpine/alpine (gen.), unimproved grassland: unimproved, subalpine/alpine grasslands, i.e. occurring above the natural tree-line: CORINE 36.32, 36.34, 36.38, 36.431, 36.433, 36.434, 36.44. EUNIS 4.32, EUNIS 4.34, EUNIS 4.38, EUNIS 4.431, EUNIS 4.433, EUNIS 4.434, EUNIS E1.B5.

subalpine, heath: CORINE 31.4. EUNIS F2.2.

CORINE 31.4: small, dwarf or prostrate shrub formations of the subalpine and alpine belts, dominated by ericaceous species, *Dryas* or dwarf junipers. Habitats Directive: Natura 2000 code: 4060.

subalpine scrub (gen.): *Alnus viridis* and *Pinus mugo* scrub of the Alps: CORINE 31.5, 31.611. EUNIS F2.4, EUNIS F2.311.

CORINE 31.5: DWARF MOUNTAIN PINE SCRUB; *Mugo-Rhodoretum hirsuti*. *Pinus mugo* brushes of well-drained, often calcareous, soils in the Alps and Apennines, frequently accompanied by *Rhododendron hirsutum*, *Erica herbacea*, *Arctostaphylos uva-ursi*, *A.alpina*, *Rhodothamnus chamaecistus*.

CORINE 31.611: subalpine green alder scrub, *Alnetum viridis*. Green alder (*Alnus viridis* ssp. *viridis*) dominated formations, rich in tall herbs, of slopes with a good water-holding capacity, mostly on siliceous soils, in the subalpine and lower alpine belts of the Alps.

tall herb clearing/tracksides in forest, forest supplementary habitats: tall herb-rich communities of open areas and tracksides within forest, largely excluding thermophilous forest fringe vegetation (CORINE 34.4) and humid tall herb communities (CORINE 37.71), but including the communities of usually large-leaved herbs developing along woodland edges, with *Galium aparine*, *Glechoma hederacea*, *Geum urbanum*, *Aegopodium podagraria*, *Silene dioica*, *Carduus crispus*, *Chaerophyllum hirsutum*, *Lamium album*, *Alliaria petiolata*, *Lapsana communis*, *Geranium robertianum*, *Viola alba*, *V.odorata* (CORINE: 37.72). Also included here are tall herb communities colonising medio-European and sub-Mediterranean deciduous or coniferous woodland clearings, clear-felled or burnt areas (CORINE: 31.87): *Epilobion angustifolii* and *Antropion*. EUNIS E5.2, EUNIS E5.411, EUNIS E5.43, EUNIS E5.57.

tall herb communities (gen.): CORINE 37.1, 37.7, 37.8. EUNIS E3.4, EUNIS E5.4, EUNIS E5.5.

Formations of tall herbs in lowland, humid grassland, montane/subalpine grassland and alluvial sites, and edging rivers and streams, excluding reed and tall sedge beds (CORINE 53.1-3).

tall sedge, reed/tall sedge beds: CORINE 53.2, 53.3. EUNIS E3.4, EUNIS E5.4, EUNIS E5.5.

CORINE 53.2: LARGE SEDGE COMMUNITIES; *Magnocaricion*; formations of large Cyperaceae of genera *Carex* or *Cyperus* occupying the edge or the entirety of humid depressions, oligotrophic mires and rich fens, on ground that can be dry for part of the year. They occur, in particular, on the landward side of reedbeds in waterside successions and as colonists of humid depressions on mineral soils, or of acid and alkaline fens.

CORINE 53.3: FEN-SEDGE BEDS; *Cladietum marisci* i.a; *Cladium mariscus*-dominated formations, mostly limited in the northern part of their range, where they have a distinct relict distribution, to alkaline and sometimes acid fens and to the land-building zone of calcareous lakes, somewhat more widespread in the Mediterranean region as a waterside vegetation.

temp. pool, standing freshwater: small, temporary water bodies of natural origin and their basins, flooded by river overflow, fluctuation in ground-water level, and/or rain or snow melt, considered both when containing water and when not. CORINE 22.5, in part (?). Deep, temporary lakes, which

would be included in the turlough category, are not covered by the interpretation of temporary pools used here, since many of the syrphid species associated with small, shallow, temporary pools cannot validly be predicted to occur in association with deep turloughs.

CORINE 22.5: bodies of water that are completely and recurrently emptied of water for part of the time, such as Irish turloughs. This definition seems to imply that the small, temporary pools that occur seasonally all over Europe are not included in this CORINE category. If so, then the CORINE category 22.5 does not coincide with the interpretation of temporary pool used here and should not be used to link this category to the CORINE system.

Turloughs: Natura 2000 code 3180: temporary lakes principally filled by subterranean waters and particular to karstic limestone areas in Ireland. Most flood in the autumn and then dry up between April and July. However, some may flood at any time of the year. The soils are variable, including limestone bedrock, marls, peat, clay and humus, while aquatic conditions range from ultra oligotrophic to eutrophic. The vegetation mainly belongs to the alliance *Lolio-Potentillion anserinae* Tx.1947, but also *Caricion davallianae* Klika 1934. EUNIS C1.67.

temp pool/edge perm.pool with cow dung, in open, open ground supplementary habitats: edges of temporary pools or of permanent pools or ponds in open ground, visited by cows or cattle, so that the strip of water-logged ground at the water margin is both trampled and enriched by cow dung.

temp.pool in open ground, open ground supplementary habitats: small temporary water bodies of natural origin, flooded by river overflow, fluctuation in ground-water level, and/or rain or snow melt, and not shaded by a tree canopy.

temp. pool u. canopy, forest supplementary habitat: small temporary water bodies of natural origin, flooded by river overflow, fluctuation in ground-water level, and/or rain or snow melt, and shaded by a tree canopy.

thermophilous forest fringe: woodland edge communities of *Trifolio-Geranieta* forming a belt between mesophilous grassland and shrubby forest mantle: CORINE 34.4. EUNIS E5.2.

CORINE 34.4: THERMOPHILE FOREST FRINGES; *Trifolio-Geranieta*; Woodland edge (hem) communities of warmth-requiring, drought-resistant herbaceous perennials and frutescent vegetation forming a belt between dry or mesophile grasslands and the shrubby forest mantle, on the sunny side, where the nutrient supply is limited, or, sometimes, pioneering the woodland colonisation into grasslands.

thermophilous *Quercus* (gen.), deciduous forests: dry oak forests (*Quercetalia pubescenti-petraeae*), with stands of overmature, mature and young (saplings/scrub) trees: CORINE 41.7. EUNIS G1.7.

CORINE 41.7: THERMOPHILOUS AND SUPRA-MEDITERRANEAN OAK WOODS; *Quercetalia pubescenti-petraeae*; forests or woods of sub-Mediterranean climate regions and supra-Mediterranean altitudinal levels, dominated by deciduous or semi-deciduous thermophilous oak species; they may, under local microclimatic or edaphic conditions, replace the evergreen oak forests in meso-Mediterranean or thermo-Mediterranean areas, and irradiate far north into medio-European or sub-Atlantic regions.

transit. mire, wetlands: transition mire, wetland type intermediate between fen and bog: CORINE 54.5. EUNIS D2.3.

CORINE 54.5: TRANSITION MIRE; *Scheuchzerietalia palustris*; *Caricion lasiocarpae*, *Rhynchosporion albae* p. i.a.; Wetlands mostly or largely occupied by peat-forming plant communities developed at the surface of oligotrophic or meso-oligotrophic water reaching a level above, sometimes well above, the substratum, providing little or no mineral or nutrient supply. Their characteristics are thus intermediate between those of soligenous and topogenous mires and those of strictly ombrogenous bogs. In large systems, the most prominent communities are swaying swards, floating carpets or quaking mires formed by medium-sized or small sedges, associated with sphagnum or brown mosses. They are accompanied by aquatic and amphibious communities (22.3, 22.4) and by formations transitional to these on the one hand, to fens (54.2, 54.4), bogs (51.1) or humid grasslands (37) on the other; sphagnum buttes (51.11), in particular, are often an important feature. Tall sedge and reed communities (53), willow and alder carrs (44) invade part of the peatland. Transition mires form mostly as colonists of oligotrophic ponds and lakes, large bog pools or lags. Their distribution is mostly northern peri-Alpine, peri-Hercynian and northern European. Outside of transition mire systems, their communities can be found in bog hollows (51.12), in blanket bogs (52), in depressions of

rich or acidic fens (542, 54.4), in spring systems (54.1), in humid heaths (31.1) and a few other habitats. Characteristic species include *Eriophorum gracile*, *Carex lasiocarpa*, *C.chordorrhiza*, *C.limosa*, *Scheuchzeria palustris*, *Hammarbya paludosa*, *Liparis loeselii*, *Calla palustris*. Transition mires are an extremely important refuge of specialized, threatened species of both plants and animals; their richness and diversity in remarkable invertebrates, dragonflies among others, is even greater than that of most other mire ecosystems.

tundra (gen.): open, gently undulating ground, treeless due to low prevailing temperatures and, often, permanently frozen subsoil. Vegetated by dwarf ericaceous shrubs (see dwarf-heath definition), dwarf *Betula* and *Salix* spp. (see dwarf *Betula/Salix* scrub tundra definition), *Dryas* mats (see arctic-alpine tundra definition) or palsa mire (see palsa mire definition) communities, dependent upon soil characteristics and exposure. The more exposed elevations are dominated by mosses and lichens. The mires have an abundance of shallow pools and their plant communities vary from those of acid fen to bog.. Palsa mire is here treated as a wetland macrohabitat category. EUNIS F.1.

Ulex thickets, Atlantic scrub: gorse/furze (*Ulex*) thickets: CORINE 31.85. EUNIS F3.15.
CORINE 31.85: GORSE THICKETS; *Ulex europaeus* thickets of the Atlantic domain (including British *Ulex europaeus-Rubus fruticosus* scrub p.)

understorey trees, urban park: stands of small, usually deciduous trees, with ornamental blossoms or foliage (e.g. *Crataegus*, *Ilex*, *Laburnum*, *Prunus*, *Robinia*, *Sorbus*). CORINE 85.11: Park woodlots.

unimproved grassland (gen.): lightly-grazed grassland (i.e. grassland cropped sufficiently to result normally in dominance by grasses, inhibition of extensive scrub cover and a sward height greater than 10cm) which is not fertilised or cultivated and not subject to reseeding or to systematic removal of loose, surface stones. Modification of species-association coding dictated by heavy grazing (i.e. reduction in general sward height to less than 5cm) can be achieved by reference to the "heavy grazing, cattle" and "heavy grazing, sheep" categories in the Farm Management operations impacts spreadsheet.

unvegetated water feature, urban park: constructed (or much modified) standing/slow moving body of water, often shallow (depth no more than 1m), with a solid (e.g. concrete or rock), unvegetated margin and an absence of aquatic macrophytes. CORINE 85.13: Park basins.

urban (gen.), culture macrohabitats: habitats of urban parks and gardens

urban parks: CORINE 85.1. EUNIS X11.

CORINE 85.1: LARGE PARKS; Large, varied green spaces (including parks, botanic gardens and some cemeteries). Their constituting elements can be specified by use of the codes below:

85.11 Park woodlots

85.12 Park lawns

85.13 Park basins

85.14 Park flower beds, arbors and shrubbery

vegetated water feature, urban park: constructed (or much modified) standing/slow moving body of water, often shallow (depth no more than 1m), with at least an edging of planted or spontaneous emergent hydrophytes or tall-herb vegetation. CORINE 85.13: Park basins

very dry (general), lowland unimproved grassland: CORINE 34.326; 34.33; 34.34. EUNIS E1.266, EUNIS E1.27, EUNIS E1.28.

CORINE 34.326: Sub-Mediterranean *Mesobromion*. Closed, mesophile grasslands, usually rich in *Bromus erectus* and orchids, of the periphery of the Mediterranean basin in Catalonia, the eastern Pyrenees, the Corbières, the Causses, Provence, the south-western Alps and the northern Apennines.

CORINE 34.33: SUB-ATLANTIC VERY DRY CALCAREOUS GRASSLANDS *Xerobromion* (*Seslerio-Xerobromion*).

CORINE 34.34: CENTRAL EUROPEAN CALCAREOUS-SILICEOUS GRASSLANDS *Koelerio-Phleion phleoidis* (*Armerion elongatae*, *Sedo-Cerastion* p.)

vineyard: plantations of the European grape vine, *Vitis vinifera*. CORINE 83.21. EUNIS FB.4.

water edge (gen.): this general category addresses the ecotone situations occurring between freshwater and terrestrial environments.

water feature (general), urban park: constructed (or much modified) standing/slow moving body of water, often shallow (depth no more than 1m), with or without planted or spontaneous emergent hydrophytes or tall-herb vegetation. This category includes linear features, like permanently water-filled channels/ditches, but excludes fountains. CORINE 85.13: Park basins

western karstic *Q. pubescens* savanna, western *Quercus pubescens* forest: natural savanna (i.e. climatically and geologically induced and maintained savanna, sensu Grove and Rackham, 2005) of western European white oak on karstic limestone, with scattered overmature and mature trees and stands/thickets of young (saplings/scrub) trees, with only patchy ground vegetation of *Thymus* spp etc and areas of exposed bed-rock; frequently accompanied by *Acer monspessulanum* and with thickets of *Buxus sempervirens* predominating in the shrub layer, but *Rhamnus alaternus*, *Pistacia terebenthus*, *Amelanchier ovalis*, *Viburnum lantana*, *Coronilla emerus*, *Osyris alba*, *Helleborus foetidus* and *Rubia peregina* also present, where there is sufficient soil.

western *Q. pubescens*, thermophilous *Quercus* forest: western European white-oak forest (*Quercion pubescenti-petraeae*: *Buxo-Quercetum*, *Lithospermo-Quercetum petraeae*, *Potentillo albae-Quercetum*, *Pteridio-Quercetum pubescentis*, *Aceri-Quercetum petraeae*) with stands of overmature, mature and young (saplings/scrub) trees: CORINE 41.71. EUNIS G1.71. CORINE 41.71: WESTERN WHITE OAK WOODS AND RELATED COMMUNITIES *Quercus pubescens* forests and woods of the supra-Mediterranean zone of France, west of the Alpine arc, and of north-eastern Spain, with irradiations to southern Germany and Belgium. Low medio-European forests of *Q. petraea* or *Q. robur* occupying warm exposures beyond the range of *Q. pubescens* and linked to the *Quercion pubescenti-petraeae* by the presence of *Buxus sempervirens* or other thermophile calcicolous plants (*Limodorum abortivum*, *Melittis melissophyllum*). These forests occur in a wide range of edaphic conditions and two of the extremes, western *Q. pubescens* on karst and western *Q. pubescens* on clay (marl), are treated here as separate subcategories.

western *Q. pubescens* on clay, western *Quercus pubescens* forest: western European white oak forests on calcareous clay/marl soil, with stands of overmature, mature and young (saplings/scrub) trees: often dense, closed canopy forest with *Acer campestre*, *Fraxinus exelsior*, *Sorbus aria*, *Sorbus torminalis* (less frequently also *Sorbus domestica*); *Prunus mahaleb*, *Cornus sanguinea*, *Tamus communis*, *Rubia peregina*, *Rubus fruticosus* agg., *Hedera helix*, *Erica vagans*.

western taiga, coniferous forest: northern conifer forest dominated by *Pinus sylvestris*, in which *Picea abies* and *Betula* species may also occur, with a shrub layer of dwarf ericaceous shrubs e.g. *Empetrum nigrum*, *Ledum palustre*, *Vaccinium vitis-idaea*, and a ground layer dominated by bog mosses in wetter places and by *Cladonia* and *Cetraria* lichens in drier, more northern areas. This category includes the forest stages developing after fires, which are natural to these forests (though rare today due to human influence). Large quantities of dead, burned wood are typical for burned areas. This category does not include *Betula* or *Picea*-dominated locations - these should be treated as *Betula* forest or *Picea* forest (respectively). Habitata Directive, Natura 2000 code: 9010. EUNIS G3.A.

wet woods (gen.): tree and shrub vegetation of marshes, fens and bogs, with stands of overmature, mature and young (saplings/scrub) trees (CORINE 44). Encompassing very wet swampy woods: CORINE 44.A, 44.91. EUNIS D1, D2, D4, F9, G1, G3, in part; EUNIS G1.41, G1.52.

CORINE 44: ALLUVIAL AND VERY WET FORESTS AND BRUSH; Tree and shrub vegetation of flood plains, marshes, fens and bogs.

CORINE 44.A: BIRCH AND CONIFER SWAMP WOODS; *Vaccinio-Piceetea*: *Piceo-Vaccinienion uliginosi* (*Betulion pubescentis*, *Ledo-Pinion*) i.a. Woods of *Betula pubescens*, *Pinus* spp. or *Picea abies* colonizing bogs and acid fens.

CORINE 44.91: ALDER SWAMP WOODS; *Carici elongatae-Alnetum* (*Irido-Alnenion*); Mesotrophic and meso-eutrophic *Alnus glutinosa* swamp woods of marshy depressions, with *Carex elongata*, *Thelypteris palustris*, *Dryopteris cristata*, *Osmunda regalis*, *Solanum dulcamara*, *Calystegia sepium*, *Ribes nigrum*, and often, in acidocline variants, *Betula pubescens*. The constancy of *Carex paniculata*, *C. acutiformis*, *C. elata*, often dominates the herb layer in the most humid types.

wetland macrohabitats: land on which either surface water (standing or running) or water-logged conditions persist throughout, or during a substantial part of, the year.

xeric/semi-arid (gen.), lowland unimproved grassland. CORINE 34.1; 34.3; 34.5; 34.71-2. EUNIS E1.1, EUNIS E1.2, EUNIS E1.3, EUNIS E1.51, EUNIS E1.52.

HABITAT SURVEY FORM

SITE NAME:

LOCATION:

**SAMPLE
STATION:**

DATE OF SURVEY:

CODE NUMBER OF HABITAT OBSERVED	CODE NUMBERS OF ASSOCIATED SUPPLEMENTARY HABITATS

NOTES

Chapter 3: RANGE AND STATUS CATEGORIES

3.1. Species coding and coverage

The Range and Status categories are grouped under a number of sections. The coding system used is not the same in all the sections.

3.1.1. Spreadsheet Section 1: database coverage

This section of the file indicates the level of coverage provided by the database for the species listed and changes in the level of coverage that have been made in the most recent issue of the database files.

Species which have been added to the database species list in the 2020 issue of the database files are coded "1" in the "species added 2020" column.

Species are coded "1" or blank, in the "species account compiled" column, blank indicating that no species account has yet been compiled. A significant number of species for which species accounts have been written are not coded in all of the potentially relevant StN spreadsheets categories, due to lack of information

The "habitat covered" columns indicate which species are coded into all relevant categories of the spreadsheets, including at least one macrohabitat category. Species are coded "1" or blank, in the "species covered" columns. A species coded "1" in both "habitat covered" columns was coded into all the spreadsheets in the previous issue of the spreadsheets, as well as the current issue.

3.1.2 Spreadsheet Section 2: Nomenclature and taxonomy

This section shows when the nomenclature used for each species in the database was last updated, gives a rough guide to the taxonomic status of each species and codes date of description of the species in 25-year time periods. In the "nomenclatural update" column the date of the most recent update of the nomenclature of a species is given as the day, month and year of the update, or as the month and year of the update.

In the "taxonomic status" column fuzzy coding is used as follows:

4 = concept of species apparently stable; species identifiable in at least one sex, using generally reliable, European-level keys

3 = concept of species apparently stable and species adequately differentiated in generally reliable regional keys (i.e. keys covering some extensive part of Europe), but not incorporated into generally reliable, European-level keys

2 = concept of species unstable/impractical, due to existence of inadequately differentiated segregates (e.g. the situation of *Cheilosia vernalis* within the *vernalis* complex) or other taxonomic complications, such as the species not being incorporated into any regional key, or only being recognisable genetically

1 = status of taxon as a valid species doubtful, but the case for relegation of the name to synonymy has either not yet been investigated or formally made.

A taxon categorised as "status doubtful" (i.e. coded "1"), in the Taxonomic Status category is not coded for other attributes in the Range and Status spreadsheet except for indicating (where known), under "European States and other entities", the part of Europe from which the type material of that taxon originates. The only exception to this generalisation occurs in the genus *Pipiza*, for which an indication is provided of where in Europe the different species names are in use, in the "European States and other entities" part of the file. But, given the uncertainty surrounding application of these *Pipiza* names the distribution data associated with them has to be regarded as of doubtful value.

The expression "European-level key", as employed above, is used to refer to identification keys that purport to cover all, or nearly all, the known European species of a genus, in contradistinction to keys with restricted geographical coverage, like those that deal only with the species known from a particular country or part of Europe, referred to here as regional keys.

In the "date of description" columns each species is coded 1 for the 25-year time period within which its original description was published.

3.1.3. Spreadsheet Section 3: species lists for different parts of Europe and elsewhere

The third (and by far the largest) section of the Range and Status spreadsheet deals with the range of each species in Europe and elsewhere, using general Biogeographic Region categories for parts of the world other than Europe. This section also covers *all* the European (and Turkish) species.

For coding the Range categories a simple presence/absence system is used, as follows:

1 = species present
blank = species absent.

The following major works have been used in coding range information from outside Europe:

Afrotropical Region: Dirickx (1998)
Australasian/Oceanian Regions: Thompson and Vockeroth (1989)
Nearctic Region: Vockeroth (1992), Wirth *et al* (1965); Skevington *et al* (2019)
Neotropical Region: Thompson *et al* (1976)
Oriental Region: Knutson *et al* (1975)
Palearctic Region: Peck (1988)
North Africa: Dirickx (1994); Djellab *et al* (2013); Ebejer *et al* (2019)

Range within Europe is coded at two levels:

— the biogeographical “zones” recognised by the EU (with some minor modification)
— European States and other geopolitical entities (e.g. islands, geographically definable parts of States).

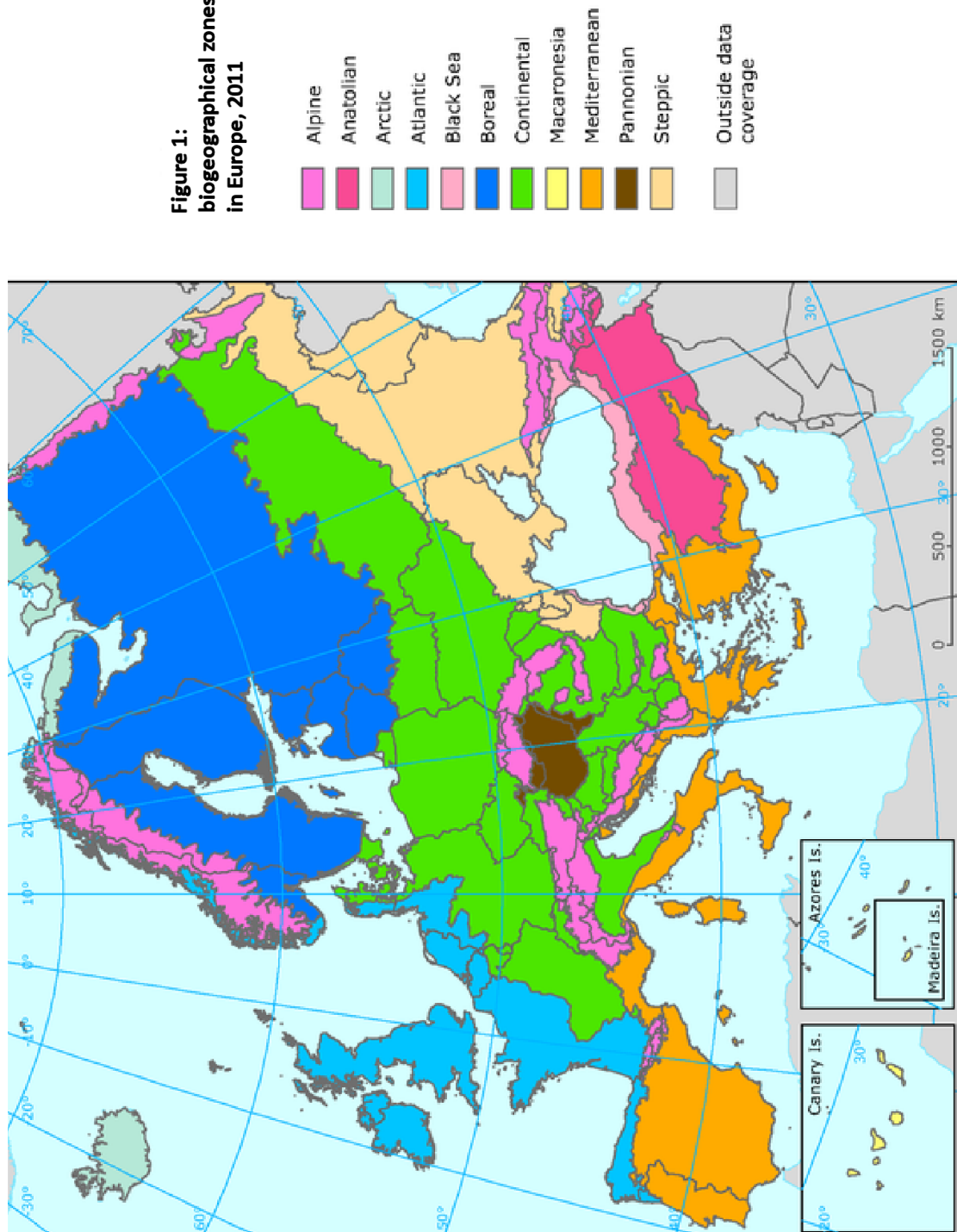
The present version of the database covers the syrphid species known from the following biogeographical zones:

Alpine (excluding Scandinavian alpine as recognised by the EU)
Arctic
Atlantic
Continental
Macaronesian
Mediterranean
Northern (Scandinavian alpine + boreal of the EU)
Pannonian

The EU biogeographical zones of Europe as used here are shown in Figure 1.

The geopolitical boundary between Europe and Asia is not particularly meaningful, biogeographically. For purposes of the StN database the geopolitical delimitation of Europe has nonetheless been used as a basis for deciding which syrphid species to include as “European” and which to exclude, except in the case of Turkey. Turkish species for which data are included in the database. By contrast, species that reach the edge of Europe only in the Caucasus are not. In principle, the species of Syrphidae covered are those that can reasonably be regarded as resident in some part of Europe that is covered by the database. One or two of the species covered, for instance *Ischiodon aegyptius* (Wied.), are possibly not resident, but repeatedly establish temporary populations that may, or may not, survive from one year to the next in Europe. A species almost certainly only recorded from part of Europe covered by the database as a consequence of transport by Man, and with no clear evidence of having established itself there, is not covered by the database, if its origin is outside Europe (and Turkey). An example is the Georgian species *Merodon batumicus* Paramonov, a live specimen of which has been found in the Netherlands (Delfos and van Helsdingen, 2000), having apparently arrived there in a consignment of bulbs. *M. batumicus* is neither covered by the database nor listed in it as a species occurring in the Netherlands.

Figure 1:
biogeographical zones
in Europe, 2011



In terms of coverage of the faunas of different countries or other recognisable entities, the database includes all the species (excepting certain doubtful or poorly known taxa) currently known from:

- Balearic Isles
- Belgium
- Britain (the island)
- Denmark
- Finland
- Iceland
- Ireland (the island)
- Liechtenstein

Luxembourg
 Malta
 Netherlands
 Norway
 Slovenia
 Sweden
 United Kingdom
 Atlantic and Continental parts of France
 Atlantic parts of Spain and Portugal
 northern Germany (the Länder of Bremen, Mecklenburg-Vorpommern Niedersachsen, and Schleswig-Holstein)
 southern Germany (the Länder of Baden-Württemberg and Bayern)
 non-alpine Switzerland (Switzerland below 1700m)

Coverage is not complete for other European States due to lack of information about some of the species involved. For certain parts of Europe the available data are so inadequate or unreliable as to make listing the known fauna pointless. An overview of the available lists is provided in Figure 2.



Figure 2: Availability of species lists of Syrphidae for different parts of Europe (January 2020)
 Dark grey = reliable list available; pale grey = list available, but requires updating; white = no list available.

The species lists incorporated into the Range and Status spreadsheet are based almost entirely on published information. The following is a summary of major sources used in compiling the species lists for particular countries/parts of Europe:

Andorra: Carles-Tolrá (2006) ; Marcos-Garcia et al (2002a) ; Speight (2019) ; van Steenis *et al* (2016)
 Austria: Nedeljković *et al* (2015); Ricarte *et al* (2017) ; Šašić *et al* (2016) ; Vujić *et al* (2012), Vujić *et al*, 2013
 Azores: Rojo *et al* (1997), Marcos-Garcia et al (2002a)
 Balearic Isles: Kassebeer (2002); Marcos-Garcia *et al* (2002a); Ricarte & Marcos-Garcia (2007); Riddiford and Ebejer (2006)
 Belarus: Peck (1988), Reemer (2000)

Belgium: de Bree *et al* (2014); Verlinden and Decleer (1987), Decleer (1989), Verlinden (1991), Baugnee (2002); van de Meutter (2003); van de Meutter & Reemer (2012); van de Meutter *et al* (2015)

Britain: Ball *et al* (2011); Speight *et al* (2015); Stubbs (2012); Speight & Vanappelghem (2018)

Canary Isles: Baez (1977a, b; 1982, 1986); Haeseler *et al* (2002); Marcos-García *et al* (2002a); Reemer (2014); Smit *et al* (2004)

Czech Republic: Chvala (1997); Bartak & Vujić (2004); Bartsch *et al* (2010), Hadrava *et al* (2018)

Denmark: Bruun & Bygbjerg (2016); Bygbjerg (2001, 2004, 2007a, 2007b, 2010, 2011); Bygbjerg & Petersen, 2009; Jensen (2001 - Faroe Isles); Tolsgaard & Bygbjerg (2006); Torp (1994)

Estonia: Kuznetsov (1993), van Steenis (1999)

Faroes: Jensen (2001)

Finland: Bartsch (1995); Hackman (1980); Haarto (2014); Haarto and Kerppola (2004, 2007, 2009, 2014); Haarto and Ståhls (2014); Haarto *et al* (2019); Kahanpää *et al* (2017); Kerppola (2011a, 2011b, 2016); Kerppola and Raekunnas (2012); Nielsen (2004); Ståhls & Vujić (2009); Bartsch *et al* (2010) and www.tam.pp.fi/syrph/index.html.

France: <http://syrfid.ensat.fr/>, plus Cavailles & Bouteloup (2019); Cavailles *et al* (2019); Descaves & Speight (2017); Dussaix (2013); Dussaix *et al* (2007, 2008); Gharet (2010); Haarto and Ståhls (2014); Lebard *et al* (2019); Marcos-García *et al* (2011); Lair (2018); Sarthou *et al* (2007); Šašić *et al* (2016); Smit and Vujić (2008); Speight (2007a, 2007b, 2018); Speight *et al* (2007, 2013a, 2013b, 2015, 2016, 2017); Speight and Castella (2010); Speight and Descaves (2015); Speight and Garrigue (2016); Speight and Goy (2016); Speight and Lebard (2014); Speight and Ricarte (2012); Speight and Sarthou (2008); Speight & Vanappelghem (2018); Ssymank and Lair (2015); Tissot *et al* (2013, 2019a, 2019b); Treiber (2011); Treiber and Doczkal (2016); Vallet (2010); Veselić *et al* (2017)

Germany: Binot *et al* (1998); Doczkal and Dziock (2004); Doczkal *et al* (1993, 2001); Flügel (2001); Nielsen (2004); Röder (1998); Ssymank *et al* (1999, 2012); Ssymank and Doczkal (2017); data for Northern Germany provided by F.Dziock; supplemented by Bartsch *et al* (2005); Stuke and Wolff (1998); Wolff (1998); Stuke *et al* (2000); Stuke and Schulz (2001) and Stuke *et al* (2004)

Gibraltar: Ebejer & Bensusan (2011); Ricarte *et al* (2017)

Greece: Ačanski *et al* (2016); Claussen and Lucas (1988); De Courcy Williams *et al* (2011); Grković *et al* (2016, 2017, 2019); Peck (1988); Pérez-Bañón *et al* (2000, 2016); Petanidou *et al* (2011); Radenković *et al* (2011); Ricarte *et al* (2012); Šašić *et al* (2016); Smit and Vujić (2008); Ssymank (2012b); Stackelberg (1961); Ståhls *et al* (2009); Standfuss and Claussen (2007); Van de Weyer and Dils (1999); van Steenis & van Steenis (2014); van Steenis *et al* (2016); Veselić *et al* (2017); Vujic *et al* (2000, 2007, 2012, 2015, 2016, 2018, 2019)

Hungary: Tóth (2001); Nielsen (2004); Reemer & Turnhout (2015)

Iceland: Ólafsson (1991)

Ireland: Speight (2008, 2015); Speight & Vanappelghem (2018);

Italy (including Sardinia and Sicily): Birtele (2011); Birtele *et al* (2002), Burgio *et al* (2000); Burgio and Sommaggio (2003); Claussen and Van de Weyer (2004); Daccordi (1995); Daccordi and Sommaggio (2002); Delmastro and Sommaggio (2003); Kehlmaier (2009); Nedeljković *et al* (2013); Nielsen (2004); Šašić *et al* (2016); Scarparo *et al* (2017); Sommaggio (2010); Sommaggio and Corazza (2006); Vujić *et al* (2012)

former Yugoslavia: data supplied by A.Vujic; Vujic *et al* (2001, 2002); Witek *et al* (2013)

Latvia: Karpa (2008); Kuznetsov (1993)

Liechtenstein: Speight and Lucas (1992), Speight (1993b); Speight *et al* (2015)

Lithuania: Lutovinovas (2007, 2012); Lutovinovas & Kinduris (2013, 2015); Lutovinovas & Putys (2019); Pakalniškis *et al* (2000, 2006); Petrašiūnas (2016)

Luxembourg: Erpelding (1989); Haarto and Ståhls (2014); Verlinden and Decleer (1987), Carrières (2001a, 2001b, 2003) plus data provided by E Carrières; Van Steenis (2006)

Macaronesian region: Rojo *et al* (1997), Marcos-García *et al* (2002a)

Madeira: Aguiar, Smit and Wakeham-Dawson (2005), Barkemeyer (1999), Gomes and Baez (1990), Marcos-García *et al* (2002a), Smit *et al* (2004); Van Eck (2011)

Malta: Ebejer (1988, 1995)

Mediterranean region: Dirickx (1994)

Montenegro: Chroni *et al* (2018); Nedeljković *et al* (2010, 2013, 2015); Šašić *et al* (2016); Simić (1987); Ståhls & Barkalov (2017); Van Steenis *et al* (2015); Vujić *et al* (1997); Vujić *et al* (2001); Smit and Vujić (2008); Veselić *et al* (2017); Vujić *et al* (2012, 2013)

Netherlands: Barendregt (1982), NJN (1998); Bot (2014); de Bree *et al* (2014); Faasen (2017); Jacobusse *et al* (2016); Reemer *et al* (2009); Smit and de Bree (2014, 2016); Smit *et al* (2001,

2015); Van Steenis, W. *et al* (2014); plus data provided by P.J.van Helsdingen, M.Reemer and W. van Steenis

North Macedonia: Glumac (1972); Krpač *et al* (2001, 2006, 2009, 2011); Nedeljković *et al* (2010, 2015); Peck (1988); van Steenis *et al* (2016); Vujic (1990, 1995, 1996); Vujic *et al* (2004, 2012)

Norway: Gammelmo and Aarvik (2007); Gammelmo & Nielsen (2008); Haarto and Ståhls (2014); Nielsen (1999, 2002, 2004, 2005, 2008, 2014a, 2014b); Nielsen & Ødegaard (2013); Nielsen & Svendsen (2014); Ståhls and Krivosheina (2003); Van Steenis (2011); plus data provided by Tore Nielsen

Poland: Mielczarek (2010, 2011, 2013, 2014a, 2014b); Mielczarek *et al* (2019); Soszyński (1991); Soszyński *et al* (2013); Wakkie *et al* (2011); Zoralski & Kowalczyk (2014); Zoralski & Mielczarek (2018)

Portugal: Lucas (1996); Marcos-Garcia *et al* (1998); Marcos-Garcia *et al* (2002a); Ricarte & Lyszkowski (2009); Ricarte Sabater *et al* (2009); Tartally *et al* (2013); Van Eck (2011, 2016)

Roumania: Bradescu (1991, 1992, 1993); Grković *et al* (2019); Jessat (1998); Ricarte *et al* (2017); Stănescu (1992); Stănescu & Parvu (2005); Vujic *et al* (1998); Vujić *et al* (2012)

Russia (European): Barkalov & Mutin (2018); Peck (1988); Prokhorov & Popov (2016, 2017); Soszyński *et al* (2013); Vujić *et al* (2012)

Serbia: Glumac (1972); Grković *et al* (2019); Markov *et al* (2016); Miličić *et al* (2018); Nedeljković *et al* (2009a, 2009b, 2010, 2013, 2015); Šašić *et al* (2016); Smit & Vujić (2008); Van Steenis *et al* (2015); van Steenis *et al* (2016); van Steenis *et al* (2019); Vujić (1996); Vujic & Milankov (1999); Vujić & Simić (1999); Vujić *et al* (2008); Vujić, M. *et al* (2016)

Slovak Republic: Chvala (1997); Mielczarek (2014)

Slovenia: de Groot & Govedič (2008); Janević & de Groot (2018); Van Steenis *et al* (2013)

Spain: Alexander (2005); Garcia (2018); Grković *et al* (2019); Marcos-García *et al* (1998, 2002a,b, 2007, 2011); Milankov *et al* (2009); Nielsen (2004); Reemer (2014); Ricarte & Marcos-Garcia (2007, 2010); Ricarte *et al*, (2006, 2008, 2010, 2013, 2014, 2017); Speight *et al* (2015); van Eck (2010); Van Steenis & van Steenis (2014);

Sweden: Bartsch (1995, 2001, 2008, 2009); Bartsch *et al* (2005, 2009a, 2009b, 2010); Hellqvist (2009)

Switzerland: Bächli *et al* (2014); Carron *et al* (2006); Dirickx & Obrecht (2007); Dutto & Maistrello (2017); Haenni (2010); Maibach *et al* (1998); Merz (2001); Nielsen (2004); Šašić *et al* (2016); Speight & Sommaggio (2010); Speight *et al* (2015, 2019); Toth (1994); Toth & Rezbanayai-Reser (2002); Vujić *et al* (2012)

Turkey: Aktaş and Saribiyik (2001); Chroni *et al* (2018); Claussen and Hayat (1997a, 1997b); Dirickx (1998); Goeldlin (1976); Goeldlin and Lucas (1981); Grković *et al* (2015, 2019); Hayat (1997); Hayat and Alaoğlu (1990); Hayat and Claussen (1997); Hurkmans (1987, 1993); Hurkmans & Hayat (1997); Likov *et al* (2019); Nedeljković *et al* (2015); Özgür and Saribiyik (2002); Peck (1988); Ricarte *et al* (2017); Saribiyik (1999a, 1999b, 2000a, 2000b, 2001, 2003a, 2003b, 2003c, 2004, 2008, 2009, 2014); Saribiyik and Aktaş (1996a, 1996b); Saribiyik and Hasbenli (1997); Saribiyik and Özgür (2000); Speight (1991); Speight and Lucas (1992); Toth (2013); Van Steenis (2000); Van Steenis & Lucas (2011); Van Steenis & van Steenis (2014); Van de Weyer (2000, 2010); Vujic *et al* (1999, 2011); Vujić *et al* (2012, 2013c)

United Kingdom: Ball and Morris (2013); Ball *et al* (2011); Nash (1997), with additional data provided by B.Nelson; Ransom (2016); Speight (2015); Stubbs (2012); Wright (2013a, 2013b).

3.1.4. Spreadsheet Section 4: European endemism

The fourth section of the spreadsheet categorises the species according to the degree of European endemism they each exhibit. Since the land mass of Turkey lies almost entirely outside the geographical area normally recognised as the European continent, in assessing European endemism it has, of necessity, been regarded as an Asiatic part of the Palaearctic Region. Thus, species apparently endemic to Turkey are coded as extra-European in the file. In coding the Degree of Endemism categories a simple system is employed, the species consigned to a particular category being coded "1" and the species not consigned to that category indicated as a blank. A species endemic to Europe is coded "1" for the category "European (general)" and "1" for "European endemic". If the species is a localised endemic, it will also be coded "1" for the category "localised endemic".

3.1.5. Spreadsheet Section 5: Status

The fifth (and final) section of the spreadsheet deals with the conservation status of the species, expressed as the degree to which each species is estimated to be under threat of extinction in the part of

Europe concerned. Estimates of species status are not available for many parts of Europe, and this is reflected in the file content.

In the Degree of Threat categories, the fuzzy coding system used elsewhere in the Syrph the Net tables is employed, as follows:

- 3 = maximal association
- 2 = moderate association
- 1 = minor association
- blank = the species is not associated with this category.

The fuzzy coding system is particularly useful here, because the precise status of species within these parts of Europe is frequently unclear, not least since the different authors who have consigned species to status categories in their own areas have not used the same systems or criteria in categorising the species. Typically, a species whose status is clear in one of the parts of Europe covered by the Table will receive a coding of 3 in the relevant column. In cases where a species appears to be a border-line case it is given a coding of 2 in each of the categories to which it may be consigned. In cases where, on balance, it seems most justified to consign a species to a particular category, but there are some grounds for considering it might be consigned to a different category, it is coded 2 and 1 for these categories, respectively. Use of IUCN status categories has been deliberately avoided here, it being concluded that, at this point in time, a simpler system with more flexibility matches better the heterogenous nature of existing syrphid data, while still enabling a usable categorisation of the species.

3.2. Summary table of Range and Status categories

1. DATABASE COVERAGE	
Species account compiled	
Species covered 2010	
Species covered 2013	
Species added in 2013	
2. NOMENCLATURE AND TAXONOMY	
Nomenclatural update	
Taxonomic Status	
Date of description	
	1751-1775
	1776-1800
	1801-1825
	1826-1850
	1851-1875
	1876-1900
	1901-1925
	1926-1950
	1951-1975
	1976-2000
	2001-
3. RANGE	
World Range	
Afrotropical Region	
Australasian/Oceanian Region	
Nearctic Region	
Neotropical Region	
Oriental Region	
Palearctic Region (gen.)	
	N Africa
European Range	
European biogeographical zones	
Alpine	
Arctic	

Atlantic
Continental
Macaronesian
Mediterranean
Northern
Pannonian
other

European States and other entities

Andorra
Austria
Belgium
Czech Republic
Denmark

Faroes

Estonia
Finland
France (gen.)

Corsica

Germany (gen.)

N Germany (gen.)
Schleswig-Holstein
Nieder-sachsen & Bremen
Mecklenburg-Vorpommern

S Germany (gen.)

Baden-Württemberg
Bayern

Gibraltar
Greece

Crete
Cyclades
Rhodes & Dodecanese

Hungary
Iceland
Ireland (gen.)
Italy

Sardinia
Sicily

Latvia
Liechtenstein
Lithuania
Luxembourg
Malta
Montenegro
Netherlands
North Macedonia
Norway
Poland
Portugal

Azores
Madeira

Republic of Ireland
Roumania
Russia (European)
Serbia
Slovak Republic
Slovenia

Spain	Balearic Isles Canaries
Sweden	
Switzerland (gen.)	lowland non-alpine Jura
Turkey	
United Kingdom (gen.)	Britain England Northern Ireland Scotland Wales
4. DEGREE OF ENDEMISM	
Extra-European	
European (gen.)	European endemic (gen.) Localised endemic
5. STATUS	
Europe	threatened decreasing unthreatened
Alpine zone	threatened decreasing unthreatened
Atlantic zone	threatened decreasing unthreatened
Continental zone	threatened decreasing unthreatened
Belgium	threatened decreasing unthreatened
Britain	threatened decreasing unthreatened
Denmark	threatened decreasing unthreatened
France	threatened decreasing unthreatened
Germany	threatened decreasing

Ireland	unthreatened
	threatened
	decreasing
Netherlands	unthreatened
	threatened
	decreasing
Switzerland	unthreatened
	threatened
	decreasing
	unthreatened

3.3. Glossary of Range and Status categories

afrotropical: the Afrotropical region. Essentially, Africa south of the Sahara desert.

alpine, European biogeographical zones: the Alpine zone of Europe, as shown in Figure 1, excluding its Scandinavian part, which is included in the “Northern Region” category used here.

Alps, alpine zone: the massif of the Alps, including its valleys, as shown in Figure 1.

Andorra, European States and other entities: the principality of Andorra, in the Pyrenees, partly within France and partly within Spain.

Arctic, European biogeographical zones: the Arctic zone of Europe, as shown in Figure 1.

Atlantic, European biogeographical zones: the Atlantic zone of Europe, as shown in Figure 1.

australasian/oceanian: the australasian and oceanian regions treated together.

Austria, European States and other entities: the European State of Austria

Azores, European States and other entities, Portugal: the Macaronesian island archipelago of the Azores (including Faial, Flores, Pico, Santa Maria, São Jorge, São Miguel, Terceira)

Balearic Isles, European States and other entities, Spain: the group of Mediterranean islands comprising Ibiza, Mallorca and Menorca.

Belgium, degree of threat: the European State of Belgium (for Belgium, status is coded for the entire territory of the State).

Britain, European States and other entities: the island of Great Britain.

Canaries, European States and other entities, Spain: the Macaronesian island archipelago of the Canary Isles, including El Hierro, Fuerteventura, Gran Canaria, La Palma, Lanzarote and Tenerife

Checklist of European and Turkish Syrphidae: names currently in use for European and Turkish Microdontidae and Syrphidae, including taxa of doubtful validity (for a guide to the degree of reliability with which each taxon can be recognised, see "taxonomic status" category)

continental, European biogeographical zones: the continental zone of Europe, as shown in Figure 1.

Corsica, European States and other entities, France: the Mediterranean island of Corsica

Czech Republic, European States and other entities: the European State of the Czech Republic (including the regions Bohemia and Moravia).

Date of description, nomenclature and taxonomy: the 25-year time unit containing the year in which the original description of a species was published, within the period 1751 to today. This time period comprises 11 units of 25 years, each of which is coded separately: 1751-1775, 1776-1800, 1801-1825, 1826-1850, 1851-1875, 1876-1900, 1901-1925, 1926-1950, 1951-1975, 1976-2000, 2001-

Denmark, European States and other entities: the European State of Denmark, excluding the Faroes, which are treated as a separate geographical entity (see under Faroes).

decreasing: although not yet recognisably threatened, exhibiting a noticeable decrease in numbers of populations and/or range within the geographical area concerned, during the 20th. century.

degree of endemism: the extent to which a species is confined to Europe, as indicated by its geographical range.

degree of threat: extent to which a species is threatened with extinction in the continent of Europe and various subdivisions of Europe, using very generalised threat categories.

England, European States and other entities: the United Kingdom region of England.

Estonia, European States and other entities: the European State of Estonia.

Europe (gen.), degree of threat: extent to which a species is threatened with extinction in the continent of Europe, from the Ural mountains to the Atlantic Ocean.

European (gen.), degree of endemism: a species whose range is predominantly (but not entirely) within Europe.

European endemic (gen.), degree of endemism: a species confined to Europe.

European range: the regions of Europe within which a species is known to occur.

European biogeographical zones, European range and Degree of endemism: the biogeographical zones of Europe, as shown in Figure 1.

European States and other entities, European Range: States, Principalities and other recognisable geographical, or socio-political, units within Europe, including EU Member States. At present, the database does not provide a separate category (i.e. column) for the syrphid faunas of a number of European states (including Austria), for which recent national species lists are not available.

extra-european, degree of endemism: a species whose range is predominantly outside Europe, or as extensive outside Europe as in Europe.

Faroes, European States and other entities, Denmark: the Faroe islands, as depicted by Jensen (2001). The Faroe islands are here treated separately from the rest of the State of Denmark.

Finland, European States and other entities: the European State of Finland.

France, European States and other entities: the European State of France, exclusive of France-Outre-Mer and Corsica.

Germany (gen.), European States and other entities: the European State of Germany (for Germany, status is coded for the entire territory of the State)

Gibraltar, European States and other entities: the British Overseas Dependency of Gibraltar, at the southern tip of the Iberian peninsula.

Greece, European States and other entities: the European State of Greece, including islands (e.g. Crete, Cyclades, Rhodes & the Dodecanese)

Hungary, European States and other entities: the European State of Hungary

Iceland, European States and other entities: the European State of Iceland

Ireland, European States and other entities: the island of Ireland, including the Republic of Ireland and Northern Ireland (for Ireland, status is coded for the entire island).

Italy, European States and other entities: the European State of Italy, excluding Sardinia and Sicily, which are treated as separate geographic areas

Jura, European States and other entities, Switzerland: that part of the Jura massif lying within Switzerland

last nomenclatural update: the date when the name used for a taxon in the StN database was last amended (in most cases this is also the date when the name of the taxon was first added to the StN files)

Latvia, European States and other entities: the European State of Latvia.

Lithuania, European States and other entities: the European State of Lithuania.

Liechtenstein, European States and other entities: the European Principality of Liechtenstein.

localised endemic, European endemic: a species confined to a restricted part of Europe, such as part of one region of the continent, or one site.

lowland, Switzerland: Switzerland below 1000m altitude (in the 1998 version of the database, lowland Switzerland was defined as Switzerland below 650m, but this proved to be an impractical grouping).

Luxembourg, European States and other entities: the European Grand-Duchy of Luxembourg.

Macaronesian, European biogeographical zones: the Macaronesian zone of Europe, as shown in Figure 1, but excluding Cape Verde.

Madeira, European States and other entities, Portugal: the Macaronesian islands of Madeira and Porto Santo

Malta: the State of Malta, comprising the Mediterranean islands of Gozo and Malta.

Mediterranean, European biogeographical zones: the Mediterranean zone of Europe, as shown in Figure 1.

N Africa, Palaearctic region: the part of Africa consigned to the Palaearctic region, from Morocco to Egypt (inclusive). (This column codes only European species recorded from N Africa – N African species not known from Europe are not listed in the database).

N Germany, Germany: the Länder of Bremen, Schleswig-Holstein, Mecklenburg-Vorpommern and Nieder-Sachsen.

nearctic: the nearctic region, taken here as North America north of Mexico, including the USA (apart from Hawaii), Canada and Greenland, plus associated offshore islands.

neotropical: the neotropical region, essentially South America north to Mexico (inclusive).

Netherlands, European States and other entities: the State of the Netherlands

non-alpine, Switzerland: those parts of Switzerland below 1700m altitude

N Ireland, United Kingdom: the administrative region of the island of Ireland comprising the counties Antrim, Armagh, Derry, Down, Fermanagh and Tyrone.

Northern, European biogeographical zones: the boreal zone plus the Scandinavian part of the alpine zone, shown in Figure 1.

North Macedonia, European States and other entities: the former Yugoslav Republic of Macedonia

Norway, European States and other entities: the European State of Norway.

oriental: the oriental region, as delimited in Delfinado & Hardy (1975); essentially southern Asia from Pakistan and India eastwards through southern China to Taiwan (inclusive) and south-east to the Celebes (inclusive)

other, European biogeographical zones: used for species known entirely from biogeographical zones of Europe not yet covered by the spreadsheets, or for non-European species known from Turkey.

palaearctic (gen.): the palaearctic region, essentially Europe plus Africa south to the Sahara (inclusive) and Asia south to the Himalayas and across to Honshu (Japan) (inclusive).

Pannonian, European biogeographical zones: the Pannonian zone of Europe, as shown in Figure 1.

Poland, European States and other entities: the European State of Poland

Portugal, European States and other entities: the European State of Portugal, excluding Macaronesian islands (e.g. Azores and Madeira)

Pyrenees, alpine zone: the massif of the Pyrenees, including its valleys, as included in the alpine zone shown in Figure 1.

range: the geographical area in which a species occurs.

Republic of Ireland, European States and other entities: the European State of the Republic of Ireland

Roumania, European States and other entities: the European State of Roumania

Russia (European): those parts of the Russian Federation located within the continent of Europe, including the Caucasian area to the frontier between the Russian Federation and Georgia and Azerbaijan

Sardinia, European States and other entities, Italy: the Mediterranean island of Sardinia

Scotland, European States and other entities: the United Kingdom region of Scotland.

S Germany, Germany: the Länder of Baden-Württemberg and Bayern.

Sicily, European States and other entities, Italy: the Mediterranean island of Sicily

Slovak Republic, European States and other entities: the European State of the Slovak Republic

Slovenia, European States and other entities: the European State of Slovenia

Spain, European States and other entities: the European State of Spain, excluding the Balearics and the Canary islands, which are treated as separate geographic areas

species account compiled, database coverage: a species for which a species account is provided in the current StN Species Accounts volume (these species are not necessarily included in all of the StN spreadsheets – a species cannot be coded if the information available about it is insufficient)

species added in 2013, database coverage: species first listed in the StN spreadsheets in 2013

species added in 2014, database coverage: species first listed in the StN spreadsheets in 2014

species covered 2013, database coverage: species whose attributes are coded into all of the StN 2013 spreadsheets

species covered 2014, database coverage: species whose attributes are coded into all of the StN 2014 spreadsheets

Sweden, European States and other entities: the European State of Sweden.

Switzerland (gen.), European States and other entities: the Confederation of Switzerland

taxonomic status: the degree of reliability with which the taxon associated with a name used in the checklist can be recognised/degree of stability of the name of the taxon

threatened: probably threatened with extinction in the geographical area concerned. Critical use of the IUCN threat categories has not been possible and estimations of threat status are based simply on best available expert judgement.

Turkey, European States and other entities: the State of Turkey, including both European and Asiatic elements.

United Kingdom, European States and other entities: the European State of the United Kingdom, including England, Scotland, Wales and Northern Ireland (and offshore islands, including the Channel Isles, the Orkneys and the Shetlands).

unthreatened: apparently neither threatened nor decreasing in either number of populations or range within the geographical area concerned.

Wales, European States and other entities: the United Kingdom region of Wales.

world range: the biogeographical regions in which a species occurs.

Chapter 4: MICROSITE FEATURE CATEGORIES

4.1. Microsite feature coding

The Microsite Features categories provide, in coded form, microhabitat data for the larvae/puparia of species of European Syrphidae. The coding system used is as follows:

- 3 = maximally preferred microsite feature,
- 2 = preferred microsite feature,
- 1 = the species can occur with this microsite feature under certain circumstances but would not generally be predicted to occur with this feature
- blank = the species does not occur with this microsite feature.

Each microsite feature category recognised is treated in a separate column and defined, in alphabetic order, in the Microsite Feature Glossary. It is important to consult the glossary in order to understand the precise interpretation to be put upon the terms used.

The coded data are derived from both published and unpublished sources. In Syrphidae, intra-generic similarities between larval life styles of the species make possible a certain amount of extrapolation, from what is known of the microhabitat preferences of some species, to the microhabitat preferences of others that are less well known. Using best professional opinion, this extrapolation process, taken together with what is known of the macrohabitat preferences and habits of the adult insects of such less well-known species, has been employed to code microsite feature categories for their larvae/puparia. The data coded into the Microsite Features spreadsheet is thus an amalgam of established fact and deduction. References to published data on larval microhabitats are given in the Species Accounts volume.

4.2. Microsite feature definitions

In all but a small minority of cases, the term microsite feature is used here to denote physical features of the environment, discernable by human eye, that are important components of the microhabitats of syrphid larvae or puparia. No one of these features can be regarded as identical with the microhabitat of a species, because to define the microhabitat of an organism it is necessary to refer to not only physical features but also the conditions under which these features are used by the species (e.g. temperature and humidity parameters), and, frequently, to more than one physical feature. Three of the microsite features referred to are not physical features of the environment, but attributes of physical features. These are water trophic status, water movement and soil drainage, which are included here for convenience. Species are only coded for water trophic status or water movement if their larvae are aquatic/sub-aquatic. Species are only coded for soil drainage if their larvae are associated with the soil.

4.3. Summary table of Microsite feature categories

LARVAL ACTIVITY ZONE: TERRESTRIAL			
<i>Epigeon</i>			
Plants (gen.)	Trees (gen.)		
	Foliage (gen.)		
	Overmature/senescent trees (gen.)		
	trunk cavities		
	rot-holes		
	insect workings		
	sap runs/lesions		
	loose bark		
	Mature trees		
	Understorey trees		
	Shrubs/bushes/saplings (gen.)		
	Tall shrubs		
	Low shrubs		

Timber (gen.)	Upward climbing lianas	
	Herb layer (gen.)	
		On herb layer plants (gen.)
		tall strong herbs
		low-growing plants
		tussocks
		In herb-layer plants (gen.)
		in leaves/stems
	Standing	
	Fallen (gen.)	with bark no bark
Ground surface debris (gen.)	Stumps	
	Dung (gen.)	cow dung cow manure
	Compost	
	Litter (gen.)	forest herb layer fruit, decaying Opuntia platyclades, decaying
	Stones	
	Nests of social insects (gen.)	in trees in timber ground level
	<i>Hypogaeon</i>	
	Root zone (gen.)	
	Rotting tree roots	
	Grass-roots	
	With root aphids	
	Bulbs/tubers	
	Stem bases	
LARVAL ACTIVITY ZONE: AQUATIC		
Water plants (gen.)	Emergent (gen.)	out of water
		at surface below surface
	Floating	
	Submerged	
	Submerged sediment/debris (gen.)	
	Fine sediment (gen.)	sand mud/ooze organic detritus
	Coarse sediment (gen.)	dead wood twigs non-woody plant debris
	Water-saturated ground (gen.)	

	Wet mud/ooze
	Peat (gen.)
	Sodden plant debris (gen.)
	timber
	twigs
	non-woody
	Sodden cow-dung
HIBERNATION/OVERWINTERING ZONE	
Above ground surface (gen.)	
	Trees (gen.)
	Rot-holes
	Rotten wood
	Under bark
Timber (gen.)	Plant stems
	Standing
	Fallen
Ground surface (gen.)	
	Tussocks
	Litter (gen.)
	herb layer litter
	Forest litter
Root zone (gen.)	Under stones/boulders
	Bulbs/stem bases
	Rotten tree roots
Water-saturated ground (gen.)	Crevices/tunnels
	Wet mud/ooze
	Peat
Nests of social insects	Plant debris
In water (gen.)	
	Submerged plants
	Submerged debris
	Bottom sediments
SOIL/WATER CONDITIONS	
Soil drainage	
	Poorly drained/gleyed
	Freely draining
Water trophic status	
	Oligotrophic
	Mesotrophic
	Eutrophic
Water movement	
	Slow moving
	Standing

4.4. Glossary of Microsite Feature categories

above ground surface (gen.), hibernation/overwintering: self explanatory.

larval activity zone: the habitat strata and microsites within which the larvae occur. The data for hibernation/overwintering periods is coded separately, under "hibernation/overwintering" and refers to the overwintering stage of the life cycle.

aquatic, larval activity zone: microsite features occurring within surface water or groundwater. Larvae living in water in rot-holes in the trunks etc. of living trees are not coded under the aquatic activity zone. They are coded under rot-holes, in the terrestrial activity zone.

at surface, emergent, water plants: on emergent water plants, at, or within a centimetre from, the surface of the water.

below surface, emergent, water plants: on parts of emergent water plants below the water surface.

bottom sediments, in water, hibernation/overwintering: in surface layers of bottom sediments of temporary or permanent water bodies.

bulbs/stem bases, in the root zone, hibernation/overwintering: within the tissues of bulbs or corms, swollen stem bases, tubers or root stocks of herbaceous plants.

bulbs/tubers, root zone: within the tissues of bulbs, tap-roots, tubers or corms.

coarse sediment (gen.), submerged sediment/debris: in mineral or organic sediment or debris with a mineral particle size above 2mm. Organic material included is predominantly above 1mm in size and frequently includes much larger fragments.

compost, ground surface debris: a man-made, heaped, usually moist, accumulation of (predominantly non-woody) plant debris and soil left to rot down to provide an enriched medium for growing vegetables or other plants

cow dung, ground surface debris: in cow-dung in grassland or forest (see also sodden cow-dung)

cow manure, dung: a mixture of cow-dung and straw, traditionally left in heaps (a practice now decreasing due to concerns over environmental pollution) in farmland to rot, after removal from cow-houses and prior to being spread on fields

crevices/tunnels, root zone, hibernation/overwintering: in crevices/tunnels in the plant-root zone of soils, caused mainly by actions of small mammals, earthworms or the rotting of plant roots.

dead wood, coarse sediment, submerged sediment/debris: large pieces of floating or submerged dead wood, such as sections of trunk or major branches.

dung (gen.), among/under surface debris: the dung of mammals, both predatory and herbivorous.

emergent, water plants (gen.): bottom rooting perennials (helophytes) such as *Phragmites australis*, *Scirpus*, *Alisma*, *Iris*, *Typha*.

eutrophic, water trophic status: waters rich in the mineral nutrients required by green plants, and so having high primary production.

fallen (gen.), timber: in fallen dead trunks and/or large branches of trees.

fallen, timber, hibernation/overwintering: in fallen dead trunks and/or large branches.

fine sediment (gen.), submerged sediment/debris: in mineral or organic sediment with a mineral particle size below 2mm and organic particles predominantly below 1mm..

floating, water plants: among or attached to floating parts of aquatic plants.

foliage (gen.), trees: leaves and twigs of deciduous or coniferous trees. Foliage of any type or age of tree, shrub and woody bush is included here.

forest litter, among/under surface debris: non woody plant debris on the forest floor and small woody debris, e.g. twigs, fir cones, fragments of bark.

forest litter, on the ground, hibernation/overwintering: among non woody plant debris and/or small woody debris (e.g. twigs, fir cones, fragments of bark) on the forest floor.

freely draining, soil drainage: soils in which the free downward passage of water from the soil surface is not impeded.

fruit, decaying, litter: undessicated, decaying fruit (e.g. of *Opuntia*), fallen onto the ground surface.

grass-root zone, root zone: among roots of grasses or herbs in non-forest situations.

ground level, in nests of social insects: in nests of aculeate Hymenoptera on, or just under, the ground surface, including the mound nests of certain ants (Formicidae).

ground surface debris (gen.): living among or under plant remains and/or isolated stones on the ground surface. Twigs and similar small woody debris are covered by this category, but large woody debris is not. It is covered by the "Timber" category.

ground surface (gen.), hibernation/overwintering: under or in terrestrial ground surface microhabitats.

herb layer (gen.), on/in plants: ground-living, non-woody plants (including basidiomycete fungi).

herb layer litter, on the ground, hibernation/overwintering: among non-woody plant debris in terrestrial, non-forested situations.

herb layer litter, among/under surface debris: among non-woody plant debris in non-forested situations.

hibernation/overwintering zone: the habitat strata and microsites used for shelter from winter weather conditions by syrphids (mostly as larvae: to see in which life-cycle stage a species overwinters, see Traits spreadsheet).

in herb layer plants (gen.), in/on plants: living in the tissues of ground-living, non-woody plants.

in leaves/stems, in herb layer plants: living in the tissues of leaves or stems of low-growing, non-woody plants, above the ground surface.

insect workings, overmature/senescent trees: wet/humid tunnels made through wood by other insects, especially cerambycids, scolytids or *Cossus* (Cossidae), usually with insect faeces (partially-digested wood) and seeping sap.

in standing water, water movement: self-explanatory.

in timber, in nests of social insects: in aculeate nests in fallen or standing stumps, trunks or fallen big branches of dead trees.

in trees, in nests of social insects: self explanatory.

in water (gen.), hibernation/overwintering: in permanent or temporary water bodies, on submerged parts of plants, among submerged debris or in bottom mud. Aquatic, tree rot-hole dwelling larvae of Syrphidae are not coded under this category. They are coded under rot-holes.

litter (gen.), among/under surface debris: organic debris on the ground surface (rubbish left by man excluded).

litter (gen.), on the ground, hibernation/overwintering: organic debris on the ground surface (rubbish left by man excluded).

loose bark, overmature/senescent trees: under loose bark.

low shrubs/bushes/saplings: woody plants up to the height of 0.5 m, e.g. *Vaccinium*, *Calluna*, *Salix repens*.

low-growing plants, on herb layer plants: ground-living, non-woody flowering plants up to 0.5m in height.

mature trees: trees that have reached the age of fructification without yet developing the features described under "overmature/senescent".

mesotrophic, water trophic status: waters having intermediate levels of mineral nutrients required by green plants, and so having an intermediate level of primary production.

mud/ooze, fine sediment, submerged sediment/debris: in organo-mineral substrates composed of silt, clay and organic matter in varying proportions, with the maximum grain size of the mineral fraction below 0.06 mm.

nests of social insects (gen.): in nests of aculeate Hymenoptera; ants (Formicidae), wasps (Vespidae) or bumble bees (*Bombus*).

nests of social insects, hibernation/overwintering: in nests of aculeate Hymenoptera; ants (Formicidae), wasps (Vespidae) or bumble bees (*Bombus*).

no bark, fallen (timber): self-explanatory.

non-woody, plant debris, coarse sediment, submerged sediment/debris: among/in decaying stalks and leaves of higher plants.

non-woody, odden plant debris: among/in sodden, decaying stalks and leaves of higher plants, including compost heaps, manure and silage.

oligotrophic, water trophic status: waters having low levels of mineral nutrients required by green plants, and so having low primary production.

on herb layer plants, in/on plants: living on the surface of ground-living, non-woody plants.

on/in timber (gen.) (hibernation/overwintering): overwintering on, in or under tree stumps, dead standing or fallen trunks or fallen major branches.

***Opuntia* platyclades, decaying,** litter: fallen, decaying, non-dessicated platyclades of the cactus *Opuntia*

organic detritus, fine sediment, submerged sediment/debris: in fine (0.045 - 1mm) particulate organic material. At one extreme, this includes bottom sediments of water bodies in peat.

out of water, emergent, water plants: on the parts of emergent water plants projecting above the water surface.

overmature/senescent trees (gen.): the term overmature tree is not applied here as in commercial forestry, i.e. a tree which has exceeded the age at which it would normally be harvested. Here an overmature/senescent tree is taken to be one on which microhabitats for saproxylic organisms have developed. As a generality, such trees are significantly older than those which would be regarded as overmature by foresters.

peat, water-saturated ground: in water-logged surface peat layers of wetlands.

plant debris, water-saturated ground, hibernation/overwintering: water-sodden remains of macrophytes, including non-woody and small woody material.

plants (gen.): the parts of living plants on, or in, which the larvae live are categorised here. Vegetative and reproductive parts are included, as are both soft and woody tissues. For convenience, epigeal dead woody material is also categorised under this heading.

plant stems, above ground surface, hibernation/overwintering: in hollow, standing stems of dead plants or between plant stem and leaf sheath. This category includes species overwintering in these situations on emergent parts of plants in water, for example, standing dead *Phragmites* or *Typha*.

poorly drained/gleyed, soil drainage: soils in which the free downward passage of water is to a significant extent prevented or impeded, such that a perched water-table can occur.

root zone (gen.): the root zone of herb-layer plants.

root zone (gen.), hibernation/overwintering: in the root zone of herb-layer plants (excluding situations where the root zone is water sodden) or in rotting tree roots.

rot-holes, trees, activity and hibernation/overwintering zones: dendrothelmic tree holes (a dendrothelm is a rain-fed temporary water body on a tree).

rotten wood, trees, hibernation/overwintering: in rotten wood on living trees, including in trunk cavities and insect workings.

rotting tree roots, hibernation/overwintering: within rotting tree roots at/under the ground surface.

rotting tree roots, root zone: within rotting tree roots at/under the ground surface.

sand, fine sediment, submerged sediment/debris: in submerged mineral substrates, ranging in size from 0.06 to 2 mm.

sap runs/lesions, overmature/senescent trees: wet tree wounds maintained by sap and/or the activities of fungi or saproxylic invertebrates. These have a variety of origins, including mechanical damage caused by man or storms, or fire, and may or may not be evident externally.

shrubs/bushes/saplings (gen.), trees, on/in plants: on shrubs, bushes or young trees.

slow moving, water movement: in lentic zones of running waters with a current velocity below 25 cm/s.

sodden cow-dung, water-saturated ground: cow-dung on water-saturated mud or in water-sodden plant debris/ground vegetation

sodden plant debris (gen.), water-sodden ground: among water sodden remains of macrophytes, including non-woody and small woody material.

soil drainage: only two very broad categories of soil drainage conditions are distinguished here, relating to the extent to which the soil surface layers are pervious or impervious. Species whose larvae or puparia do not spend some phase of their life history in either the litter layer or the root zone are not coded for soil drainage categories.

standing, timber: in standing trunks or stumps of dead trees with or without bark.

standing, water movement: in waters with either slight water movements not affecting the stability of the sediment (e.g. at the margin of reed beds) or with no detectable water movement.

stem bases, root zone: in swollen stem bases or root stocks of herbaceous plants.

stones, among/under surface debris: isolated pieces of rock, ranging in size from 64 to 256 mm, lying on the ground surface in more or less vegetated, non-forested situations.

stumps, timber: the *in situ* trunk base remaining after a tree has either been cut or broken off within one metre or so of the ground surface.

submerged, water plants: submerged moss or rooted macro- vegetation such as *Potamogeton*, *Calitriche*, or *Ranunculus*, together with Characeae and non-rooted macro-vegetation (*Utricularia*).

submerged debris, in water, hibernation/overwintering: among submerged plant debris, including small diameter woody debris, e.g. twigs.

submerged plants, in water, hibernation/overwintering: in or on submerged parts of aquatic perennials.

submerged sediment/debris (gen.): in/among permanently submerged sediment or debris in running or standing waters.

tall shrubs/bushes/saplings: woody plants between the heights of 0.5 and 2m, e.g. *Ligustrum vulgare*, *Viburnum*, *Rubus* and young trees (saplings).

tall strong herbs, on herb layer plants: plants such as *Urtica dioica*, *Impatiens*, *Solidago* or *Petasites albus*, on wetter sites including helophytes such as *Iris palustris*.

terrestrial, larval activity zone: this term is used in contradistinction to "aquatic". Sub-aquatic categories are dealt with as "aquatic" categories.

timber (gen.), activity and hibernation/overwintering zones: in standing or fallen dead wood. This category does not refer to dead wood still attached to living trees.

timber, sodden plant debris: water-logged, fallen trunks or major branches of trees.

trees (gen.), activity zone and hibernation/overwintering zone: only tree features important for syrphids are included here: overmature/senescent trees, mature trees, shrubs/bushes/saplings, understorey trees, foliage and subcategories of these. Dead tree features are dealt with separately (see timber category).

trunk cavities, overmature/senescent trees: large dry tree holes formed in the trunk of living trees.

tussocks, hibernation/overwintering: in tussocks formed by grasses, sedges or rushes, or in moss hummocks.

tussocks, on herb layer plants: on/within tussocks formed by grasses, sedges and rushes (Graminae, Cyperaceae, Juncaceae), or in moss hummocks.

twigs, coarse sediment, submerged sediment/debris: among small diameter (twigs, bark fragments etc.) woody plant debris.

twigs, sodden plant debris: among small diameter (twigs, bark fragments etc.) woody plant debris.

under bark, trees, hibernation/overwintering: under bark of rotting parts of living trees.

under stones/boulders, on the ground, hibernation/overwintering: under pieces of rock, ranging in size from 64 mm up to approximately 50 cm, lying on vegetated or unvegetated ground.

understorey trees: trees of more than 2m in height which, at maturity, reach the height of e.g. *Crataegus*, *Juniperus communis*, *Sorbus aucuparia*, or are immature specimens of canopy-forming species. These trees may form a shade-tolerant stratum within a forest canopy or occur away from forest conditions.

upward-climbing lianas, on/in plants: woody or herbaceous plants climbing 2m or more above the ground surface on trees.

water movement: rate of flow of surface water (species living in tree rot-holes are not coded under water movement).

water plants (gen.): on or in higher plants living entirely or partly in water, including floating, submerged and emergent species.

water-saturated ground (gen.), hibernation/overwintering: in situations where the surface layer of the soil is permanently or temporarily (at least for some weeks) water-logged.

water-saturated ground (gen.): in a permanently or temporarily (at least for some weeks) water-logged soil surface layer. Aquatic/semi-aquatic syrphid larvae living in tree humus in rot holes are not coded in this category. They are coded under rot-holes.

water trophic status: the terms olig-, meso- and eutrophic are here used loosely. The description of each trophic category is based on biotic and abiotic features of surface waters recognizable in the field, and/or easily measured parameters (oxygen, pH). They are not based upon the concentrations of total N, P and chlorophyll-a. Species that do not spend some stage of their life history in water are not coded under water trophic status. Neither are species whose larvae live in tree rot-holes.

wet mud (hibernation/overwintering): terrestrial water-logged surface mud.

wet mud/ooze, water-saturated ground: in water-logged surface mud.

with bark, fallen (timber): self-explanatory.

with root aphids, root zone: in association with colonies of root aphids (usually tended by ants).

Chapter 5: TRAIT CATEGORIES

5.1. Coding of traits

The Traits spreadsheet provides, in coded form, data on selected traits of the species of Syrphidae covered by the database. Some of the trait variables refer to larval traits, others to traits of the adult insect. The fuzzy coding system has been applied as follows:

- 3** = maximum association
- 2** = moderate association
- 1** = minor association
- blank = no association

The body length trait has been coded simply using 1 for presence and blank for absence. Thus a species ranging in length from 5-7mm is coded 1 in the 5.0mm, 5.5mm, 6.0mm, 6.5mm and 7.0mm body length categories and blank in the other body length categories.

Where possible, extrapolation from knowledge existing for well-known species in a genus has been used to code traits for less well-known species in the same genus, using best professional judgement. In cases where it is deemed that such an approach is not justified, species are coded in the “unknown” category for the trait concerned.

5.2. Trait categories

Each trait category recognised is treated in a separate column and defined in alphabetic order in the Traits Glossary. It is important to consult the Glossary in order to understand the precise interpretation to be put upon the terms used.

Each species has a myriad of definable traits. Selection of traits for coding in this spreadsheet has been based on availability of information and perceived utility in environmental interpretation activities.

A flight period table is provided for Europe in general. This generalised flight period table inevitably provides only approximate information. But it is no longer possible to provide more precise flight period data for particular parts of Europe: the available data nearly all date from prior to the onset of changes in flight periods caused by climate change.

5.3. Summary table of Trait categories.

Food type (larvae)	
micro-organisms (gen.)	saproxyllic
living plants	
living animals	
unknown	
Commensalism (larvae)	
unknown	
none	
quasi-commensals	
within Aculeate Hymenoptera nests	
Duration of development (egg/larva/puparium)	
<2 months	
2-6 months	
7-12 months	
>1 year	
Overwintering phase	
unknown	
larva	
puparium	

	adult
Inundation tolerance (larvae)	
	unknown
	short respiratory tube, non tolerant
	short respiratory tube, tolerant
	medium respiratory tube
	long respiratory tube
Number of generations /year	
	<1
	1
	2
	>2
Body length (adults)	
	3.0mm
	3.5mm
	4.0mm
	4.5mm
	5.0mm
	5.5mm
	6.0mm
	6.5mm
	7.0mm
	7.5mm
	8.0mm
	8.5mm
	9.0mm
	9.5mm
	10.0mm
	10.5mm
	11.0mm
	11.5mm
	12.0mm
	12.5mm
	13.0mm
	13.5mm
	14.0mm
	14.5mm
	15.9mm
	15.5mm
	16.0mm
	16.5mm
	17.0mm
	17.5mm
	18.0mm
	18.5mm
	19.0mm
	19.5mm
	20.0mm
	20.5mm
	21.0mm
	21.5mm
	22.0mm
	22.5mm
	23.0mm
	23.5mm
	24.0mm
	24.5mm
	25.0mm

Food sources (adults)

Nectar-bearing flowers (gen.)

Trees

Lianas

Shrubs/bushes (gen.)

Tall shrubs

Low shrubs

Herbs (gen.)

tall strong herbs

low-growing plants

Pollen-only flowers (gen.)

Trees

Lianas

Shrubs/bushes

Herbs (gen.)

Monocot.

Dicot.

Leaf surfaces

Sap-runs

None known

Migratory status (adults)

Non migrant

Weakly migratory

Strongly migratory

Flight period, Europe (gen.)

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

5.4. Traits Glossary

<1, number of generations per year: less than one generation per year i.e. larval development takes more than one year to complete

<2 months, duration of development: the length of time taken for development, from egg-deposition to eclosion of the adult insect, is less than two months.

>1 year, duration of development: the length of time taken for development, from egg-deposition to eclosion of the adult insect, is more than one year

>2, number of generations per year: polyvoltine species in which the number of successive life cycles completed within a year is greater than 2

1, number of generations per year: univoltine species i.e. species in which the life cycle takes a year to complete

1st.half, (month), flight period: the first half of a month, varying in length according to the number of days in the month concerned.

2, number of generations per year: bivoltine species i.e. species in which the life cycle is completed twice during the course of a year (one generation being more protracted than the other, due to overwintering)

2-6 months, duration of development: the length of time taken for development, from egg-deposition to eclosion of the adult insect, is from two to six months

2nd.half, {month}, flight period: the second half of a month, varying in length according to the number of days in the month concerned.

7-12 months, duration of development: the length of time taken for development, from egg-deposition to eclosion of the adult insect, is from seven months to one year

adult, overwintering phase: species which passes the winter as the adult insect

Apr, flight period: April

Aug, flight period: August

body length (adults): length of the adult insect, from the anterior extremity of the head (excluding antennae) to the posterior extremity of the abdomen, coded 1 or blank, in 0.5mm categories from 3.0mm to 25.0mm. Thus a species ranging in length from 5-7mm is coded 1 in the 5.0mm, 5.5mm, 6.0mm, 6.5mm and 7.0mm categories.

central France: comprising the Départements of Allier, Cher, Cote d'Or, Indre, Indre-et-Loire, Loir-et-Cher, Loiret, Nièvre, Saône-et-Loire and Yonne.

commensal, commensalism: species whose larvae are commensal within nests of some species of Aculeate Hymenoptera. The term commensal is applied rather loosely here. Larvae of *Xanthogramma* are probably more accurately regarded as inquilines and those of *Microdon* as kleptoparasites.

commensalism (larvae): larvae living commensally, or quasi-commensally with species of Hymenoptera Aculeata or saproxylic species. The term commensal is applied rather loosely here. Larvae of *Xanthogramma* are probably more accurately regarded as inquilines and those of *Microdon* as kleptoparasites.

Dicot., herbs: dicotyledonous plants whose flowers produce only pollen (i.e. do not produce nectar), e.g. *Epilobium*, Papaveraceae, *Urtica*.

duration of development (egg/larva/puparium): the length of time taken for development, from egg-deposition to eclosion of the adult insect

Feb, flight period: February

flight period: the period of the year during which the adults of a species occur (for species in which adults overwinter, the period spent inactive while overwintering is not included as part of the flight period). In the case of the data presented for Europe (gen.) in the Table, the unit of time used for each category is one month.

food sources (adults): sources of sugars or protein recorded as used by adult syrphids as food, usually in the form of nectar or pollen (respectively). One recognised food source category not coded is "honey-dew" deposits dropped on leaf surfaces by Aphididae (Homoptera), because authors have not been consistent in recording use of this food source and available observations are insufficient to make coding of the species worthwhile.

food type (larvae): larval food, categorised according to whether it is living animals or plants, or decomposing organic matter. Although the larvae which feed on decomposing organic matter are generally understood to be microphagous, their actual food is uncertain. They are all considered as microphages here, but it is recognised that their status may change following more detailed investigation.

herbs (gen.), pollen-only flowers: non-woody plants whose flowers produce only pollen (i.e. do not produce nectar), e.g. Cyperaceae, Gramineae, Juncaceae, Plantaginaceae, *Chelidonium*, *Epilobium*, *Papaver*, *Urtica*.

herbs (gen.), nectar-bearing flowers: non-woody plants whose flowers produce both pollen and nectar e.g. Apiaceae, Asteraceae.

inundation tolerance (larvae): the capacity of larvae to withstand submersion in water, categorised primarily according to the extent to which they exhibit relevant morphological adaptation in the respiratory processes or tegument

Jul, flight period: July

Jun, flight period: June

larva, overwintering phase: species which pass the winter period as a larva

leaf surfaces, food sources (adults): upper surface of leaves of large-leaved herbs and shrubs, e.g. *Rubus fruticosus* agg., *Urtica*, where pollen grains from other plants can accumulate.

lianas, pollen-only flowers: woody or herbaceous plants climbing 2m or more above the ground surface, with flowers that do not produce nectar e.g. *Rosa canina*.

lianas, nectar-bearing flowers: woody or herbaceous plants climbing 2m or more above the ground surface and with nectar-producing flowers, e.g. *Clematis*, *Convolvulus*, *Hedera*, *Lonicera periclymenum*, *Polygonum baldschuanicum*.

living animals, food type: species whose larvae are predatory.

living plants, food type: species whose larvae feed on the tissues of living, non-woody plants (it is not clear whether the larvae of some of the species consigned to this category feed primarily on living plant tissue or necrotic plant tissue, or micro-organisms associated with necrotic plant tissue, but, the larvae are essentially dependent on living plants, rather than dead plants).

long resp. tube, tolerant: species whose larvae possess a long (extensile) respiratory tube, enabling them to survive prolonged periods of submersion in water and to continue development whilst submerged.

low-growing plants, herbs: non-woody flowering plants up to 0.5m in height., with flowers producing both pollen and nectar, e.g. *Ajuga*, *Euphorbia* spp., *Galium*, *Hieracium*, *Potentilla erecta*, *Ranunculus*, *Saxifraga*, *Sedum*, *Stellaria*, *Taraxacum*.

low shrubs, shrubs/bushes: woody plants up to the height of 0.5 m, with nectar-producing flowers, e.g. *Calluna*, *Erica*, *Potentilla fruticosa*, *Salix repens*, *Vaccinium*.

Mar, flight period: March

May, flight period: May

medium resp. tube, tolerant: species whose larvae possess a moderately long respiratory tube, enabling them to survive prolonged periods of shallow submergence/partial submergence in water and continue their development whilst submerged

micro-organisms (gen.), food type: species whose larvae feed on micro-organisms associated with various forms of decomposing organic matter

migrant (gen.): species known to undertake long-distance movements.

migratory status (adult): categorisation of the species according to the extent to which they are known to undertake long-distance movements

Monocot., herbs: monocotyledonous plants whose flowers produce only pollen (i.e. do not produce nectar), e.g. Cyperaceae, Gramineae, Juncaceae, Plantaginaceae, Typhaceae

nectar-bearing flowers (gen.), food sources (adults): plants whose flowers produce both nectar and pollen.

non-migrant, migratory status: species not known to migrate

none, commensalism: species whose larvae exhibit no tendencies towards commensalism

none known, food sources, adults: species for which no adult food source is known, including both poorly species and those species not known to feed as adults (i.e. *Microdon* spp.).

non tolerant, inundation tolerance: species whose larvae have a short respiratory tube, exhibit no other adaptation to withstand submersion in water and characteristically occur only in habitats not subject to seasonal flooding

Nov, flight period: November

number of generations per year: the number of successive life cycles completed by a species during a year

Oct, flight period: October

overwintering phase: the phase (larva, puparium or adult) of the life cycle in which the species overwinters

pollen-only flowers (gen.): plants with flowers which produce only pollen (i.e. that are without nectar). These flowers are generally regarded as wind-pollinated, but progressively it is becoming recognised that pollen-using insects, like syrphids, can play a role in pollination of such flowers

puparium, overwintering phase: species which pass the winter as a puparium

quasi-commensals, commensalism: species whose larvae exhibit some degree of commensal association, either with species of aculeate Hymenoptera (in particular species whose larvae appear to a significant extent dependent upon the root-aphid-farming activities of ant colonies) or other insects (e.g. saproxylics which provide microhabitat for saproxylic syrphid larvae, like *Cossus* or *Hylobius*).

saproxylic, micro-organisms: species whose larvae feed on micro-organisms dependent upon dead or dying wood or the activities of other saproxylics (saproxylic: an organism dependent upon the dead or dying wood of moribund or dead trees, or upon the presence of other saproxylics)

sap runs, food sources (adults): wet tree wounds maintained by sap and/or the activities of fungi or saproxylic invertebrates, especially those of trees with sugar-rich sap i.e. *Acer* spp.

Sep, flight period: September

short respiratory tube, tolerant: species whose larvae have a short respiratory tube but characteristically occur in parts of habitats subject to seasonal flooding and may exhibit additional morphological adaptation to withstand submersion in water (e.g. a covering of hydrofuge hairs, as in *Eupeodes latifasciatus*).

shrubs/bushes, pollen-only flowers: woody plants up to 2.0m, with flowers that do not produce nectar, e.g. *Alnus viridis*, *Corylus*, *Empetrum*, *Juniperus*.

shrubs/bushes (gen.), nectar-bearing flowers: woody plants up to 2m with nectar-producing flowers.

strongly migratory, migratory status: species repeatedly recorded as undergoing migrational activity

tall shrubs, shrubs/bushes: woody plants between the heights of 0.5 and 2m with nectar-producing flowers, e.g. *Cistus*, *Cornus*, *Euonymus*, *Ligustrum vulgare*, *Lonicera xylosteum*, *Prunus spinosa*, *Rubus* spp., *Sambucus*, *Salix* spp., *Viburnum*.

tall, strong herbs, herbs: non-woody plants with nectar-producing flowers, normally reaching more than 0.5m in height, e.g. *Adenostyles*, *Angelica*, *Cirsium palustre*, *Heracleum*, *Iris palustris*, *Impatiens*, *Petasites albus*, *Sambucus ebulus*, *Senecio*, *Solidago*,

tolerant (gen.), inundation tolerance: species whose larvae exhibit morphological adaptation to survive periods of submersion in water

trees, pollen-only flowers: woody plants normally 2m or more at maturity, with flowers that do not produce nectar, e.g. *Alnus*, *Betula*, *Castanea*, *Fraxinus excelsior*, *Pinus*, *Populus*, *Ulmus*.

trees, nectar-bearing flowers: woody plants with nectar-producing flowers, normally 2m or more at maturity, e.g. *Crataegus*, *Salix* spp., *Sorbus aucuparia*.

unknown: species for which data are insufficient to enable coding of the trait category concerned.

weakly migratory, migratory status: species occasionally recorded as exhibiting weak migrational activity.

Chapter 6: FRANCE, distribution at departmental level

6.1 The French départements

In this spreadsheet each column represents a French département, denoted by its number. The unique number allotted to a département is often used as an alternative to the name of the département in publications listing records of species. Figure 3 maps the geographical location of each département. The names of the départements are listed, in numerical order, following the map.

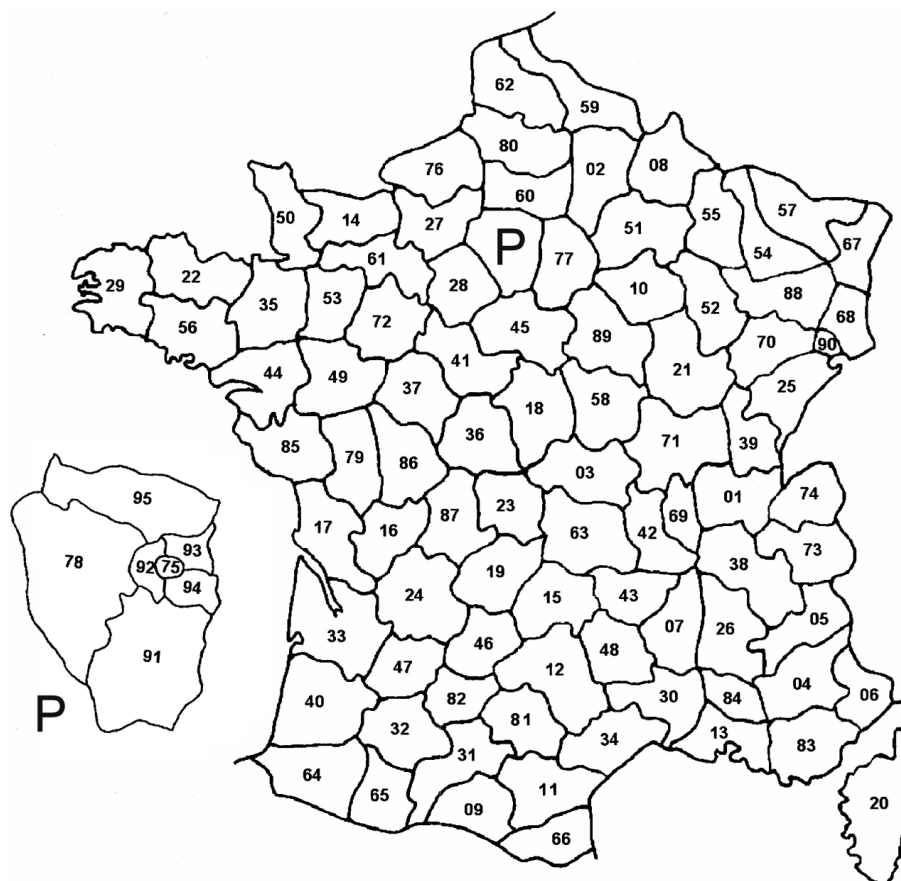


Figure 3: map of France, showing the départements and their numbers. The Paris region is indicated by the letter P. In the insert P, to the left of the map, an enlargement of the Paris region is given, showing its départements and their numbers.

Names of the French Départements

01 = Ain; 02 = Aisne; 03 = Allier; 04 = Alpes-de-Haute-Provence; 05 = Hautes-Alpes; 06 = Alpes-Maritimes; 07 = Ardèche; 08 = Ardennes; 09 = Ariège; 10 = Aube; 11 = Aude; 12 = Aveyron; 13 = Bouches-du-Rhône; 14 = Calvados; 15 = Cantal; 16 = Charente; 17 = Charente-Maritime; 18 = Cher; 19 = Corrèze; 20 = Corsica (including 20a: Corse-du-Sud and 20b: Haute-Corse); 21 = Côte-d'Or; 22 = Côtes-d'Armor; 23 = Creuze; 24 = Dordogne; 25 = Doubs; 26 = Drôme; 27 = Eure; 28 = Eure-et-Loir; 29 = Finistère; 30 = Gard; 31 = Haute-Garonne; 32 = Gers; 33 = Gironde; 34 = Hérault; 35 = Ille-et-Vilaine; 36 = Indre; 37 = Indre-et-Loire; 38 = Isère; 39 = Jura; 40 = Landes; 41 = Loir-et-Cher; 42 = Loire; 43 = Haute-Loire; 44 = Loire-Atlantique; 45 = Loiret; 46 = Lot; 47 = Lot-et-Garonne; 48 = Lozère; 49 = Maine-et-Loire; 50 = Manche; 51 = Marne; 52 = Haute-Marne; 53 = Mayenne; 54 = Meurthe-et-Moselle; 55 = Meuse; 56 = Morbihan; 57 = Moselle; 58 = Nièvre; 59 = Nord; 60 = Oise; 61 = Orne; 62 = Pas-de-Calais; 63 = Puy-de-Dôme; 64 = Pyrénées-Atlantiques; 65 = Hautes-Pyrénées; 66 = Pyrénées-Orientales; 67 = Bas-Rhin; 68 = Haut-Rhin; 69 = Rhône; 70 = Haute-Saône; 71 = Saône-et-Loire; 72 = Sarthe; 73 = Savoie; 74 = Haute-Savoie; 75 = Ville-de-Paris; 76 = Seine-Maritime; 77 = Seine-et-Marne; 78 = Yvelines; 79 = Deux-Sevres; 80 = Somme; 81 = Tarn; 82 = Tarn-et-Garonne; 83 = Var; 84 = Vaucluse; 85 = Vendée; 86 = Vienne; 87 = Haute-Vienne; 88 =

Vosges; **89** = Yonne; **90** = Territoire-de-Belfort; **91** = Essonne; **92** = Hauts-de-Seine; **93** = Seine-St-Denis; **94** = Val-de-Marne; **95** = Val-d'Oise.

6.2 Coding of distribution

In this spreadsheet each column represents a French département, identified by its number (dpt.no.). A published distribution record of a species from a département is coded “1” in the relevant column. Blanks denote lack of reliable published records. Unpublished records are not coded into the spreadsheet, except under exceptional circumstances, which are detailed. Most of the distribution data on which the spreadsheet is based are derived from publications listed in Speight *et al* (2018). Publications not listed in Speight *et al* (2018), but which have been used as sources of French records coded into the 2020 spreadsheet, are as follows:

Bazin & Speight (2018); Dauzet *et al* (2015); Cavailles & Bouteloup (2019); Cavailles *et al* (2019); Descaves & Speight (2018); Fleury (2017); Fleury & Berthe (2019); Fleury & Potiron (2019); Fleury & Voise (2018); Francois *et al* (2019); Gerrin & Herbrecht (2016); Lauriaut & Lair (2018); Lebard & Combrisson (2019); Lebard & Speight (2019); Lebard *et al* (2019); Leconte (2018); Nève (2014); Speight (2018); Speight & Lebard (2018); Speight & Vanappelghem (2018); Timon-David (1961); Tissot *et al* (2019a, 2019b); Top (2017); Vanappelghem (2019).

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