G1.Aa Carpinus and Quercus mesic deciduous woodland

Summary

These are mixed deciduous broadleaved woodlands typical of free-draining or impeded brown soils of moderate to high base-status and nutrient content across the lowlands and foothills of temperate Europe, with local extensions into the submediterranean, Pannonian and Boreal zones. The canopy can be rich and varied in composition and of complex structure, often with an extensive understorey, and these woodlands have long been affected by diverse traditions of sustainable silviculture, giving high cultural value. Virgin old-growth stands are very few. The field layer has a core of widely distributed mesophyte herbs with some striking regional differences. The major threat is clearance and replacement by other commercial forest types and agriculture, poor silvicultural management of remaining stands, eutrophication and over-grazing. Restoration of fragmented stands is a priority wherever possible to facilitate the population dynamics and spread of dispersal-limited ancient woodland species.

Synthesis

This mesic deciduous woodland type is evaluated Near Threatened (NT) because of a moderate decline in area affecting relatively large parts of the area (criterion C/D1). The habitat is assessed Least concern (LC) with respect to all other criteria, because the calculated trend in area over the lats 50 years is relatively low (-10%, criterion A) and this forest type is widespread in Europe.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Near Threatened	C/D1	Near Threatened	C/D1

Sub-habitat types that may require further examination

This woodland habitat has distinctive Atlantic and Continental types with transitions to the submediterranean Iberia and the Balkan which may warrant separate assessment. Also the unfavourable conservation status of its most important Annex I types 9160 (Sub-Atlantic and medio-European oak or oakhornbeam forests of the Carpinion betuli), 9170 (Galio-Carpinetum oak-hornbeam forests) and 9020 (*Fennoscandian hemiboreal natural old broad-leaved deciduous forests (Quercus, Tilia, Acer, Fraxinus or Ulmus) rich in epiphytes) provide an important warning signal. The southeastern Annex I types 91L0 (Illyrian oak –hornbeam forests Erythronio-Carpinion) and especially 91Y0 (Dacian oak & hornbeam forests) represent special sub-habitat types with many characteristic species.

Habitat Type

Code and name

G1.Aa Carpinus and Quercus mesic deciduous woodland

Endymio-Carpinetum, an Atlantic type of G1.Aa woodland characterized by dominance of *Hyacinthoides non-scripta* in spring, UK (Photo: John Rodwell).

Tilio-Carpinetum, a more Continental type of G1.Aa woodland with spring dominance of *Anemone nemorosa,* Bialowieza forest, Poland (Photo: Gert-Jan Nabuurs).

Habitat description

These are deciduous broadleaved woodlands typical of free-draining to somewhat-strongly impeded brown earth soils and gleys of quite low, moderate to high base-status and moderate to high nutrient content across the lowlands and foothills of the temperate zone of western, central and southern Europe, with local extensions into regions of sub-Mediterranean, Pannonian and Boreal climate. Partially this includes alluvial Quercus/ Carpinus-dominated forests in mountain valleys with infrequent indundation. The canopy is typically of mixed composition with oaks figuring prominently, notably *Quercus robur* and *Q. petraea* but with regional contributions from other oaks, along with *Carpinus betulus, Fraxinus excelsior, F. angustifolia, Acer pseudoplatanus, A. campestre, A. platanoides, Ulmus glabra, Tilia cordata* and *T. tomentosa.* Typically, *Fagus sylvatica* is at most a minor component here because it does not tolerate the stagnation in gley soils and is disadvantaged competitively, though transitions to more mesophilous and immature stands of free-draining G1.6a *Fagus* woodland on non-acid soils are quite common.

The tree canopy can have a complex multi-layered structure (often much affected by sylviculture) but it casts a relatively light shade, so there is often a rich and extensive understorey of saplings, small trees, shrubs and lianes. Among the latter, *Crataegus monogyna, C. laevigata, Corylus avellana*, *Euonymus europaeus*, *Viburnum opulus, Daphne mezereum, Lonicera xylosteum* and *Hedera helix* are frequent throughout with other associates figuring according to regional or local climatic and edaphic conditions.

The field layer too has a core of characteristic widely distributed hemicryptophytes and geophytes throughout the range with other contingents according to major climatic differences and local site conditions. *Viola reichenbachiana, Polygonatum multiflorum, Lamiastrum galeobdolon, Milium effusum, Campanula trachelium, Carex sylvatica, Pulmonaria obscura, P. officinalis, Scrophularia nodosa, Brachypodium sylvaticum, Galium odoratum, Poa nemoralis, Paris quadrifolia, Sanicula europaea, Adoxa moschatellina, Ranunculus auricomus, Arum maculatum* are common throughout with *Deschampsia cespitosa, Festuca gigantea, Stachys sylvatica, Circaea lutetiana, Impatiens noli-tangere* and *Athyrium filix-femina* in moister situations. There, too, especially where the soils are freshly aerated and more

nutrient-rich, can be a striking vernal geophyte element with *Ranunculus ficaria, Allium ursinum, Anemone nemorosa, Leucojum vernum* and, in the Atlantic north-west, *Hyacinthoides non-scripta.*

Within this broad frame, the geographic and climatic extremes can present rather striking contrasts. To the Atlantic west, through Great Britain, Ireland and the foothills of northern Spain, *Fraxinus excelsior* can often exceed the oaks in its cover, is often accompanied by *Ulmus glabra* and, among the smaller trees of the understorey, *Ilex aquifolium* with *Lonicera periclymenum* a common liana. Ferns such as *Polystichum setiferum, P. aculeatum, Dryopteris filix-mas, D. affinis, Asplenium scolopendrium* and *A. trichomanes* and a lush cover of bryophytes, especially bulky pleurocarpous mosses, reflect the humid atmosphere. In northern Spain, *Quercus ilex, Q. pyrenaica, Laurus nobilis* and *Rhamnus alaternus* in the canopy, *Smilax aspera* and *Euphorbia peregrina* as lianes and *Helleborus viridis, Pulmonaria affinis* and *P. longifola* among the herbs, reflect the warmer oceanic conditions adjacent to the sub-Mediterranean zone.

Towards the east of its range, this habitat grades into the lime-oak woodlands which extend far into the Russian lowlands. In the transitional types, *Tilia cordata* becomes more important in the canopy, along with occasional *T. tomentosa*, and *Q. polycarpa* and *Q. dalechampii c*an figure among the oaks. Further south, extending from the foothills of Austria, through Slovenia, into the Balkans, the flora has a distinct Illyrian aspect with *Quercus cerris, Q. frainetto, Carpinus orientalis, Fraxinus ornus* and a large contingent of herbs among which *Epimedium alpinum, Erythronium dens-canis, Hellebrous dumetorum ssp. atrorubens, Knautia drymeia, Cyclamen purpurescens, Staphyles pinnata* and *Helleborus odorus* are the most frequent.

Indicators of good quality:

- Typical structure and composition of canopy: High forest stands should have a complex composition with a mixed age structure, well-developed understorey and active regeneration but diverse patterns of exploitation mean that there are numerous other quality states for this habitat and this also affects the kinds of regeneration that can occur.
- Typical flora and fauna composition of the region
- Presence of old trees and a variety of dead wood (lying and standing) and the associated flora, fauna and fungi
- Presence of mosaics of developmental stages including gaps
- Sufficient proportion of historically old (ancient) woodland with high species diversity
- Survival of larger stands of forest without fragmentation and isolation
- Absnce of non-native tree species and absence of invasive aliens in all layers (fauna, flora).
- No eutrophication and pronounced invasion of nutrient-demanding herbs due to eutrophication from atmospheric deposition or ground-water enrichment

Characteristic species:

Tree layer: *Quercus robur, Q. petraea, Carpinus betulus, Fraxinus excelsior, Acer pseudoplatanus, A. campestre, Ulmus glabra, Tilia cordata, Acer platanoides, Prunus avium;*

Shrub layer: *Corylus avellana, Crataegus laevigata, C. monogyna, Euonymus europaeus, E. verrucosus, Sambucus nigra, Prunus avium, Sorbus aucuparia, Cornus sanguinea, Rosa arvensis, Ligustrum vulgare, Sorbus torminalis;*

Herb layer: *Lamiastrum galeobdolon, Galium odoratum, Poa nemoralis, Mercurialis perennis, Hedera helix, Geranium robertianum, Geum urbanum, Dryopteris filix-mas, Polygonatum multiflorum, Viola reichanbachiana, Brachypodum sylvaticum, Oxalis acetosella, Stellaria holostea, Pulmonaria officinalis, Anemone nemorosa, Anemone ranuculoides, Ranunculus auricomus, Vinca minor, Galium sylvaticum, Carex montana, Primula veris, Mycelis muralis, Aegopodium podagraria, Fragaria vesca, Athyrium filix-femina, Melica uniflora, Campanula trachelium, Ajuga reptans, Carex sylvatica in the more subcontinental forests also Galium schultesii, Hepatica nobilis, Lathyrus vernus and Asarum europaeum.*

Classification

This habitat may be equivalent to, or broader than, or narrower than the habitats or ecosystems in the following typologies.

EUNIS:

G1.Aa Carpinus and Quercus mesic deciduous woodland.

EuroVeg checklist:

Carpinion betuli Issler 1931

Pulmonario longifoliae-Quercion roboris Rivas-Mart. et Izco in Rivas-Mart. et al. 2002

Physospermo verticillati-Quercion cerridis Biondi et al. ex Biondi, Casavecchia et Biscotti 2013

Erythronio-Carpinion (Horvat 1958) Marincek in Wallnöfer et al. 1993

Castaneo-Carpinion betuli Quézel et al. 1992

Querco roboris-Tilion cordatae Solomeshch et Laivinš ex Bulokhov et Solomeshch 2003

Annex I:

9020 Fennoscandian hemiboreal natural old broadleaved deciduous forests (Quercus, Tilia, Acer, Fraxinus or Ulmus) rich in epiphytes

9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli

9170 Galio-Carpinetum oak-hornberam forests

91G0 Pannonic woods with Quercus petraea and Carpnius betulus

91L0 Illyrian oak-hornbeam forests (Erythronio-Carpinion) ˃ 91Y0 Dacian oak & hornbeam forests

91Y0 Dacian oak and hornbeam forests

Emerald:

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

MAES-2:

Woodland & Forest

IUCN:

1.1 Boreal Forest

1.4 Temperate Forest

EFT:

5.1 Pedunculate oak-hornbeam forest

5.2 Sessile oak-hornbeam forest

5.3 Ashwood and oak-ash forest

5.4 Maple-oak forest

5.5 Lime-oak forest

5.9 Other mesophytic deciduous forests

VME:

F2 Mixed oak-ask forests

F3 Mixed oak-hornbeam forests

Does the habitat type present an outstanding example of typical characteristics of one or more biogeographic regions?
Yes

<u>Regions</u>
Atlantic
Continental

<u>Justification</u>
These are deciduous woodlands typical of much of the central and western European lowlands with a rich structure, many ancient woodland species and a typical vernal aspect on soils which escaped clearance and exploitation due to impeded, often stagnating conditions.

Geographic occurrence and trends

EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Austria	Present	480 Km^2	Increasing	Stable
Belgium	Present	1200 Km^2	Increasing	Increasing
Bulgaria	Present	3200 Km^2	Decreasing	Decreasing
Croatia	Present	5430 Km^2	Increasing	Stable
Czech Republic	Present	1574 Km^2	Decreasing	Decreasing
Denmark	Present	105 Km^2	Unknown	Stable
Estonia	Uncertain	unknown Km^2	Unknown	Unknown
Finland	Aland Islands: Present Finland mainland: Present	12 Km^2	Stable	Stable
France	France mainland: Present	24875 Km^2	Unknown	Decreasing
Germany	Present	1170 Km^2	Decreasing	Decreasing
Hungary	Present	2430 Km^2	Stable	Stable
Ireland	Present	50 Km^2	Stable	Stable
Italy	Italy mainland: Present	2223 Km^2	Stable	Stable
Latvia	Present	62 Km^2	Decreasing	Decreasing
Lithuania	Present	1500 Km^2	Decreasing	Decreasing
Luxembourg	Present	unknown Km^2	Unknown	Unknown
Netherlands	Present	64 Km^2	Decreasing	Decreasing
Poland	Present	738 Km^2	Decreasing	Decreasing
Portugal	Portugal mainland: Present	8 Km^2	Increasing	Unknown
Romania	Present	6050 Km^2	Stable	Stable
Slovakia	Present	2133 Km^2	Stable	Decreasing
Slovenia	Present	286 Km^2	Stable	Stable

| EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Spain	Spain mainland: Present	485 Km^2	Decreasing	Decreasing
Sweden	Present	unknown Km^2	Unknown	Unknown
UK	Northern Island: Present United Kingdom: Present	5000 Km^2	Stable	Decreasing

EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Bosnia and Herzegovina	Present	2260 Km^2	Decreasing	Decreasing
Former Yugoslavian Republic of Macedonia (FYROM)	Present	40 Km^2	Stable	Decreasing
Kaliningrad	Uncertain	unknown Km^2	Unknown	Unknown
Kosovo	Uncertain	unknown Km^2	Unknown	Unknown
Montenegro	Present	186 Km^2	Unknown	Unknown
Norway	Norway Mainland: Present Svalbard: Uncertain	177 Km^2	Decreasing	Decreasing
Serbia	Uncertain	unknown Km^2	Unknown	Unknown
Switzerland	Present	100 Km^2	Stable	Decreasing

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	6162400 Km^2	16975	59075 Km^2	No data for Sweden
EU 28+	6162400 Km^2	17679	61661 Km^2	No data for Sweden

Distribution map
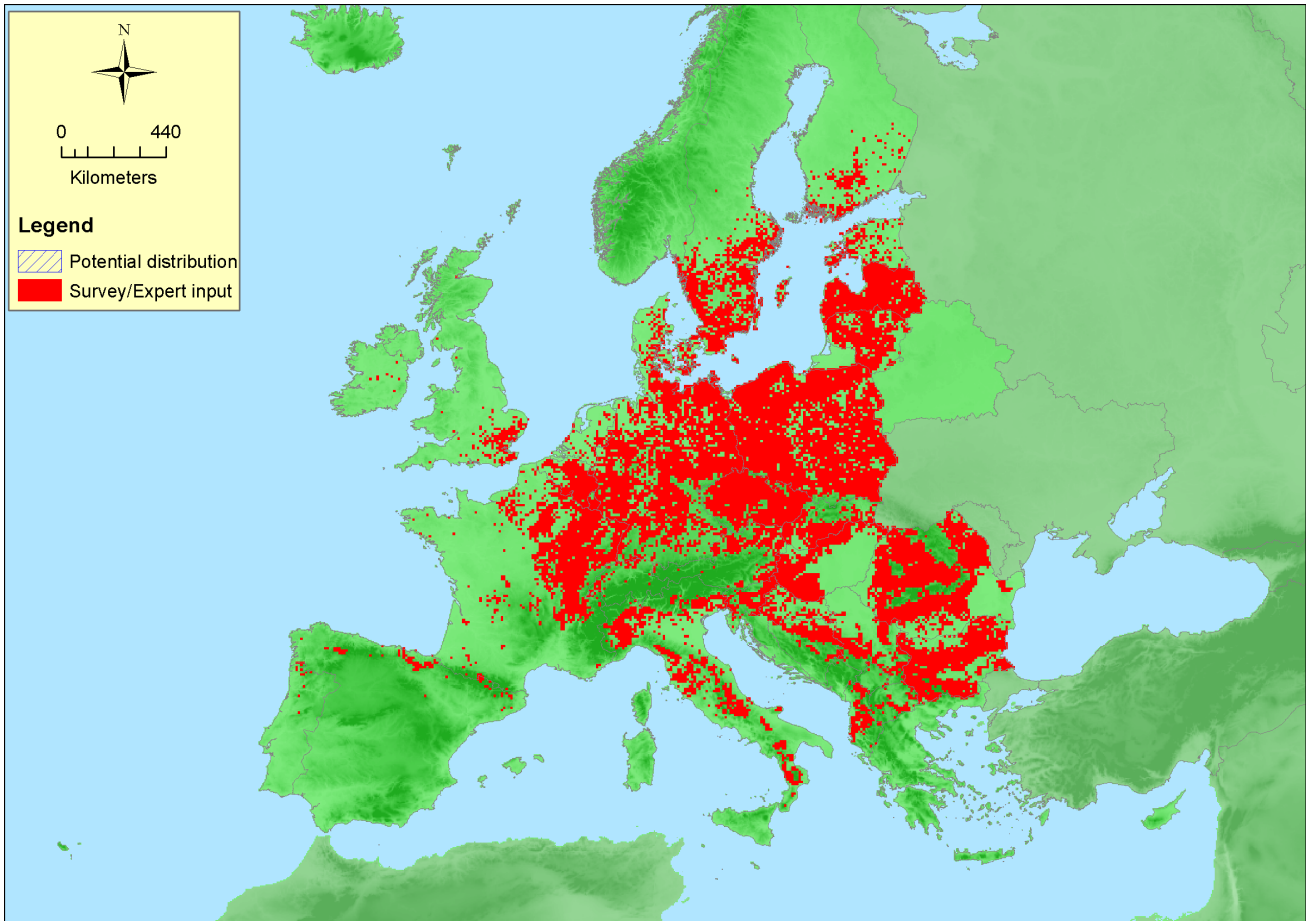
The map is rather complete. Data sources: Art17, EVA, Bohn.

How much of the current distribution of the habitat type lies within the EU 28?

From the available data, 96% assuming EU28+ corresponds to 100%.

Trends in quantity

The calculated trends for EU28 and EU28+ are negative (about -10%) but overall (30% extent) the area is reported as more or less stable with about equal percentages (about 15% of total extent) increasing and decreasing. For the remaining 40% the trend is unknown but probably not much different from neighbouring countries with known trend.

- Average current trend in quantity (extent)
  EU 28: Stable
  EU 28+: Stable
- Does the habitat type have a small natural range following regression?
  No
  Justification
  Although not explicitly calculated from the map, the EEO will be much greater than 50,000 km2 and there is no evidence of an important decline in the recent past.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No
  Justification
  The woodland type has a large range and occurs on a variety of mesic soils.

Trends in quality

Overall declining in countries with large areas of this woodland type (e.g. Bulgaria, Czech Republic, France,

Germany, Poland, Lithuania). Only increasing in Belgium. Remainder stable.

- Average current trend in quality
  EU 28: Decreasing
  EU 28+: Decreasing

Pressures and threats

Forest exploitation of various kinds seems the most important overall pressure as well as clearance and removal of dead wood. In northwestern Europe, eutrophication due to airborne nitrogen is an additional major threat. Fragmentation, drainage and overgrazing are explicitly reported by some countries.

List of pressures and threats

Sylviculture, forestry

Forest and Plantation management & use

Biological resource use other than agriculture & forestry

Damage caused by game (excess population density)

Pollution

Air pollution, air-borne pollutants

Natural System modifications

Water abstractions from groundwater
Anthropogenic reduction of habitat connectivity

Conservation and management

Management and restoration should be directed to maintanance of large, unfragmented stands of ancient woodland with a rich structure of native shrubs and trees and a mosaic of developmental stages including gaps. Where woodlands are grazed, this should not be so intensive as to prevent regeneration.

List of conservation and management needs

Measures related to agriculture and open habitats

Other agriculture-related measures

Measures related to forests and wooded habitats

Adapt forest management

Conservation status

Annex I types:

9020: BOR U2, CON U2

9160: ALP U2, ATL U2, BOR U2, CON U1, MED XX

9170: ALP U1, ATL U2, BLS FV, CON U1, PAN U2

91G0: ALP U1, BLS U1, CON U1, PAN U1

91L0: ALP U2, CON U1, MED U1, PAN U1

91Y0: CON U1, STE U1

When severely damaged, does the habitat retain the capacity to recover its typical character and functionality?

Severe damage will require a very long time for recovery because of the high species diversity of this forest type including many ancient woodland species with low dispersal capacity and requirements for a mesic woodland climate.

Effort required

200+ years
Both

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-10% %	unknown %	unknown %	unknown %
EU 28+	-9% %	unknown %	unknown %	unknown %

Based on countries with complete data excluding Norway (with inconsistent data), representing 60% of the total area: 30% is reported as stable, 12% as increasing and 18% as decreasing.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	>50000 Km^2	Yes	Yes	No	>50	Yes	Yes	No	No
EU 28+	>50000 Km^2	Yes	Yes	No	>50	Yes	Yes	No	No

EOO and AOO are very large. Reports indicate a slight but continuing overall decline in extent and threats in the next 20 years caused by forest use, drainage and fragmentation.

Criterion C and D: Reduction in abiotic and/or biotic quality

Criteria C/D	C/D1		C/D2		C/D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	59 %	37 %	unknown %	unknown %	unknown %	unknown %
EU 28+	58 %	37 %	unknown %	unknown %	unknown %	unknown %

Criterion C	C1		C2		C3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	unknown %	unknown %	unknown %	unknown %	unknown %	unknown %
EU 28+	unknown %	unknown %	unknown %	unknown %	unknown %	unknown %

Criterion D	D1		D2		D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	unknown %	unknown%	unknown %	unknown%	unknown %	unknown%
EU 28+	unknown %	unknown%	unknown %	unknown%	unknown %	unknown%

This combination of moderate decrease in quality across a relatively large proportion of the extent results in an assessment of Near Threatened (NT) under criterion C/D1.

Criterion E: Quantitative analysis to evaluate risk of habitat collapse

Criterion E	Probability of collapse
EU 28	unknown
EU 28+	unknown

There is no quantitative analysis available that estimates the probability of collapse of this habitat type.

Overall assessment "Balance sheet" for EU 28 and EU 28+

	A1	A2a	A2b	A3	B1	B2	B3	C/D1	C/D2	C/D3	C1	C2	C3	D1	D2	D3	E
EU28	LC	DD	DD	DD	LC	LC	LC	NT	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	DD	DD	DD	LC	LC	LC	NT	DD	DD	DD	DD	DD	DD	DD	DD	DD

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Near Threatened	C/D1	Near Threatened	C/D1

Confidence in the assessment
Medium (evenly split between quantitative data/literature and uncertain data sources and assured expert knowledge)

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