G1.7a Temperate and submediterranean thermophilous deciduous woodland

Summary

These thermophilous broadleaved deciduous woodlands form a wide, but interrupted, belt across the submediterranean zone of Europe, with milder winters and warmer drought-prone summers than sustain the broadleaved temperate woodlands, but colder, intermittently frosty and snowy winters than are typical for the evergreen broadleaved woodlands and scrub of the Mediterranean. To the north, they tend to occupy lower altitude, drier and warmer sites, to the south, rainier sites at higher altitudes, but the relief and parent materials differ widely across the range and soils can be the weakly base-rich to moderately acidic. The canopy, rarely very tall, is dominated by thermophilous and drought-resistant deciduous (and some evergreen) trees, among which a diversity of *Quercus* spp. play an important role. The light shade encourages a rich understorey and herb layer, the composition of which varies with regional climate. The main threats are inappropriate forestry interventions and, in Central Europe, natural succession after cessation of traditional management by coppicing and livestock grazing. Some areas suffer from fires, overgrazing by game and the spread of alien species. The habitat requires nature-friendly forestry management or no management (especially in the south) or restoration of traditional management practices (especially in the north).

Synthesis

The habitat type is assessed as Least Concern under all criteria, both for EU28 and EU28+, although about 22-23% of its area has experienced a slight decline in quality on average. However, several of its subtypes (e.g. Annex I types) and most of its occurrences in some regions (especially in Central Europe) have been affected by severe decline in quality over large areas.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Least Concern	-	Least Concern	-

Sub-habitat types that may require further examination

This habitat type is defined very broadly and although in general it is classified as NT, it contains several subtypes that are clearly of much higher conservation concern. In particular, most occurrences of this habitat in Central Europe, especially on deeper soils, are threatened due to developing denser canopy after abandonment of coppicing, which causes a shift into mesic forests and extirpation of light-demanding plant species and insects confined to canopy openings. Also, this habitat type includes several Annex I types, all of them being threatened. Among them, 91I0 Euro-Siberian steppic woods with Quercus spp is one habitat of extremely high conservation concern, often occurring in small patches, with a restricted total area and a rapidly decreasing quality of the remaining stands.

Habitat Type

Code and name

G1.7a Temperate and submediterranean thermophilous deciduous woodland

Thermophilous oak forest with *Quercus pubescens* in the region Ardeche, France (Photo: John Janssen).

A landscape with thermophilous oak forests in Slovenia (Photo: John Janssen).

Habitat description

These thermophilous broadleaved deciduous woodlands form a wide, but interrupted, belt across the submediterranean zone of Europe, with milder winters and warmer drought-prone summers than sustain the broadleaved temperate woodlands, but colder, intermittently frosty and snowy winters than are typical for the evergreen broadleaved woodlands and scrub of the Mediterranean. To the north, they tend to occupy lower altitude, drier and warmer sites, to the south, rainier sites at higher altitudes, but the relief and parent materials differ widely across the range and the weakly base-rich to moderately acidic soils are of varied types. The canopy, rarely very tall, is dominated by thermophilous and drought-resistant deciduous (and some evergreen) trees, among which oaks are the commonest contributors to an upper tier. Quercus petraea and Q. robur remain important in the sub-Continental thermophilous woodlands of the Czech Republic, Poland, Slovakia, Romania, Ukraine and the northern Balkans but, across much of the range through France, northern Spain, Switzerland, northern Italy, the Pannonian Basin, around the Adriatic and in Greece, *Q. pubescens* is the leading oak, with *Q. cerris* and *Q. frainetto* becoming important from Italy eastwards. *Q. dalechampii*, *Q. polycarpa* and *Q. virgiliana* are common associates, with *Q. trojana* in the Balkans. In the Iberian Peninsula, *Q. pyrenaica*, *Q. faginea* ssp. *faginea*, *Q. faginea* ssp. *broteroi* and *Q. canariensis* replace these oaks as dominants. In less modified stands there is a second tier of trees with, across much of the range, *Sorbus torminalis*, *S. domestica*, *S. aria*, *Ulmus minor*, *Acer campestre*, *A. monspessulanum* and *Pyrus pyraster*, with *Fraxinus ornus*, *Ostrya carpinifolia* and *Carpinus orientalis* commoner in the south-eastern regions, *Acer tataricum* and *Tilia tomentosa* mainly in the more Continental east. The light shade cast by the oaks and thinning of the canopy characteristically permit a dense shrub layer among which *Cornus mas*, *Viburnum lantana*, *Ligustrum vulgare*, *Ruscus aculeatus*, *Crataegus monogyna*, *Prunus spinosa* and *Cotinus coggygria* are frequent along with more mesic shrubs like *Corylus avellana*, *Cornus sanguinea* and *Euonymus europaeus*. To the west, *Buxus sempervirens* and *Rubus ulmifolius* occur, to the southeast *Paliurus spina-christi*, *Hippocrepis emerus*, *Pistacia mutica* and *Juniperus excelsa* and, in the warmer south, evergreen Mediterranean species such as *Phillyrea latifolia*, *Arbutus unedo*, *Pistacia lentiscus*, *P. terebinthus*, *Viburnum tinus* and *Erica arborea*. Lianas are common with *Clematis vitalba*, *Lonicera caprifolium*, *L. etrusca*, *Tamus communis*, *Rubia peregrina* and *Hedera helix* the most consistent species throughout. The herb layer is rich with sub-Mediterranean species making a prominent contribution: *Lithospermum purpurocaeruleum*, *Lathyrus venetus*, *Melittis melissophyllum*, *Tanacetum corymbosum*, *Silene coronaria*, *Potentilla micrantha*, *Vincetoxicum hirundinaria*, *Physospermum cornubiense*, *Hellebrous odorus*, *H. foetidus*, *Mercurialis ovata* and *Viola hirta* are characteristic through much of the range, with many other species occurring in particular regional types.

Indicators of quality:

- Natural composition of canopy
- Structural diversity/complexity with (semi)natural age structure or completeness of layers

• Typical flora and fauna composition of the region
• Presence of old trees and a variety of dead wood (lying or standing) and the associated flora, fauna and fungi
• Presence of natural disturbance such as treefall openings with natural regeneration
• Long historical continuity (ancient woodland) with high species diversity
• Survival of larger stands of forest without anthropogenic fragmentation and isolation (to support fauna which needs large undisturbed forests)
• Absence of non-native species in all layers (flora & fauna)
• No signs of eutrophication or pollution
• No man-induced very high population levels of ungulates

Characteristic species:

Flora (vascular plants):

Canopy trees: *Quercus pubescens*, *Q. cerris*, *Q. frainetto*, *Q. dalechampii*, *Q. polycarpa*, *Q. virgiliana*, *Q. petraea*, *Q. robur*, *Q. pyrenaica*, *Q. faginea* ssp. *faginea*, *Q. faginea* ssp. *broteroi*, *Q. canariensis*, *Q. trojana*, *Sorbus torminalis*, *S. domestica*, *S. aria*, *Ulmus minor*, *Acer campestre*, *A. monspessulanum*, *Pyrus pyraster*, *Fraxinus ornus*, *Ostrya carpinifolia*, *Carpinus orientalis*, *Acer tataricum*, *Tilia tomentosa*.
Shrub layer: *Cornus mas*, *Viburnum lantana*, *Ligustrum vulgare*, *Ruscus aculeatus*, *Crataegus monogyna*, *Prunus spinosa*, *Cotinus coggygria*, *Corylus avellana*, *Cornus sanguinea*, *Euonymus europaeus*, *Buxus sempervirens*, *Rubus ulmifolius*, *Paliurus spina-christi*, *Hippocrepis emerus*, *Pistacia mutica*, *Juniperus excelsa*, *Phillyrea latifolia*, *Arbutus unedo*, *Pistacia lentiscus*, *P. terebinthus*, *Viburnum tinus*, *Erica arborea*.
Herb layer: *Lithospermum purpurocaeruleum*, *Lathyrus niger*, *L. venetus*, *Melittis melissophyllum*, *Tanacetum corymbosum*, *Silene coronaria*, *Potentilla micrantha*, *Vincetoxicum hirundinaria*, *Brachypodium pinnatum*, *Physospermum cornubiense*, *Hellebrous odorus*, *H. foetidus*, *Mercurialis ovata*, *Polygonatum odoratum*, *Viola hirta* plus additional species of the regional floras.

Classification

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

EUNIS:

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EuroVegChecklist:

Junipero excelsae-Quercion pubescentis Jakucs 1960
Aceri tatarici-Quercion Zólyomi 1957
Quercion petraeae Issler 1931
Convallario majalis-Quercion roboris Shevchyk et Solomakha in Shevchyk et al. 1996
Erythronio-Quercion petraeae Ubaldi et al. 1988
Carpino orientalis-Quercion pubescentis Korzhenevsky et Shelyag-Sosonko 1983
Elytrigio nodosae-Quercion pubescentis Didukh 1996
Carpino betuli–Quercion petraeae Grebenshchikov et al. 1990
Quercion confertae Horvat 1958
Quercion petraeae-cerridis Lakušić et Jovanović in B. Jovanović ex Čarni et Mucina 2013
Fraxino orni-Ostryion Tomažić 1940
Crataego laevigati-Quercion cerridis Arrigoni 1997
Pino calabricae-Quercion congestae S. Brullo et al. 1999
Aceri granatensis-Quercion fagineae (Rivas Goday, Rigual et Rivas-Mart. in Rivas Goday et al. 1960) Rivas-Mart. 1987

Quercion pubescentis-petraeae Br.-Bl. 1932 nom. mut.
Carpinion orientalis Horvat 1958
Syringo-Carpinion Jakucs (1959) 1960

Annex I:

91AA Eastern white oak woods

91B0 Thermophilous Fraxinus angustifolia woods

91H0 Pannonian woods with Quercus pubescens

91I0 Euro-Siberian steppic woods with Quercus spp

91M0 Pannonian-Balkanic turkey oak–sessile oak forests

91N0 Pannonic inland sand dune thicket (Junipero-Populetum albae)

91Z0 Moesian silver lime woods

9230 Galicio-Portuguese oak woods with Quercus robur and Quercus pyrenaica

9240 Quercus faginea and Quercus canariensis Iberian woods

9250 Quercus trojana woods

9310 Aegean Quercus brachyphylla woods

Emerald:

G1.7 Thermophilous deciduous woodland

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

MAES-2:

Woodland and forest

IUCN:

1.4 Temperate Forest

EFT:

8.1 Downy oak forest
8.2 Turkey oak, Hungarian oak and Sessile oak forest
8.3 Pyrenean oak forest
8.4 Portugese oak and Mirbeck's oak Iberian forest
8.5 Macedonian oak forest
8.6 Valonia oak forest
8.7 Chestnut forest
8.8 Other thermophilous deciduous forests

VME:

G Thermophilous mixed deciduous broadleaved forests

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

Regions
Continental

Pannonian

Justification
In the Pannonian region, this habitat type represents one of the most widespread forest types on drier soils. In the Continental region, it is a common forest type in the southern part of this region, especially on the Balkan Peninsula.

Geographic occurrence and trends

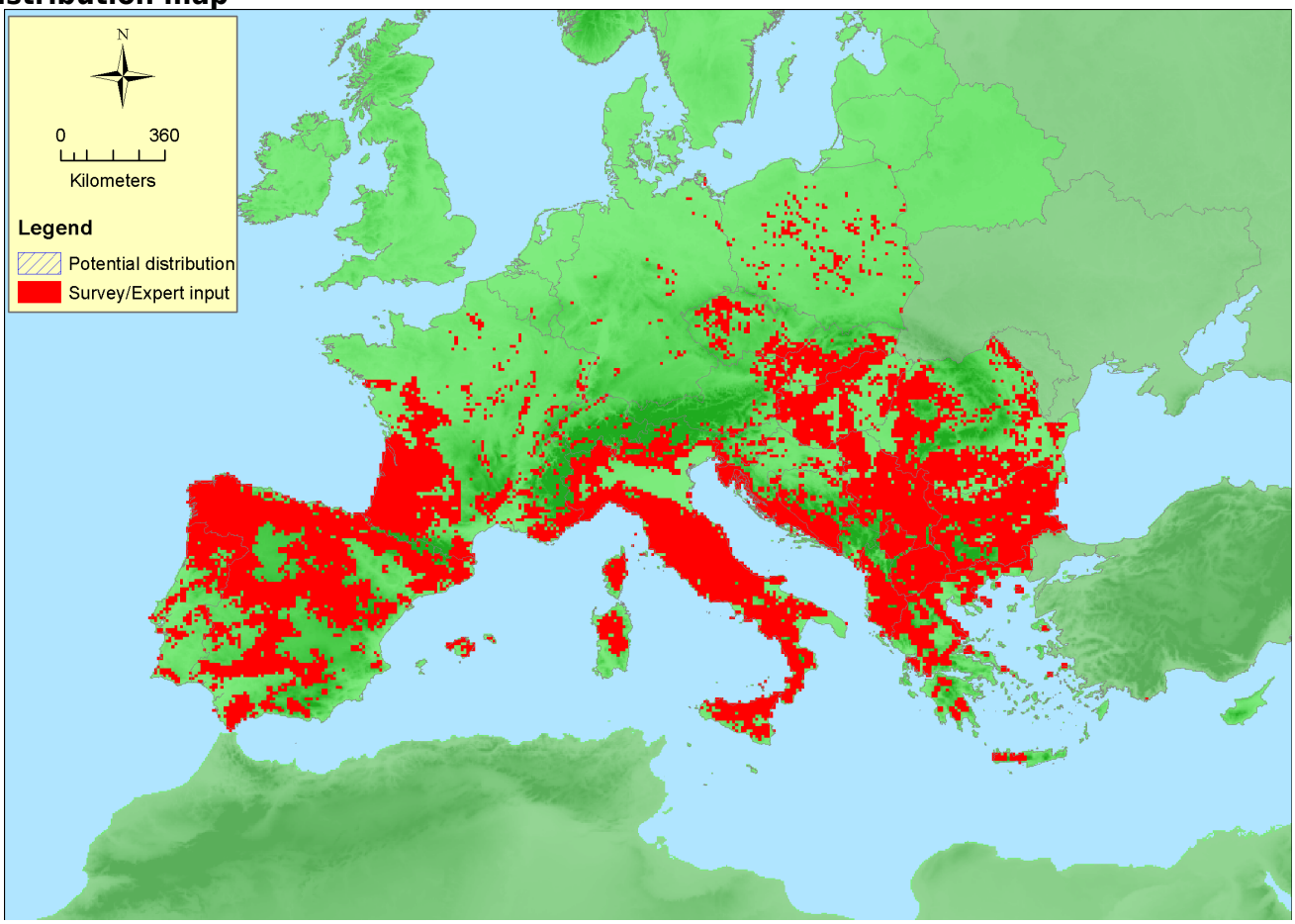
EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Austria	Present	200 Km^2	Decreasing	Decreasing
Bulgaria	Present	9350 Km^2	Decreasing	Decreasing
Croatia	Present	3784 Km^2	Increasing	Increasing
Czech Republic	Present	167 Km^2	Decreasing	Decreasing
France	France mainland: Present	13470 Km^2	Increasing	Decreasing
Germany	Present	Unknown Km^2	Stable	Decreasing
Greece	Greece (mainland and other islands): Present	11448 Km^2	Stable	Stable
Hungary	Present	2090 Km^2	Stable	Decreasing
Italy	Italy mainland: Present Sardinia: Present Sicily: Present	24818 Km^2	Stable	Decreasing
Poland	Present	18 Km^2	Decreasing	Decreasing
Portugal	Portugal mainland: Present	77 Km^2	Increasing	Unknown
Romania	Present	4600 Km^2	Decreasing	Decreasing
Slovakia	Present	210 Km^2	Decreasing	Decreasing
Slovenia	Present	1064 Km^2	Increasing	Stable
Spain	Balearic Islands: Present Spain mainland: Present	4027 Km^2	Increasing	Increasing

EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Albania	Present	Km^2	-	-
Bosnia and Herzegovina	Present	5000 Km^2	Increasing	Increasing
Former Yugoslavian Republic of Macedonia (FYROM)	Present	1782 Km^2	Increasing	Decreasing
Kosovo	Present	Km^2	-	-
Montenegro	Present	1749 Km^2	Stable	Unknown
Serbia	Present	Km^2	-	-
Switzerland	Present	85 Km^2	Stable	Increasing

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	5148500 Km^2	16073	>117446 Km^2	Current estimated Total Area is an underestimated minimum value because of missing data from some countries.
EU 28+	5148500 Km^2	17793	>126062 Km^2	Current estimated Total Area is an underestimated minimum value because of missing data from some countries.

Distribution map



Map is rather complete. Data sources: Art17, EVA, Bohn.

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

60%.

Trends in quantity

The calculated overall trend in quantity is a decrease by 4% (EU28) and 2% (EU28+), respectively. Various trends (increase, stability or decrease) have been reported from different countries. The area of this habitat is decreasing especially in the countries of Central Europe, where this habitat is at the northern limit of its distribution. In contrast, an increase has been reported for most of the countries of Southern Europe, where this habitat represents zonal vegetation in the sub-Mediterranean belt.

- Average current trend in quantity (extent)
  EU 28: Decreasing
  EU 28+: Decreasing

- Does the habitat type have a small natural range following regression?
  No
  Justification
  The EOO of the habitat type is > 50,000 km2, but it is declining especially in the northern part of its distribution range. For example, the spread of mesophilous shading trees such as *Carpinus betulus* in thermophilous oak forests of Poland results in a change of this habitat type to mesic oak-hornbeam forests.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No
  Justification
  The habitat has a broad natural range and occurs often in large stands.

Trends in quality

Altogether, there has been a decline in habitat quality affecting slightly more than 20% of the total area. The calculated relative severity of degradation is 37% (EU28) and 42% (EU28+), respectively. There are different trends in quality in different parts of the geographical range of this type. While in Southern Europe, quality tends to be stable at most sites, in Central Europe it is generally decreasing, especially due to the spread of shading mesophilous trees in forests in which traditional management by coppicing or livestock grazing has been abandoned.

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

Pressures and threats

These forests are threatened by inappropriate forestry management, especially cutting which is occasionally followed by establishment of forestry plantations. Fires are problematic especially in the southern part of the geographical range of this habitat while natural succession towards mesic forests is more typical for the northern part of its range in Central Europe. At many sites, these forests are negatively influenced by overgrazing by game (e.g. mouflon), eutrophication and the spread of alien species.

List of pressures and threats

Sylviculture, forestry

Forestry clearance
Grazing in forests/ woodland

Invasive, other problematic species and genes

Invasive non-native species

Natural System modifications

Burning down

Natural biotic and abiotic processes (without catastrophes)

Species composition change (succession)

Conservation and management

In the southern part of its geographic range this habitat does not need any specific management, however cutting followed by conversion to forestry plantations should be avoided. In the northern part of the range

some of these forests may have developed as a legacy of the historical management such as coppicing or forest grazing; in such cases, restoration of these historical management practices may be needed. Overgrazing by game should be reduced by controlling the game population size.

List of conservation and management needs

Measures related to forests and wooded habitats

Adapt forest management

Conservation status

Annex 1:

91AA: ALP XX, BLS U1, CON U2, MED U2, STE U1

91B0: CON U2, MED U1

91H0: ALP U2, BLS U1, CON U1, PAN U1

91I0: ALP FV, BLS U1, CON U1, PAN U2, STE U2

91M0: ALP U1, BLS U1, CON U1, MED U1, PAN U1, STE U1

91N0: PAN U2

91Z0: ALP U1, BLS U1, CON U1

9230: ATL XX, MED XX

9240: ALP XX, ATL XX, MED XX

9250: MED U1

9310: MED FV

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

The recovery of this habitat should occur mainly by natural means (spontaneous regeneration of canopy trees from stumps). If this does not occur (after several events of disturbance), canopy trees can be planted. In both cases, the typical character and functionality of this habitat can be restored after 50+ years.

Effort required

50+ years
Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-4 %	unknown %	unknown %	unknown %
EU 28+	-2 %	unknown %	unknown %	unknown %

The estimates of the percentage decline over the last 50 years were derived from summarizing expert judgements for several European countries.

Criterion B: Restricted geographic distribution

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

The EOO, AOO and number of locations are all far above the thresholds for B criteria.

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	23 %	37 %	unknown %	unknown %	unknown %	unknown %
EU 28+	22 %	42 %	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%

Both biotic and abiotic quality of the habitat is reduced. The Extent of degradation ranges from less than 5% in some western Balkan countries to more than 50% in some countries of Central Europe, where the degradation can be severe. The information was compiled from the country-based estimation by national experts.

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	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	DD	DD	DD	LC	LC	LC	LC	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

Overall Category & Criteria			
Least Concern	-	Least Concern	-

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

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