

Autecology of the **WILD CHERRY**

Prunus avium (L.) L.

Fr. : Merisier
Sp. : Cerezo; Cat.: Cirerer

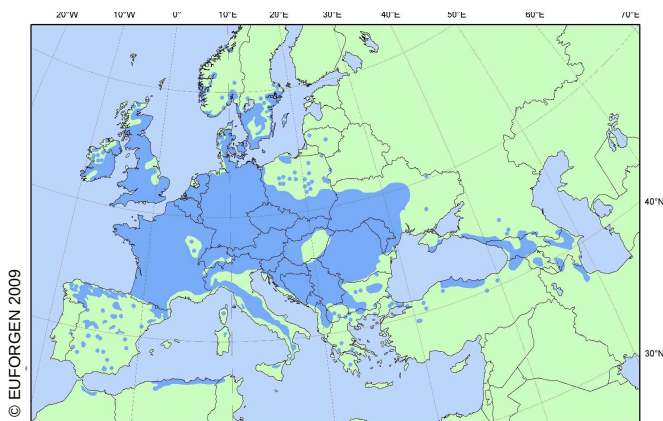
Ger. : Vogelkirsche
It. : Ciliegio



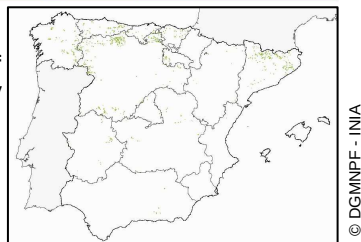
GEOGRAPHICAL DISTRIBUTION

- **Eurasian** species extending into **Sub-Atlantic** areas [23].
- Area of production stands in France = **51,000 ha** (IFN data, 2005-2009, Wild cherry, main species)

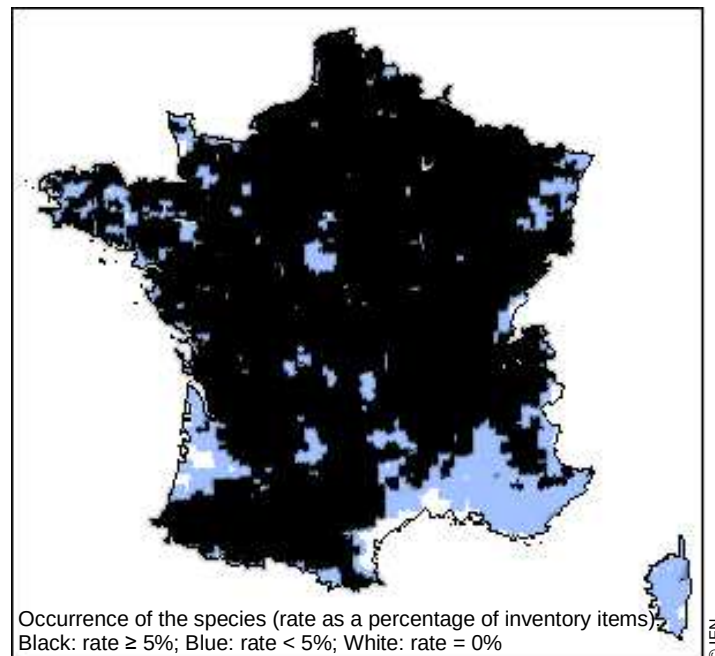
Natural range of the Wild cherry in Europe



Distribution of the Wild cherry in Spain



Distribution of the Wild cherry in France



Climate and temperament

Bioclimatic conditions

- Thrives in the **temperate and humid climates of oceanic and continental regions**, less common in the **Mediterranean region** where it is limited to cooler areas better supplied with water [20, 23, 7, 10].
- Moderately demanding in terms of total annual rainfall and atmospheric humidity, provided that the overall water balance of the soil remains favourable [11, 5, 32], at least in North and East France, but with a minimum of 600-700 mm of rainfall evenly distributed over the year [25, 17, 7]. **Sensitive to summer droughts** [17, 1] with a risk of premature leaf drop [27]; risk of cryptogamic (fungal) diseases (cylindrosporium, etc.) in humid atmospheric conditions [30].
- No geographical individualisation of cultivars in France [24].
- **Requires warmth** [6, 27, 30] and prefers warm topoclimates in harsh climates [18, 6, 5, 29].
- **Fairly resistant to cold** [19, 13, 31, 5, 27, 17, 20, 25, 7, 30]; frost crack and freezing of shoots infrequently [6, 30] but there is a risk of flowers freezing [5, 8, 30].
- **Sensitive to sticky snow** [13, 6, 11, 5] or **ice** [5] causing the tops to break.
- **Fairly sensitive to wind on thin soils** [28, 11, 32].

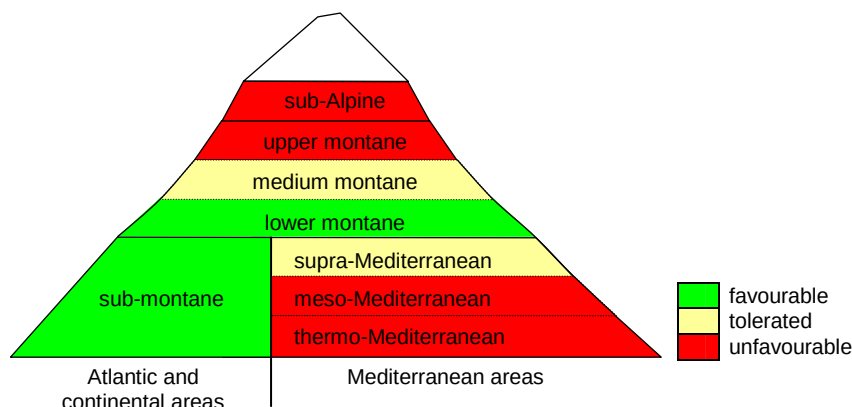
Summary of bioclimatic requirements and sensitivities of the Wild cherry

Warmth requirements	Sensitivity					
	cold	late frosts	early frosts	sticky snow	wind	drought
High	Very low	Low	Low	High	High to moderate	High

Vegetation stages

- Occurs mainly in sub-montane [10] and montane stages, where it can reach 1700 m [23, 20, 9]; optimum growth no higher than the lower montane stage [15, 5.29].

Distribution of the Wild cherry according to vegetation stages



Temperament

- This species is tolerant of shade at a young age, but needs more light in the adult phase [12, 27, 25, 17, 33, 7], hence occurring more frequently on forest edges (some, however, consider it as a partial shade species [23, 6, 11] favoured by lateral shade [13], whereas others consider it as a light-demanding species as from its earliest stages [15, 31, 21, 11, 22], which no doubt relates to the regional climate).
- **Scattered, non-social** species [11, 12].
- **Sensitive to competition**, which greatly reduces its growth rate and affects its straightness (slightly phototropic species) [11, 7].
- **Trunk sensitive to sun scald**, especially on the west side [11, 5].

Young adult



Adult



Sensitivity to competition for light	Phototropic tendency
High	Moderate

Climatic limits

(Lemaire J., comm. pers., 2011; calculated over the period 1960-90 from its natural European distribution as established by Euforgen)

Climatic limits on occurrence of the species in the absence of other limiting factors

Temperature: Average annual: 8 to 14 ° C
Absolute daily minimum: - 29 ° C
Absolute daily maximum: 41 ° C

P - FTE Penman during the growing season > 400 mm

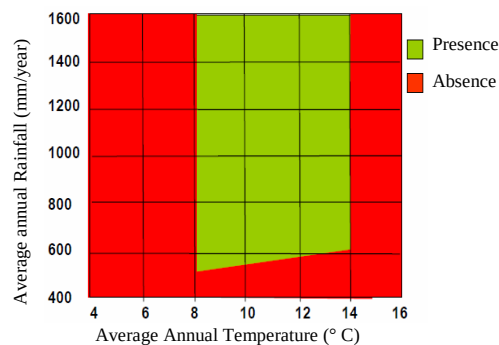
P - FTE Penman absolute minimum during the growing season: - 600 mm

Absolute minimum de Martonne index: 14

The Wild cherry is absent if there are at least 3 dry months ($R < 2 T$) or at least 4 sub-arid months ($R < 3 T$)

Climate limits of the Wild cherry

(Presence of the species if there are no other limiting factors)



Soils

Water and drainage

Water supply:

- Ground with a **water reserve** is needed [19, 4, 13, 18, 23, 21, 10, 6, 11, 29, 16, 9, 32]; **favourable topographic** position [5, 30]; a **demanding species** [15] optimally grown on cool sites with ample but not excessive water [3, 33, 30, 1].

Waterlogging:

- This species is **sensitive to poor root oxygenation**, even over short periods [23, 21, 11, 5, 29, 32, 33, 30, 1], especially in superficial horizons [13, 2], at less than 40 cm [26, 5, 8, 30], which can also hamper plant recovery [6] or result in windfall if waterlogged at a depth of less than 60-80 cm [30]. Waterlogged and highly compact soils and those with low water reserves are unfavourable conditions for the timber (butt rot) [19] and render the Wild cherry susceptible to cryptogamic diseases [11].

Drainage and excess water

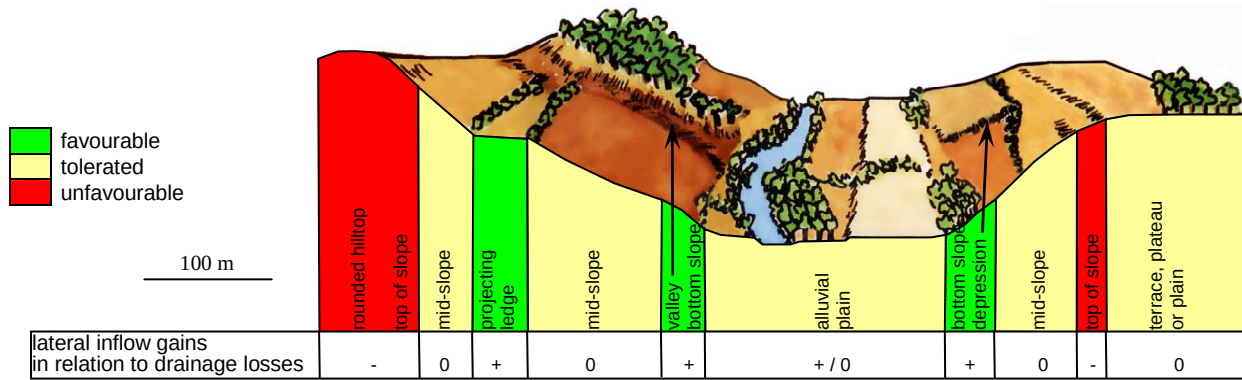
			a	b	c	d	h	i	e	f	g
Natural drainage			excessive	good	moderate	imperfect	poor	very poor	partial	virtually non-existent	non-existent
Water table	temporary	redox horizon with rust patches	no water table	absent or > 90cm	60-125cm	40-80cm	20-50cm	0-30cm	20-50cm	0-30cm	
	permanent	reductive waterlogged horizon		-	-	-	-	-	> 80cm	40-80cm	<40cm

■ favourable
■ tolerated
■ unfavourable

(from the *Species Ecology* file, Ministry of the Walloon Region, 1991, amended [21])

Favorable topographic situations for the Wild cherry in terms of water supply

(involved in the morpho-pedological compensations, to be modulated according to the climate and soil)



Texture and materials

- Occurs on pure or stony silt or clay [23], optimum growth on **thick silt** [26, 14, 8, 9] at least 40 to 80 cm thick [17, 25, 32, 33]. Clay can be unfavourable if the porosity is low [30]; sensitive to significant variation of texture at less than 40-50 cm [6] or to the occurrence of a poorly structured argillaceous level with no transition [13]; risk of root breakage on swelling clays [14].
- **Very sensitive to compaction** [5] and **high soil compactness** [21, 10, 11, 30]; prefers **well-structured soils** [28, 11].

Textures favourable to the development of the Wild cherry

(involved in the morpho-pedological compensations, to be modulated according to the other site characteristics)

very sandy S	coarse SA, LS, SL	silty LmS, Lm, LI, LIS	intermediate LAS, LSA, LA, AL	clayey A, AS	very clayey Alo	favourable
						tolerated
						unfavourable

Nutrients

Nutritive elements:

- Species occurs over a **wide pH** range between 4.5 and 7.5 [28, 6, 26, 5, 32, 33], with **optimum growth on sites that are chemically rich enough** [3]. It is therefore considered as a demanding species for timber production [13, 23, 10, 29, 30]; not to be planted in poor soils [5, 24] where its occurrence is exceptional [30].
- French cloning tests show that the growth rate does not depend on soil pH, hence the adoption of a single region of origin in France [8: 24].

Nitrogen and phosphorus:

- Fairly demanding species, especially of **nitrogen** (mull humus) [15, 13, 31, 21, 10, 11, 29, 5, 9], with optimum growth on **eumull soils** characterised by complete decomposition of the litter over the year [3].

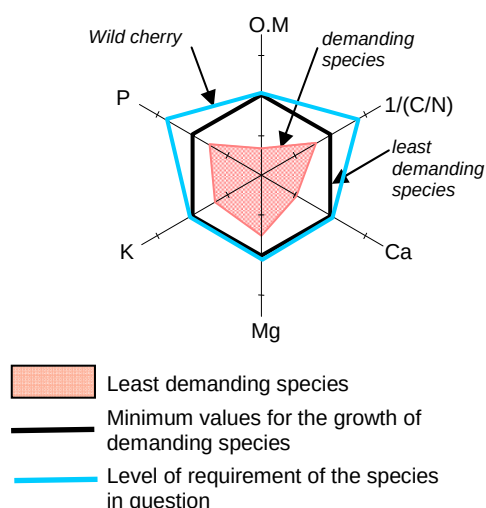
Lime in fine soil:

- The species is **not affected by low lime content** [31, 11, 16] and can be considered as totally independent in this respect [19, 28, 6, 2, 32].

Summary of the water and nutrient requirements and sensitivity of the Wild cherry

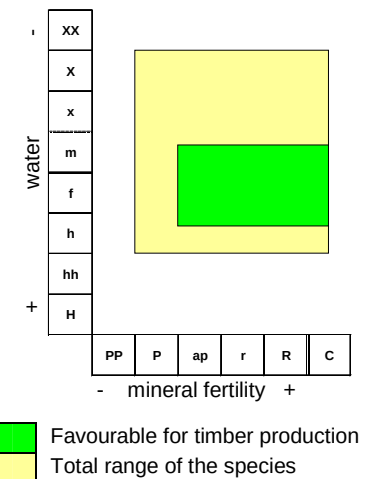
Water requirements	High
Sensitivity to temporary waterlogging	High
Nutrient requirements (Ca, Mg, K)	Average
Nitrogen (and phosphorus) requirements	High
Sensitivity to lime in fine soil	Low to zero

Mineral nutrition of the Wild cherry



Ecogram for the Wild cherry

(according to Rameau *et al.*, 1989, modified)



DYNAMIC BEHAVIOUR AND CHARACTERISTICS

- **Post-pioneer** species [23].
- Good ability to **create basal shoots** [24].
- Lifespan of about 150 to 200 years [23, 27]. Trees should be harvested **before they reach 80 years** to prevent timber deterioration [27, 30]. For sites favourable to production, the growth rate is enough to produce trees of 150-180 cm circumference in 50-65 years [3, 5], or even 80 years [27].
- Risk of **uprooting on thin soils** [11] or on soils waterlogged near the surface.
- One of the most limiting factors for the production of precious timber is **green vein**, typically localised in tension wood and linked to ecological and genetic factors [27] as well as temporary drought [comm. (J). Coello].



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MAIN FACTORS LIMITING THE PRODUCTION OF GOOD QUALITY TIMBER

- water supply disruption during the summer; this species is sometimes abundant in dry, fertile sites, but cannot produce high-quality timber in such locations.
- excessive water near the ground surface (less than 60 cm) during the growing season, even for short periods
- low porosity, poorly structured and clayey soils or with abrupt changes in texture
- slowly mineralizing form of humus (moder and mor)
- soil too poor in nutrients
- frost and heavy snow
- trunk sensitive to sun scald (especially in unprotected forest edges exposed to the west or south-west)

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