

Zelkova carpinifolia, Caucasian Zelkova

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Taxonomy

Kingdom	Phylum	Class	Order	Family
Plantae	Tracheophyta	Magnoliopsida	Rosales	Ulmaceae

Taxon Name: *Zelkova carpinifolia* (Pall.) K.Koch

Synonym(s):

- *Rhamnus carpinifolia* Pall.

Common Name(s):

- English: Caucasian Zelkova, Caucasian Elm

Taxonomic Source(s):

Board of Trustees, RBG Kew. 2018. Plants of the World Online Portal. Richmond, UK Available at: <http://www.plantsoftheworldonline.org>.

Assessment Information

Red List Category & Criteria: Vulnerable A2cd [ver 3.1](#)

Year Published: 2018

Date Assessed: June 19, 2018

Justification:

Zelkova carpinifolia is one of the emblematic relict trees of the plant diversity-rich remnants of the Colchic and Hyrcanian forests in Iran, Azerbaijan and Georgia, with a few isolated localities in Turkey. The species is an important element of the lowland deciduous forest along the Alborz Mountains, where the species is under constant human pressure. Beyond its central distribution along the Alborz and Talysh Mountains, the species only grows in several highly isolated stands. The population reduction is estimated to be at least 30% over the last 210 years (three generations) and large parts of the habitat of the species have been irreversibly destroyed or altered across its entire range. Therefore, the species is assessed as Vulnerable (A2c).

Previously Published Red List Assessments

1998 – Lower Risk/near threatened (LR/nt)
<http://dx.doi.org/10.2305/IUCN.UK.1998.RLTS.T31303A9622352.en>

1998 – Vulnerable (V)

Geographic Range

Range Description:

Zelkova carpinifolia is present in Azerbaijan, Georgia, Armenia, Iran and Turkey. Two subpopulation centres can be distinguished in the Hyrcanian forest (Talysh and Alborz Mountains) and in the Colchic forest (western Georgia) (Kozłowski and Gratzfeld 2013). These forests are of extraordinary value and

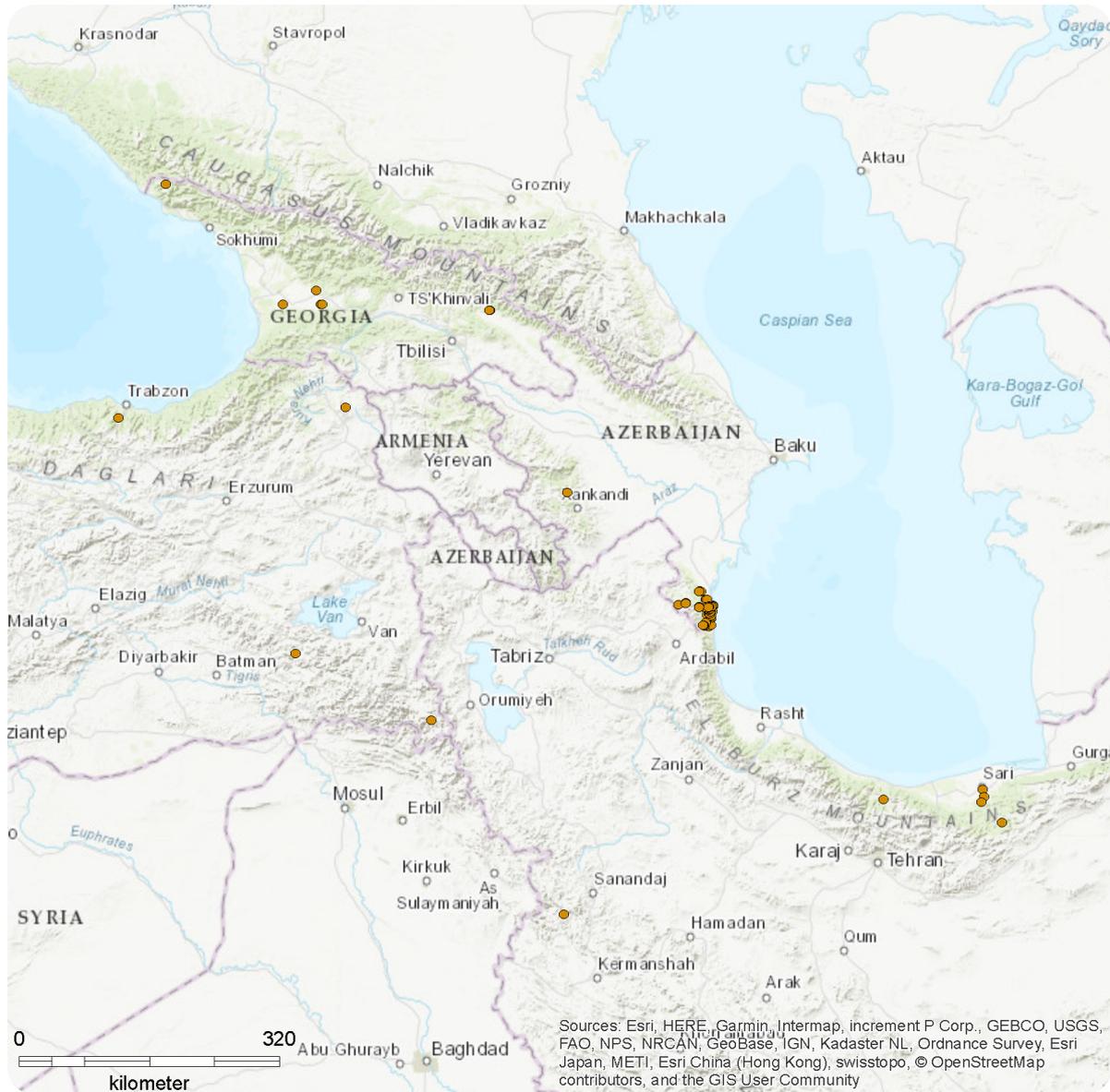
are home to numerous relict species. Apart from these two regions, isolated and fragmented stands are known from the Karabakh Mountains, Anatolia in Turkey, northwestern and eastern Georgia and the Iranian part of Kurdistan (Browicz 1982, Kozłowski and Gratzfeld 2013). The species has an estimated extent of occurrence (EOO) of over 533,480 km².

Country Occurrence:

Native: Armenia; Azerbaijan; Georgia; Iran, Islamic Republic of; Turkey

Distribution Map

Zelkova carpinifolia



Range

- Extant (resident)

Compiled by:

IUCN



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.



Population

The total number of subpopulations in the central distribution of the species in the Alborz Mountains is unknown, but it is very common there and represents around 2% of all trees in the Hyrcanian forest. Outside Iran, the species is rare with the exception of the Talysh Mountains in Azerbaijan. Numerous natural reserves and parks have been created in Georgia, Azerbaijan and Iran to protect the natural forest and this species. For example, the Babaneuri Nature Reserve in Eastern Georgia was created in 1961 to preserve a 2.4 km² stand of *Zelkova carpinifolia*. The species is also protected in the Ajameti Managed Nature Reserve and in the Sataplia Nature Reserve in Western Georgia. In Azerbaijan, the species grows mainly in the Talysh Mountains, where agro-pastoral activities are still important and human influence is strong (Scharnweber *et al.* 2007). No recent information is available for the subpopulation situated in the Karabakh Mountains. Only small and isolated stands remain in Anatolia, Turkey and in western Iran (Zagros). Limited information is available about the actual state of these subpopulations. The main range of the species is the Alborz Mountains in Iran, where human pressure still represents a threat to the natural forests (Rouhi-Moghaddame *et al.* 2008). The total number of mature individuals is difficult to estimate but is exceeding 10,000 mature individuals. The current population trend is decreasing because of the low regeneration of mixed broadleaved forests, degradation and fragmentation of its habitat and a recent disease affecting the species (Scharnweber *et al.* 2007, Rouhi-Moghaddame *et al.* 2008, Mirabolfathy 2012, Kozlowski and Gratzfeld 2013). The population reduction is estimated to be at least 30% over the last 210 years (three generations) and large parts of the habitat of the species has been irreversibly destroyed or altered across its entire range. However, further investigation and monitoring are still necessary to inform the current situation of the species across its entire range.

Current Population Trend: Decreasing

Habitat and Ecology (see Appendix for additional information)

Zelkova carpinifolia is a fast growing tree reaching a height of 25 m, with a trunk divided into numerous erect branches (Cullen 2012), and can reach 3-4 m in diameter under optimal conditions (Kozlowski and Gratzfeld 2013). *Zelkova carpinifolia* is a light-demanding canopy tree, favouring moist, humus-rich soils but not tolerating waterlogged or swampy conditions. The species occurs mainly from 100 to 600 m asl, but can grow between 1,200 to 1,500 m asl in the Talysh Mountains and even higher elevations in Anatolia (Kozlowski and Gratzfeld 2013). It is an element of mixed broadleaved forests and riparian forests, while the tree can sometimes form pure stands in the Hyrcanian area (Browicz 1982), usually on south- and west-facing slopes (Kozlowski and Gratzfeld 2013). This species can live for centuries with 800-year-old individuals reported in protected areas in Ajameti (Georgia) and in the Talysh Mountains (Azerbaijan) (Kozlowski and Gratzfeld 2013).

Systems: Terrestrial

Use and Trade

The species has been extensively logged for its valuable timber. Its dense wood is resistant to dampness and has been used in the building trade and also for door-frames and windows of mosques in Iran (Browicz 1982).

Threats (see Appendix for additional information)

Zelkova carpinifolia has been extensively logged for its valuable timber and only small fragments of the original forests remain in some regions such as the Colchis where 90% of the original lowland and foothill forests have been destroyed (Kozłowski and Gratzfeld 2013). A drastic reduction in *Z. carpinifolia* stands was noticed during the 1970s before banning its felling in Iran (Browicz 1982). It is estimated that more than 60% of the species' habitat was destroyed during the two last centuries. The situation in Azerbaijan is critical, because of a lack of management plans (Noack and Hidayatov 2007). Even relatively well-preserved forests in the Talysh Mountains have lost 40% of their cover to agriculture in the last 50 years (Kozłowski and Gratzfeld 2013). Outside Iran and Azerbaijan, only small and isolated stands of *Z. carpinifolia* are preserved in western Georgia, except in the Babaneuri Nature Reserve in eastern Georgia where a 2.4 km² large stand has been placed under protection (Kvavadze and Connor 2005). The species also faces a lack of natural regeneration in the Hyrcanian forest (Rouhi-Moghaddam *et al.* 2008) and displays a low regeneration rate with small amounts of viable seeds generated (Maharramova *et al.* 2015). Despite the establishment of several protected areas in Georgia, Azerbaijan and Iran, the species remains under threat from human activities and climate change (Maharramova *et al.* 2015). Decline and death of many trees of *Quercus* spp. and *Z. carpinifolia* due to a charcoal disease have been reported since 2010 in the Zagros and Alborz Mountains (Mirabolfathy 2013). At this point in time, this disease is affecting a small number of subpopulations in Iran, but further investigations are necessary to establish if this could be a threat to the survival of *Z. carpinifolia* in the longer term, or could change the composition of forests in the central distribution area of the species within the Alborz Mountains.

Conservation Actions (see Appendix for additional information)

Zelkova carpinifolia has been evaluated as Vulnerable in Georgia and Azerbaijan. The species is not considered to be threatened in Iran. Field surveys are needed to review old records, especially in very isolated localities in Turkey, western Azerbaijan, in the Karabakh Mountains and in the Iranian part of Kurdistan. Long-term monitoring of the species and habitat quality is necessary to inform action to prevent a slow but gradual decline in its main range in the Alborz and Talysh Mountains. A global management plan and a strict conservation policy should be developed to insure the protection of *Z. carpinifolia* in these regions. The establishment of mixed plantations with *Quercus castaneifolia* and *Z. carpinifolia* has been investigated in northern Iran to restore oak forests threatened from limited natural regeneration (Rouhi-Moghaddame *et al.* 2008). Such initiatives are important to maintain and strengthen the presence of *Z. carpinifolia*, but stronger attention should be paid to ensure the use of germplasm of local origin in plantations. Genetic analyses on the species throughout its distribution range have been carried out, showing a strong differentiation between the eastern and western range of the species (Christe *et al.* 2014b). However, these results should be compared with findings indicating that no clear genetic differentiation exists between the Colchis and the Hyrcanian centers, including that the genetic diversity is low to intermediate in all sites (Maharramova *et al.* 2015). *In situ* conservation efforts should not only be decided based on the genetic diversity of the subpopulations, but also on the grounds of vulnerability of the subpopulations and their isolations. This would be particularly relevant to the stands situated outside protected areas or declining subpopulations. Globally, the species is well represented in botanic garden collections and recorded in 60 *ex situ* collections, with only two collections found in their countries of origin alongside incomplete provenance information (Kozłowski *et al.* 2012). Genetic investigations of *ex situ* collections show that the provenance of the majority of them (65%) was from the eastern part of the range of the species (Iran, Azerbaijan and eastern Georgia) (Christe *et al.* 2014a). The remaining *ex situ* collections, 35% originate from the Georgian Colchis and Turkey, and are not representative of the haplotype in the wild. Therefore, the Colchis and Turkey

subpopulations are not yet secured in *ex situ* collections. It would be important to start an *ex situ* conservation programme in the countries of origin of the species, with a strong focus on preserving the genetic diversity of small and isolated stands in the western range of the species.

Credits

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External Resources

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Appendix

Habitats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Habitat	Season	Suitability	Major Importance?
1. Forest -> 1.4. Forest - Temperate	-	Suitable	-

Threats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	Majority (50-90%)	Causing/could cause fluctuations	Medium impact: 6
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
1. Residential & commercial development -> 1.3. Tourism & recreation areas	Past, unlikely to return	Majority (50-90%)	Negligible declines	Past impact
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
11. Climate change & severe weather -> 11.1. Habitat shifting & alteration	Ongoing	Majority (50-90%)	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.3. Livestock farming & ranching -> 2.3.2. Small-holder grazing, ranching or farming	Ongoing	Majority (50-90%)	Causing/could cause fluctuations	Medium impact: 6
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
4. Transportation & service corridors -> 4.1. Roads & railroads	Ongoing	Minority (50%)	Negligible declines	Low impact: 4
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
5. Biological resource use -> 5.3. Logging & wood harvesting -> 5.3.1. Intentional use: (subsistence/small scale) [harvest]	Ongoing	Minority (50%)	Causing/could cause fluctuations	Low impact: 5
	Stresses:	2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
5. Biological resource use -> 5.3. Logging & wood harvesting -> 5.3.2. Intentional use: (large scale) [harvest]	Past, unlikely to return	Majority (50-90%)	Rapid declines	Past impact
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		

Conservation Actions in Place

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Conservation Actions in Place
In-Place Land/Water Protection and Management
Occur in at least one PA: Yes
In-Place Species Management
Subject to ex-situ conservation: Yes

Conservation Actions Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Conservation Actions Needed
1. Land/water protection -> 1.1. Site/area protection
2. Land/water management -> 2.1. Site/area management
3. Species management -> 3.4. Ex-situ conservation -> 3.4.2. Genome resource bank
4. Education & awareness -> 4.1. Formal education

Research Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Research Needed
1. Research -> 1.2. Population size, distribution & trends
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.4. Habitat trends

Additional Data Fields

Distribution
Estimated extent of occurrence (EOO) (km ²): 533480
Lower elevation limit (m): 100
Upper elevation limit (m): 1500
Habitats and Ecology
Generation Length (years): 70

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