

The Red List of Maples

Douglas Gibbs and Yousheng Chen





BGCI

Plants for the Planet

BOTANIC GARDENS CONSERVATION INTERNATIONAL (BGCI)

is a membership organization linking botanic gardens in over 100 countries in a shared commitment to biodiversity conservation, sustainable use and environmental education. BGCI aims to mobilise botanic gardens and work with partners to secure plant diversity for the well-being of people and the planet. BGCI provides the Secretariat for the IUCN/SSC Global Tree Specialist Group.



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THE IUCN/SSC GLOBAL TREE SPECIALIST GROUP forms part of the Species Survival Commission's network of over 7000 volunteers working to stop the loss of plants, animals and their habitats. SSC is the largest of the six Commissions of IUCN-The World Conservation Union. It serves as the main source of advice to the Union and its members on the technical aspects of species conservation. The aims of the IUCN/SSC Global Tree Specialist Group are to promote and implement global red listing for trees and act in an advisory capacity to the Global Trees Campaign.

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Back cover: *Acer kuomeii* in Pingbian County, Yunnan, China by Yousheng Chen

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*This publication is dedicated to Peter Wharton
1950–2008*

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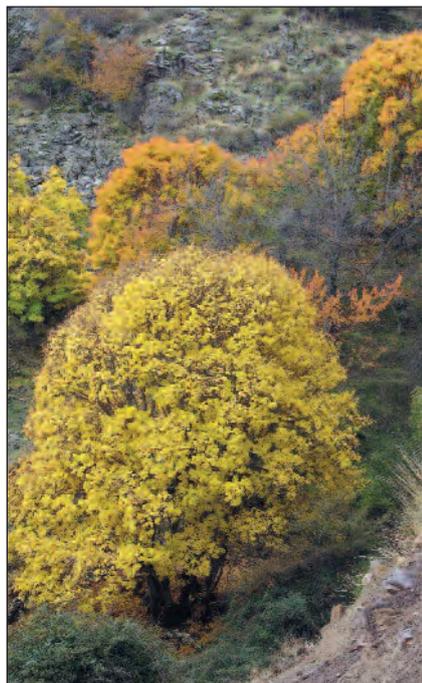
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LIST OF ACRONYMS

BGCI	Botanic Gardens Conservation International
CAS	Chinese Academy of Science
CBD	Convention on Biological Diversity
CONANP	Comisión Nacional de Áreas Naturales Protegidas
ECOSUR	El Colegio de la Frontera Sur
ESRI	Environmental Systems Research Institute
FFI	Fauna & Flora International
GIS	Geographical Information System
GSPC	Global Strategy for Plant Conservation
INECOL	Instituto de Ecología
IUCN	International Union for the Conservation of Nature and Natural Resources
MODIS	Moderate Resolution Imaging Spectroradiometer
SEMARNAT	La Secretaría de Medio Ambiente y Recursos Naturales
SSC	Species Survival Commission
UBC	The University of British Columbia
USDA	United States Department of Agriculture
VCF	Vegetation Continuous Fields

FOREWORD



Acer granatense (Jose Antonio Diaz)

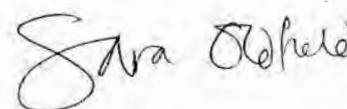
Within our gardens and natural woodlands, maples are highly valued for their autumn colour. And they provide us with so much more – timber and maple syrup are two of the economically important products provided by this group of trees. Ecologically, maples are keystone species in northern temperate forests. As with many other tree species, maples are under threat in the wild primarily as a result of forest degradation and destruction. Global climate change adds further pressure to those maples that are naturally rare or restricted to high elevations. This report presents a review of the conservation status in the wild of maples worldwide, undertaken by the IUCN/SSC Global Tree Specialist Group.

Since its establishment in 2003, the primary role of the IUCN/SSC Global Tree Specialist Group has been to assess the global conservation status of tree species in selected geographical areas and taxonomic groups. *The Red List of Maples* is the sixth publication in the series.

The collection of information on tree species of conservation concern is vital for planning conservation action. The second role of the IUCN/SSC Global Tree Specialist Group is to act as an advisory body for the Global Trees Campaign, which aims to save the world's most threatened tree species and the habitats where they grow. The Global Trees Campaign provides an important practical mechanism for implementation of the Global Strategy for Plant Conservation of the Convention for Biological Diversity. Global tree red listing contributes directly to Target 2 of the Strategy, which calls for a provisional list of threatened plant species by 2010. Target 2 underpins the other ambitious targets which relate to

in situ and *ex situ* conservation and sustainable use and trade in plants. Projects of the Global Trees Campaign carried out in partnership with organizations and individuals around the world help to deliver these various targets. The projects contribute to halting the loss of forest biodiversity and the provision of support to rural livelihoods.

The Global Tree Specialist Group is committed to undertaking a global assessment of the conservation status of tree species. Results of the global assessment will be published as components of the work are completed. Priorities for further work have been agreed at the first meeting of the Group held at the Morton Arboretum in Chicago in July 2009. We aim to ensure updated tree conservation data are made widely available to support tree conservation initiatives around the world. This sixth publication highlights the urgent need to take action for globally threatened maple species and the habitats where they occur.



Sara Oldfield
Chair of the IUCN/SSC Global Tree
Specialist Group

INTRODUCTION

Maples are a very well known, diverse and versatile group of trees and shrubs. Famous for their autumnal colour, they draw millions of visitors each year to the natural maple woods in North America and East Asia but also to gardens and arboreta worldwide.

With a centre of diversity in China, maples range across the northern hemisphere from North America to Japan including much of Europe, the very north of Africa, the Middle East, Central Asia, Himalayas and East Asia. Although it is primarily a temperate group, a few maples grow into the tropics with *Acer laurinum* being the only maple whose range actually extends into the southern hemisphere.

With a natural distribution across the globe, maples occur in many habitats from the high altitudes of the Himalayas, to the rainforests of South East Asia, to rocky cliffs in the Mediterranean and the edge of swamps in North America. This wide range of habitats and broad geographical

distribution has resulted in a diverse group from large majestic trees to small shrubs. Leaf shape and size also varies greatly and ranges from simple 3-lobed leaves to more complex shapes with more than a dozen lobes, or compound leaves with 5–7 leaflets; with some maples being deciduous whilst others are evergreen. Although many maples are known for their autumnal leaf colour, some have distinctive and attractive bark and others also have attractive flowers.

This diversity of maples, combined with their ease of growth, has long made them extremely popular and highly valued by gardeners around the world. The natural diversity has been further enhanced by the work of horticulturists over the centuries in the production of hundreds of different cultivars particularly within a group of maples referred to as Japanese maples. *Acer palmatum* forms the richest source of Japanese maple cultivars; other maples have also been used to develop cultivars including:



Acer triflorum in autumn colour

(Yousheng Chen)

Acer japonicum, *A. pseudosieboldianum*, *A. shirasawanum*, *A. buergerianum*, *A. crataegifolium*, *A. rufinerve*, *A. truncatum*. Japanese maples are not only famous for the autumn colour, but also for their ability to grow in containers and in particular for use as Bonsai trees.

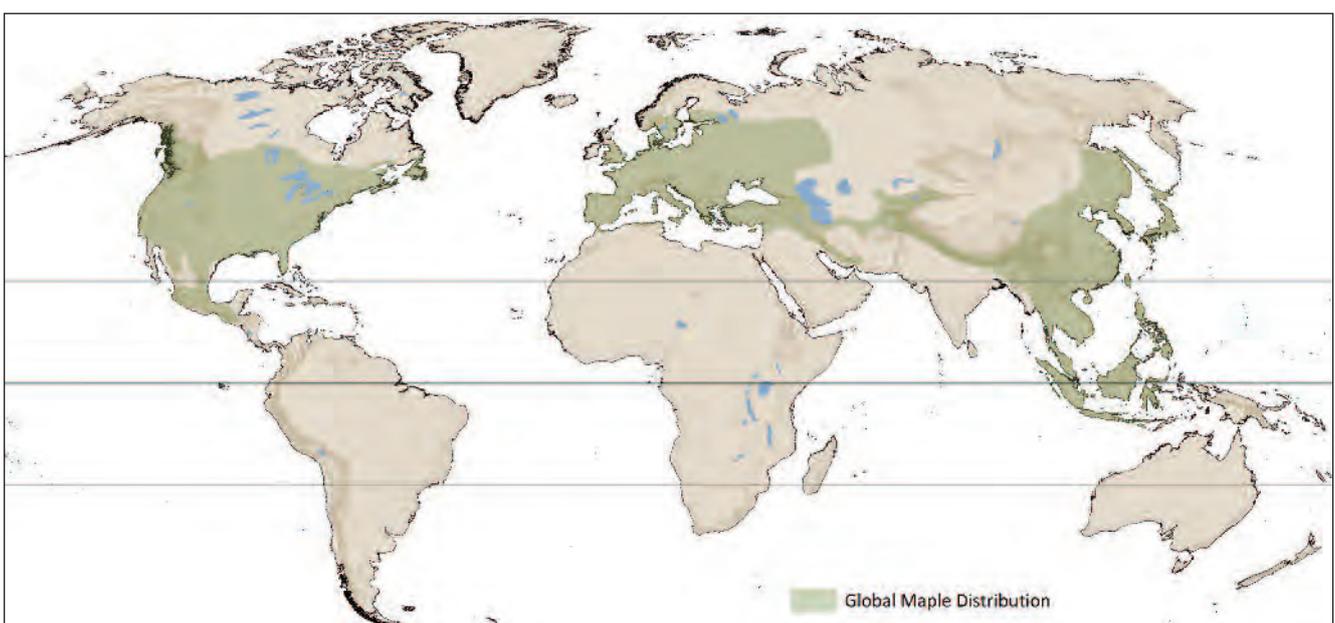


Figure 1. Global distribution of maples

A Brief History of the Maple Collection at Westonbirt Arboretum

Many thousands of visitors flock to the UK National Arboretum at Westonbirt each October to enjoy the spectacular autumn colours of the Westonbirt maples. For botanists, the real attraction is the many maple species present – 72 of the 75 species hardy enough to grow outside in Britain. A notable feature is the sheer number of mature specimens of some species such as *Acer velutinum*, *A. cappadocicum* and *A. saccharinum*. Of the 16,500 specimens in the arboretum, almost 2,500 are maples, either scattered throughout Westonbirt's 240 hectares or part of the five grouped collections.

Sir George Holford, on joining his father as a 17-year-old, extended the arboretum into Silk Wood and created the first acer collection in 1877, consisting mainly of European species and forms. American and Asiatic species were added later as they became available. Many of the European species were grafted trees from the famous Van Volxem's German nursery. Nearly 130 years later the grafts are a perfect match.

The planting of old Acer Glade also began in 1877, using selected forms of *Acer palmatum*. Although Bruce Jackson of 'Dallimore and Jackson' fame added replacements until 1939, the old Acer Glade had begun to decline, because of age and excess shading, when the Forestry Commission acquired the arboretum and opened it to the general public in 1956.

Seed was collected from the old Acer Glade trees, resulting in 5,000 seedlings. The best 200 for autumn colour were selected to form a new Acer Glade in the early 1960's, on one side of the original glade. In the 1980's new plantings were added to create a more picturesque style.

To draw visitors away from the Acer Glades, a new collection was started in The Link in Silk Wood. A natural approach was attempted, endeavouring to select the habitat to suit the species, with a mature birch/oak overstorey. *Acer palmatum* and *Acer japonicum* cultivars and forms have been used but other maple species can also be seen in abundance.

About 1980, it was decided to establish an area beyond Broad Drive, in Silk Wood, devoted entirely to Japanese Maple cultivars. It began with the planting of well known cultivars such as *Acer palmatum* 'Osakazuki' and *Acer palmatum* 'Bloodgood', and has been slowly added to ever since. By 2009 this area had been extended considerably and Westonbirt was given National Plant Collections status for both its maple cultivar and species collections.

Today these collections have a much greater focus on the conservation of species as well as creating an attraction for many thousands of visitors. Interpreting these conservation issues to over 350,000 visitors annually is an increasingly important role for collections such as Westonbirt. They also help to facilitate the study and comparison of the different forms and species by arboriculturists, students, horticulturists and gardeners. Today the threat of climate change makes collections such as this even more important.

Hugh Angus, Westonbirt Arboretum

Many other maples which are known to horticulture are also widely available as cultivars, and a number of the currently poorly known maples could potentially become far more widely utilised following further research and cultivation.

In addition to the horticultural uses and the tourism related value of maples, this group is also of importance to the timber industry and valuable as a food. Pre-Colombian North Americans were the first to produce maple syrup from a range of maples but primarily from Sugar Maple (*Acer saccharum*), the Black Maple (*Acer nigrum*) and Manitoba Maple (*Acer negundo*). The syrup is produced by tapping the trees in late winter or early spring, collecting the sap and then removing water to concentrate the liquid. Today, Canada is the largest and most significant producer, with 22 million litres of syrup being produced in 2008, and the value of all maple products sold in 2008 being almost CAD\$212 million (Statistics Canada, 2008).



Acer saccharum in autumn colour
(Westonbirt Arboretum)

A number of the larger maples are commercially grown for timber in North America and Europe: Sugar Maple (*Acer saccharum*), Black Maple (*A. nigrum*), Manitoba Maple (*A. negundo*), Red Maple (*A. rubrum*), Sycamore Maple

(*A. pseudoplatanus*). Their wood is used in construction, the manufacture of furniture and for floors, including NBA basketball court floors and bowling alley lanes. A few maples can naturally form a highly prized decorative wavy grain known as flame maple or quilt maple.

Maple wood is also valued as a tonewood, a wood that can be used in the manufacture of musical instruments, including violins, electric guitars, bassoons and double basses. The combination of the tonewood properties and the wavy grain, sometimes referred to as 'fiddleback' makes maple one of the most prized hardwoods for instruments producing a loud projective sound with an attractive finish.

INFORMATION COLLECTION FOR CONSERVATION ASSESSMENT

The collection of information on the conservation status of Aceraceae (maples) and their evaluation against the IUCN Red List Categories and Criteria (ver. 3.1) has been a collaborative process involving botanists worldwide. The experts who have provided information and supported this process are listed in the Acknowledgements.



Young leaves of *Acer heptaphlebium*
(Yousheng Chen)



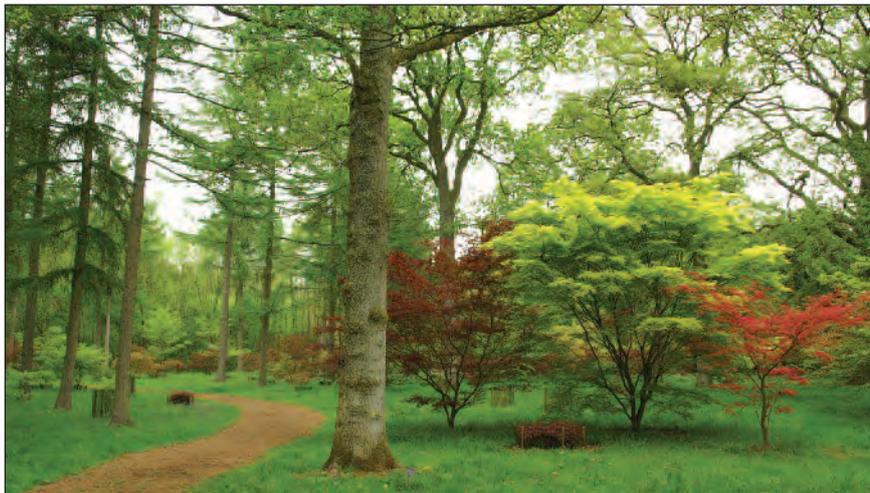
Acer pycnanthum flowers (Westonbirt Arboretum)

In spite of the economic and cultural value of maples and their products, including their great interest for horticulturists, they have not been subject to a complete and recent taxonomic revision and as a result there is not a globally accepted checklist of the group. It is very important to note that it is not the intention of this publication to resolve this issue by providing a checklist of the maple family (Aceraceae). The taxonomy used in this publication is primarily based upon the account given in the *Flora of China* (Xu *et al.*, 2008) as this provides the most recent and significant published revision with over half of the family included. In addition to the *Flora of China* account, *Maples of the World* (Van Gelderen *et al.*, 1994) and a range of regional or national floras (see assessments for further details) were used to draw up the working list of maples to be evaluated against the IUCN Red List Categories and Criteria.

In total, 191 maples have been evaluated: 123 species, 20 species at the infraspecific level (66 subspecies and varieties) and the 2 species of *Dipteronia* (a closely related genus included within the maple family, Aceraceae).

A significant task in the evaluation of the maples was the development of distribution maps for the threatened taxa. For the bulk of the taxa evaluated as threatened, this is the first time that distribution maps have been published. In addition to expert opinions, a wide range of sources were consulted in the mapping process including floras, national Red Data Books, herbarium specimen databases, field notes, online taxonomic databases and the scientific literature. Naturally the amount and the accuracy of the information for each taxon varied considerably. In addition to location data points, distribution maps were developed through the use of political units (e.g. country, state, county) and biogeographic data (altitudinal range and habitat distribution) to define the potential range of a particular taxon.

A map of global forest cover obtained from satellite remote sensing imagery was used in the development of distribution maps for each species in line with the methodology developed by Adrian Newton (Cicuzza *et al.*, 2007). For this purpose, we used the Moderate Resolution Imaging Spectroradiometer



National Council for the Conservation of Plants and Gardens (NCCPG) maple collection at Westonbirt (*Westonbirt Arboretum*)

(MODIS) Vegetation Continuous Fields (VCF) product (Hansen *et al.*, 2003). This product depicts the percentage tree cover at a resolution of 500 m using a supervised regression tree algorithm. The data is available through the University of Maryland Global Land Cover Facility (<http://glcf.umd.edu>) and are also distributed as a MODIS land cover product. To produce the distribution map, forest was defined as those cells with at least 50 percent cover, based on the MODIS dataset, which uses a 500 m equivalent grid in geographic projection (Hansen *et al.* 2002).

For each species considered, a single potential distribution map was generated using ArcEditor 9.3 Geographic Information System (GIS) (ESRI, <http://www.esri.com/>) software. This was achieved by drawing a polygon around all of the individual locations recorded, or around the boundaries of political units or the biogeographic areas in which the species has been reported. The resulting maps indicate the current extent and distribution of forest in which each species is likely to occur.

It is important to consider a number of limitations when interpreting the results. Note that the MODIS dataset does not differentiate between secondary and primary forests, or between natural and plantation forests. Furthermore, maples are not exclusively found in forests, with some species having a preference for scrub or small forest patches which would be below the 500 m resolution of MODIS. As the current distribution of many maple species is poorly known, it is possible that populations of some species exist outside the currently known limits. In such cases, it is possible that the approach adopted here may have underestimated the current extent of distribution of some of the species considered.

The maps were used as a basis for assessing the risk of extinction, according to the IUCN Red List categories and criteria (IUCN, 2001). Application of the criteria was undertaken by the Global Trees Specialist Group. Information was assembled during a regional workshop undertaken by the Group in Canada. For the maple species known to prefer forest

habitats, the potential area of occupancy was also estimated, using GIS. The measurement is given in species summaries included in the list of globally threatened species. This potential forest distribution represents the total forest area (estimated from the MODIS data) that occurs within the altitudinal range and polygon describing the distributional range of the species. This figure is intermediate between the 'area of occupancy' and the 'extent of occurrence' used in the IUCN Red List criteria (IUCN, 2001). This is because the figure calculated here represents the total forest area occurring within the distributional range of the species; in reality, only a proportion of this forest area is likely to be occupied by the species being considered (i.e. the area of occupancy). As the current distribution and status of most maples species are poorly known, this approach was considered to provide the most accurate assessment possible with the information available.



Acer wardii with samaras in Fugong County, Yunnan (*Yousheng Chen*)

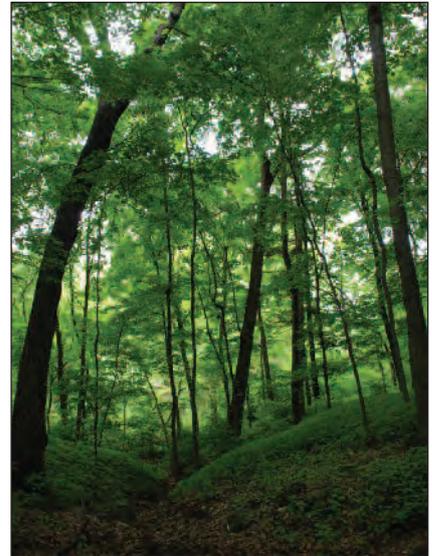
RESULTS OF THE EVALUATION

In total, 191 maples have been evaluated: 123 at the species level, 66 at the infraspecific level of subspecies and varieties. This total also includes 2 species of *Dipteronia*, a closely related genus included within the maple family (Aceraceae) which were also assessed to complete the family. This global assessment, set against the IUCN Red List Categories and Criteria, is thus one of the first complete assessments of an entire plant family.

Since the maple family has not been the subject of a recent and comprehensive taxonomic revision, there is existing debate over some species' status. Whenever possible conservation assessments were still carried out even when there is taxonomic debate, with the alternative names or details of the debate given in the assessment. If it was not possible to carry out the full assessment due to the taxonomic debate, then the

taxon has been assessed as being Data Deficient; once further research has been carried out and their taxonomic status has been defined, full assessments against the Red List Categories and Criteria should be completed. It was never the purpose of this assessment to resolve any outstanding taxonomic issues and where doubts exist, these have been indicated in the assessments whenever possible.

The results of the assessments are summarised in the table below. This indicates that of the 191 maples assessed, 54 are threatened with extinction according to the IUCN Red List categories and criteria (Critically Endangered, Endangered and Vulnerable). However, a further 29 maples could also be threatened with extinction, now or in the near future, if more were known about the Data Deficient maples or if nothing were to be done to tackle the factors threatening the remaining populations of the Near Threatened



Maple forest (Douglas Gibbs)

maples. This means that out of a total of 191 maples assessed, 83 are considered threatened with extinction at the global scale and therefore require conservation action now.

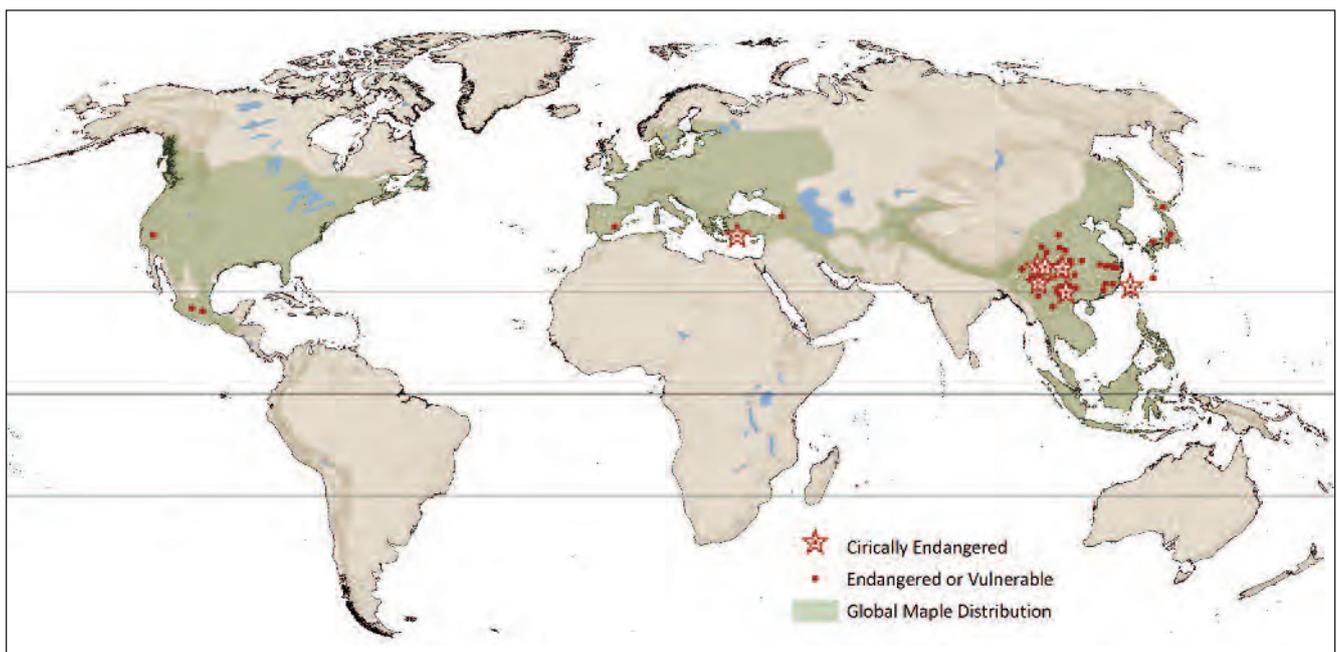


Figure 2. Globally threatened maples

SUMMARY OF RESULTS

Conservation status	Number of maple taxa
Extinct	0
Critically Endangered	7
Endangered	19
Vulnerable	28
Near Threatened	8
Data Deficient	21
Least Concern	108

CONSERVATION AND RESEARCH PRIORITIES

This global assessment of the maples should be used to focus and guide conservation policy and action at both the ecosystem and species level.

Urgent action is required to conserve the most threatened maples, in particular the seven Critically Endangered maples, some of which are reduced to literally a handful of individuals. Ideally all 54 threatened maples should be represented in well-managed *ex situ* collections as an

insurance policy against possible extinction. The Global Strategy for Plant Conservation (GSPC) calls for 60 per cent of all threatened plants to be conserved in *ex situ* collections; in the case of maples this equates to 33 threatened taxa. Initial analysis of BGCI's PlantSearch database indicates that botanic gardens are currently holding collections of approximately 40 per cent of all threatened maples (BGCI, 2009) compared to about 85 per cent of the Least Concern taxa. The origin and extent of these collections is not known but should be looked at to ensure that good quality *ex situ* conservation collections based on known, wild-sourced material exist.

BGCI is now undertaking a global survey of *ex situ* collections to establish and more accurately document which maples are already in collections, in order to be able to prioritise which maples to get in to well-managed *ex situ* collections. The combination of this information with details about propagation techniques will strongly support the development



Acer griseum bark in Chengkou County, Chongqing, China (Yousheng Chen)

of integrated conservation plans to ensure that the most threatened maples survive in the wild.

In addition to the 60 per cent of threatened species in *ex situ* collections, the GSPC also calls for 10 per cent of threatened species to be included in restoration and recovery programmes. These GSPC targets should be considered the absolute minimum level for maple conservation efforts.

Simultaneously, the status and protection of the wild maple populations needs to be reviewed and mechanisms put in place to allow local people to be involved in the *in situ* conservation and to benefit from it. It will only be through effective and well planned *in situ* conservation efforts that species can be conserved in the long term.

Further field research would greatly benefit current knowledge relating to conservation status and needs of maples. Although current field research is limited by the availability of trained botanists and resources, priorities exist.



A mature *Acer opalus*



Flowering *Acer erianthum* with seeds (Douglas Gibbs)

The Data Deficient (DD) maples all require further research to: (i) confirm their taxonomic status where this is uncertain, (ii) survey the current extent of the wild populations, and (iii) assess the threats and impacts on wild populations. Following this research, it will then be possible to complete their conservation assessments against the IUCN Red List Categories and Criteria.

With 115 maples out of the 191 included in this publication, China and in particular south west China, is the global centre of diversity for maples. However, relatively little field research has been carried out there recently and current maple experts believe that Yunnan, Sichuan and Xizang all hold great potential for the discovery of new populations and even new maples.



Acer pictum ssp. *taishakuense* leaves (Ikuyo Saeki)

The border region between China, Myanmar, Laos, Viet Nam and Thailand has historically been difficult to access. As a result of this, the countries bordering south west China all exhibit lower than expected numbers of maples (see

Figure 3) and therefore hold great potential for the discovery of new populations and possibly new maples. For example, the State of Yunnan in China has recorded the presence of 49 maples whilst Laos has recorded just 5 maples. Though Laos will not have a similar number of maples to Yunnan it is very likely to have more than its current records indicate.

Further research will no doubt strengthen and improve our knowledge and ability to conserve threatened maples; however sufficient knowledge exists and action needs to start now. Conservation action has already begun due to this report, for example with *Acer yangbiense*, but much remains to be done, bearing in mind that some of the most threatened maple species are reduced to just a handful of individuals in the wild.

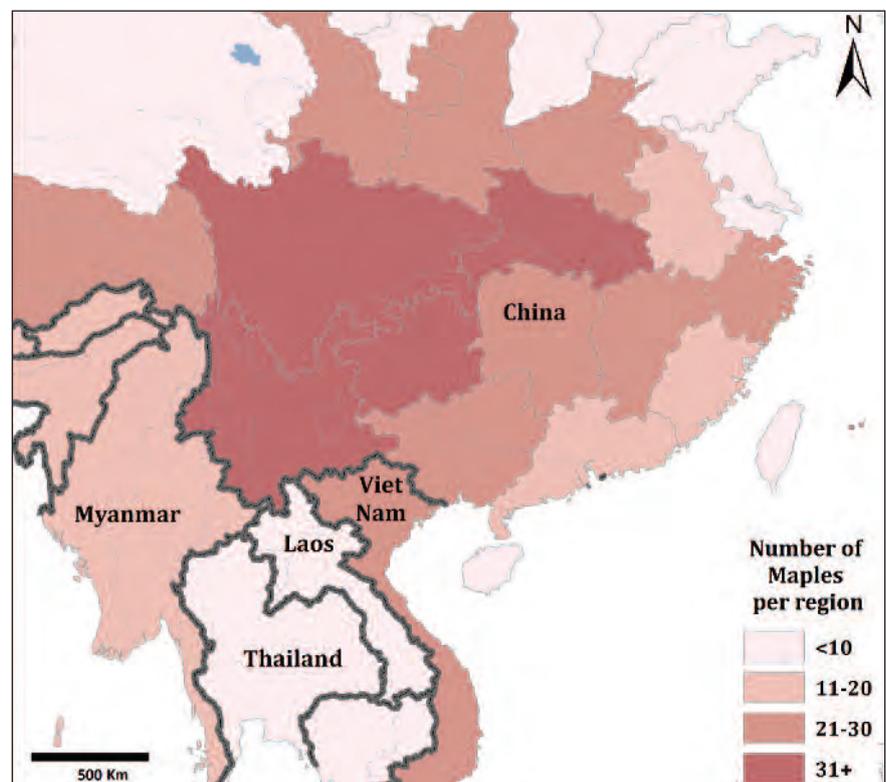


Figure 3. The number of maples per region in south east Asia

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Acer sinopurpurascens flower

(Westonbirt Arboretum)



Dipteronia sinensis from Taibaishan County, Shaanxi (Yousheng Chen)



GLOBALLY THREATENED MAPLES

Acer acutum Fang (1939)



VU A2c

China (Anhui, Henan, Jiangxi, Zhejiang)
A forest species found in south-east China that has a potential forest distribution of 15,414km² although it is under significant threat due to habitat loss.

Refs: 1, 16, 30, 48

Acer albopurpurascens Hayata

(1911)

DD

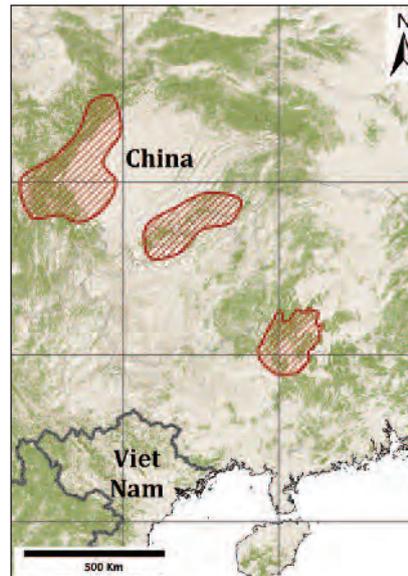
Taiwan

Thought to occur throughout the island, including within a National Park, so probably not at risk but it is listed as Vulnerable (VU) on the China Species Red List (2004).

Refs: 1, 5, 6, 16, 30, 34, 47, 48

Acer amplum subsp. *catalpifolium*

(Rehder) Chen (2008)



VU A1cd

China (Guangxi, Guizhou, Sichuan)

Found scattered in mixed forest in valleys between 500-2000m in areas of high rural population. This subspecies is under pressure from felling for timber and by deforestation for agriculture.

Refs: 1, 14, 30, 34, 48

Acer brevipes Gagnep (1950)

DD

Viet Nam

Refs: 30, 37

Acer buergerianum var. *formosanum*

(Hayata ex Léveillé) Sasaki (1928)



CR C2a(i); D

Taiwan

Only two populations are known, confined to a small area of lowland evergreen forest in Wanli and Yingshihchien in the north of Taiwan. The species is mainly threatened by the uprooting of whole plants for ornamental use.

Refs: 1, 2, 17, 18, 30, 34

Acer buergerianum var. *horizontale*

Metcalf (1942)

DD

China (Zhejiang)

There is ongoing taxonomic uncertainty about the status of some of the varieties of *Acer buergerianum*.

Refs: 1, 30

Distribution maps are provided for all the very threatened maples. Key to all maps:



Known range of species



Point locations of populations



Remaining forest cover

All assessments are by the Global Tree Specialist Group unless otherwise indicated

Acer buergerianum* var. *jiujiangense

Yu (1983)

DD

China (Jiangxi)

There is ongoing taxonomic uncertainty about the status of some of the varieties of *Acer buergerianum*.

Refs: 1, 30

Acer buergerianum* var. *kaiscianense

(Pampanini) Fang (1939)

DD

China (Gansu, Hubei, Shaanxi)

There is ongoing taxonomic uncertainty about the status of some of the varieties of *Acer buergerianum*.

Refs: 1, 30

Acer buergerianum* var. *yentangense

Fang & Fang (1966)



EN B1ab(iii)

China (Zhejiang)

Known from 5 collections in 3 locations in central Zhejiang at low altitudes (700-900m) in highly degraded bamboo habitat.

Refs: 1, 30

Acer calcaratum Gagnepain (1948)



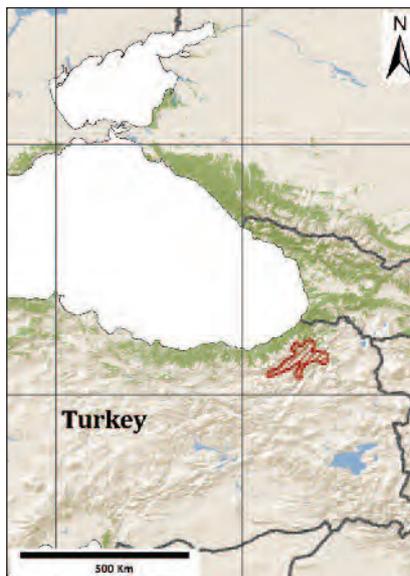
VU A2c

China (Yunnan), Myanmar, Thailand, Viet Nam

A subtropical acer found in scattered populations by streams in rainforests in Myanmar, Thailand and Viet Nam and near the border in the very south of Yunnan, China.

Refs: 1, 2, 16, 18, 30, 31, 34, 38, 47, 48

Acer cappadocicum* subsp. *divergens (Pax) Murray (1978)



VU B1b(i,ii,iii)

Turkey

Although current populations are thought to be stable, it occurs in the Çoruh Valley on dry slopes in shrubby vegetation with an extent of occurrence of 9600km². Many of the populations are under threat from the construction of a series of dams along the river. Rare in cultivation.

Assessor: Prof. Dr Adil Güner

Refs: 2, 10, 11, 12, 18, 22, 34, 63



Acer cappadocicum (Westonbirt Arboretum)

Acer cappadocicum* subsp. *lobelii

(Tenore) Murray (1982)

NT

Italy

Scattered distribution, locally scarce with very small populations or scattered individuals, often in marginal or unfavourable sites. Nearly meets VU A3c.

Refs: 2, 18, 23, 25, 30, 34, 47

Acer caudatifolium Hayata (1911)

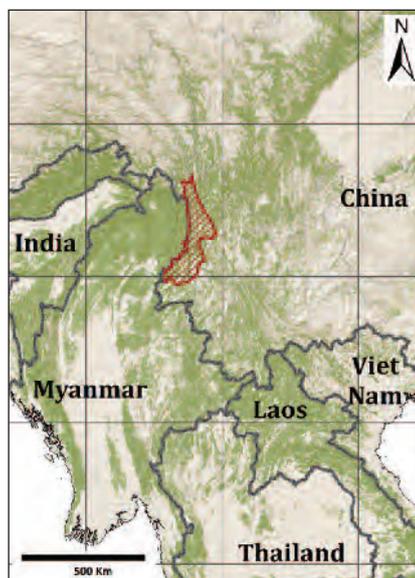
NT

Taiwan

Occurs mainly in montane forests at 2500-3000m, but can also be found at lower elevations. Nearly meets VU A2c; listed as Vulnerable on the China Species Red List (2004). A snakebark maple with attractive stripped bark but rare in cultivation, partly due to its tenderness.

Refs: 1, 2, 6, 16, 18, 22, 30, 34, 47, 48

Acer chienii Hu & Cheng (1948)



VU D2

China (Yunnan)

Very limited distribution, currently known from just 3 locations in north-west Yunnan.

Refs: 1, 16, 30, 34, 48

Acer chingii Hu (1930)

DD

China (Guangxi, Guizhou)

Only known from type specimen; thought to be found in restricted locations in forested low montane areas which also have high rural populations.

Refs: 1, 30, 48

Acer chunii subsp. *chunii* Fang (1937)



VU D2

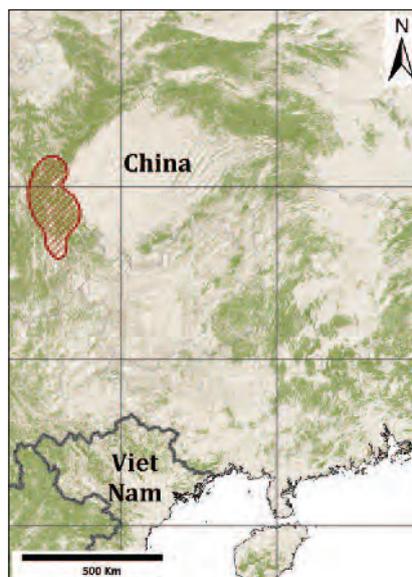
China (Fujian, Guangdong)

Known from 3 locations in northern Guangdong and Fujian in sparse forests between 800-1200m.

Refs: 1, 30

Acer chunii subsp. *dimorphophyllum*

Fang (1979)



VU D2

China (Sichuan)

A rare species found in 3 localities in sparse forests between 1000-2500m in south-west Sichuan.

Refs: 1, 30

Acer confertifolium Merrill & Metcalf

(1937)



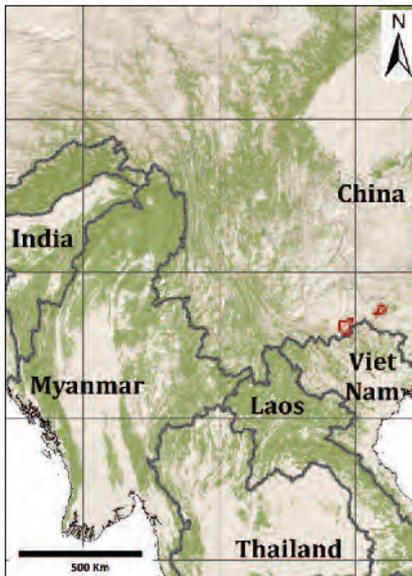
VU A2c

China (Fujian, Guangdong, Jiangxi)

Quite limited distribution, in south-east China at relatively low elevations, and under threat from increased urbanisation.

Refs: 1, 2, 16, 30, 48

Acer crassum Hu & Cheng (1948)



EN B1ab(iii)
 China (Yunnan)
 The species is found in a small area of south-east Yunnan, with an area of occupancy of 140km² and is under pressure from ongoing deforestation. It has not been collected since 1940.
 Refs: 1, 2, 16, 30, 48

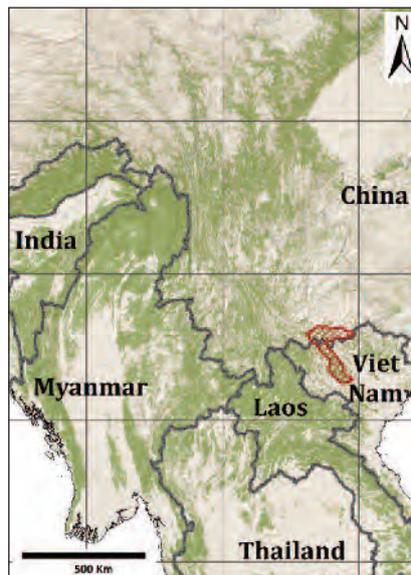
Acer duplicatoserratum var. *duplicatoserratum* Hayata (1911)

DD
 Taiwan
 Populations of this species are scattered in central to northern parts of Taiwan in submontane broadleaved forest. The decline in numbers has been caused by the illegal digging up of whole plants for the ornamental trade. However some taxonomic uncertainty exists as this taxon is close to *Acer ceriferum* which in this publication is treated as a synonym of *Acer robustum*, further taxonomic research is required (Xu *et al.*, 2008).
 Refs: 1, 2, 17, 30, 34

Acer erythranthum Gagnepain (1948)

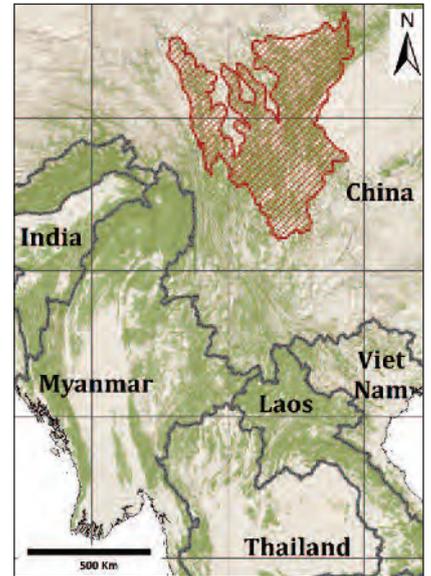
NT
 Viet Nam
 Occurs in Thua Thien-Hue, Gia Lai, Kon Tum and Lam Dong Provinces, usually in evergreen forests above 500m on deep fertile soils. Natural regeneration does not appear to be good, despite good fruiting crops. The fine timber is used for construction and making household items. Nearly meets VU A2c.
 Refs: 2, 17, 34, 36, 37

Acer fenzelianum Handel-Mazzetti (1933)



VU B1ab(ii)
 China (Yunnan), Viet Nam
 The species has a very restricted distribution in forested valleys in northern Viet Nam and southern Yunnan, with an extent of occurrence of 16,374km². Very few specimens have been recorded. It is listed as Endangered in China.
 Refs: 1, 2, 16, 30, 48

Acer fulvescens Rehder (1911)



VU A2c
 China (Sichuan, Xizang)
 The species is found in forests in Sichuan and south-east Xizang between 1800-3200m but is under pressure from habitat loss.
 Refs: 1, 16, 30

Acer glabrum var. *greenei* Keller (1942)



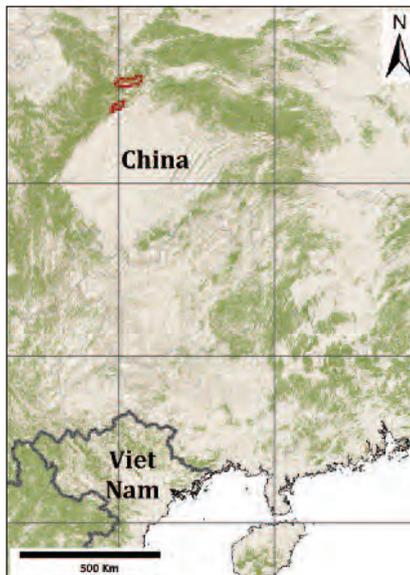
VU B1ab(i,iii)

United States of America (California)

Acer glabrum var. *greenii* is considered endemic to the southern Sierra Nevada in California, especially in Tulare County, occurring on moist to fairly dry rocky mountain slopes and in canyons. It is listed as Critically Imperiled (T1T2) by NatureServe and is under threat from wildfires and intrinsic factors such as poor regeneration.

Refs: 7, 8, 30, 45, 64

Acer gracilifolium Fang & Fu (1981)



EN B1ab(ii)+2ab(ii)

China (Gansu, Sichuan)

Known from 2 localities in mixed forest near streams in south-east Gansu and northern Sichuan with a total area of occupancy of 490km².

Refs: 1, 16, 30, 48

Acer granatense Boissier (1838)



VU B1b(iii,v)

Morocco, Spain

Also known as *Acer opalus* ssp. *granatense* (Boiss.) Font Quer & Rothm. and considered by some to be a synonym of *Acer hispanicum* Pourret, this species has a fragmented distribution along several mountain ranges, often found in microsites where the Mediterranean summer drought is partially ameliorated such as north-facing slopes, shady ravines and along streams. Successful regeneration is often hindered due to grazing pressure.

Refs: 3, 24, 27, 28, 29, 34, 50, 60



Acer griseum Leaves (Douglas Gibbs)

Acer griseum (Franchet) Pax (1902)



EN A2c

China (Gansu, Henan, Hubei, Hunan, Shaanxi, Shanxi, Sichuan)

The Paperbark Maple is well known to horticulture and is considered to be one of the most outstanding *Acers*, despite being difficult to propagate either by seed or vegetative methods. It is naturally found over a wide area of central China, but the population is now very fragmented, small and in decline.

Refs: 1, 2, 16, 18, 22, 30, 34, 47, 48

Acer heptaphlebium Gagnep. (1931)

DD

Lao People's Democratic Republic, Viet Nam

A low elevation species which is possibly threatened but needs further study to establish its conservation status.

Refs: 2, 34, 37

Acer hilaense Hu & Cheng (1948)

DD

China (Yunnan)

Collected once in 1938 and has not been seen since. The area is now degraded habitat and has been widely explored, but *Acer hilaense* has not specifically been looked for. It is an evergreen species and has a high horticultural value. Potentially it could be Critically Endangered or Extinct in the Wild. Listed as *Acer hilaense* and Critically Endangered in Chinese Species Red List (2004).

Refs: 1, 16, 30, 48

Acer komarovii Pojarkova (1949)

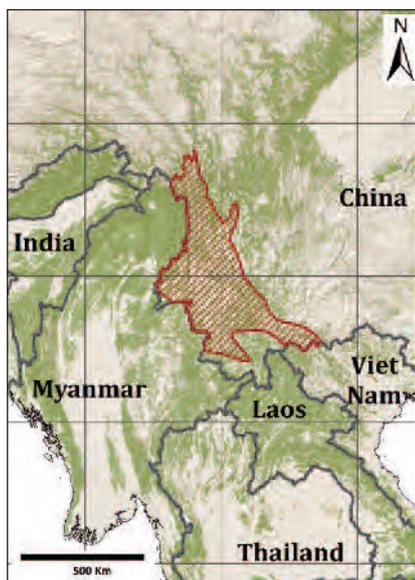
DD

China (Jilin, Liaoning), Democratic People's Republic of Korea, Russian Federation

Taxonomically this species remains uncertain, it may be a synonym of *Acer tschonoskii* ssp. *koreanum*, see the entry for *A. tschonoskii* (Least Concern) for details.

Refs: 1, 30, 34, 47, 48

Acer kungshanense Fang & Chang (1966)



VU A2c

China (Yunnan)

Found in valleys with mixed forests between 2000-3200m in north-west and southern Yunnan and under threat from habitat degradation and loss.

Refs: 1, 16, 30, 47

Acer kuomeii Fang & Fang (1966)

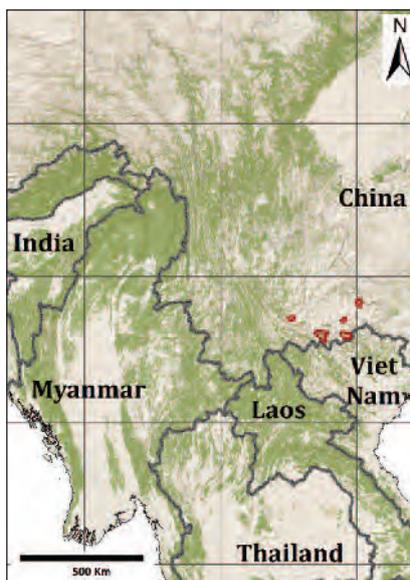
NT

China (Guangxi, Yunnan), Viet Nam

Seems to be locally abundant in one valley in southern Yunnan but has a limited range overall which includes one locality in Viet Nam, six counties in Yunnan and one county in Guangxi. Nearly meets VU A2c.

Refs: 1, 2, 30, 48

Acer kwangnanense Hu & Cheng (1948)



EN B1ab(iii)

China (Yunnan)

Recorded from 5 collections from mixed forests in a small area of degraded terrain in southern Yunnan, with an area of occupancy of 444km². Some researchers believe that the species is possibly also found across the border in northern Viet Nam, but this remains unconfirmed.

Refs: 1, 16, 30, 48

Acer kweilinense Fang & Fang (1966)

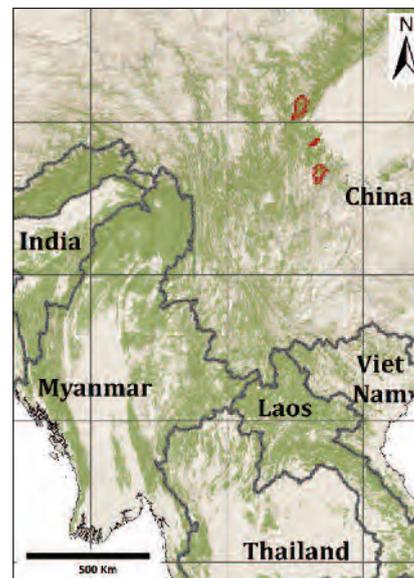
NT

China (Guangxi, Guizhou)

With a relatively small distribution this species is found in sparse forests in Northeast Guangxi and Southeast Guizhou, nearly meets VU A2c. It may also be found in Hunan, China.

Refs: 1, 2, 30, 48

Acer leipoense Fang & Soong (1966)



CR A2c

China (Sichuan)

The species is found in mixed montane forests (2000-2700m) in south-west Sichuan, with an area of occupancy of 1772km². It has not been seen recently in Baoxing, Tianquan and Leipo counties where it has been recorded to occur in the past. However a population has recently been recorded in a valley within a protected area in Ebian County.

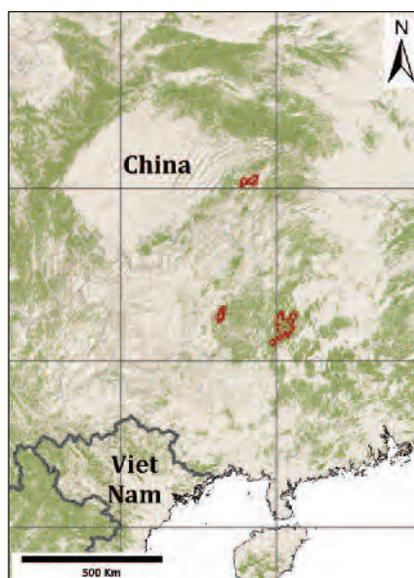
Refs: 1, 2, 16, 30, 48

Acer linganense Fang & Chiu (1979)



VU A2c
 China (Anhui, Zhejiang)
 Although the species does occur in protected areas, the population is declining due to a range of threats including pollution. There is some debate about the taxonomic status of the species and its relationship to *A. robustum*; further taxonomic research is required (Xu *et al.*, 2008).
 Refs: 1, 2, 16, 30, 48

Acer lungshengense Fang & Hu (1966)



VU B1ab(ii)+2ab(ii)
 China (Guangxi, Guizhou, Hubei, Hunan)
 Recorded from 3 localities, with a total area of occupancy of 1160km², in valleys within mixed forests in south-central China.
 Refs: 1, 16, 30, 48

Acer metcalfii Rehder (1933)

NT
 China (Guangdong, Guangxi, Guizhou, Hunan), Viet Nam
 This snakebark maple nearly meets VU A2c; listed as Vulnerable in the Chinese Species Red List (2004).
 Refs: 1, 16, 30, 34, 48

Acer miaoshanicum Fang (1966)

DD
 China (Guangxi, Guizhou)
 A subtropical acer collected only twice and some taxonomic debate exists around the status of the species.
 Refs: 1, 2, 22, 30

Acer miaotaiense Tsoong (1954)



VU A2c
 China (Gansu, Henan, Hubei, Shaanxi, Zhejiang)
 The species exists in fragmented populations with few individuals across its remaining range. Poor regeneration as well as habitat degradation and loss, due to a range of factors including drought, is threatening this species in the wild. This species is very close to *A. miyabei*, with which it has much in common; some taxonomists consider it a subspecies of *A. miyabei*.
 Refs: 1, 14, 16, 17, 30, 34, 47, 48

Acer miyabei* var. *miyabei

Maximowicz (1888)



EN C1
 Japan (Hokkaido, Honshu)
 The distribution is restricted in the Hidaka and the Ishikari districts of Hokkaido, the northern half of Iwate Prefecture, and the northern part of Akita prefecture of northern Honshu, and several isolated populations have been reported from Nagano and Fukushima prefectures. The estimated remaining 700 mature individuals are threatened by habitat loss from logging, land development, and road construction.
 Assessor: Dr Ikuyo Saeki
 Refs: 2, 9, 18, 30, 34, 46, 56, 58, 66

Acer miyabei var. *shibatai* (Nakai)
Hara (1951)



EN C1

Japan (Honshu)

Restricted to several localities in moist, somewhat swampy and flat places such as stream sides and lower montane slopes from cool temperate to subalpine areas of Central Honshu in Fukushima, Gunma and Nagano Prefectures. It is threatened by habitat loss and degradation but is protected in at least two locations.

Assessor: Dr Ikuyo Saeki

Refs: 46, 56, 58, 67



Acer miyabei leaves (Douglas Gibbs)

Acer morrisonense Hayata (1911)



VU A2c

Taiwan

This snakebark maple is found in mixed forests at medium altitude (1800-2200m) on Taiwan but is under some pressure from habitat degradation and loss. There is some debate on its taxonomy and its relationship with *Acer caudatifolium*, which some consider it to be a synonym.

Refs: 1, 5, 6, 16, 18, 30, 34, 47, 48

Acer negundo subsp. *mexicanum*
(DC.) Wesmael (1890)



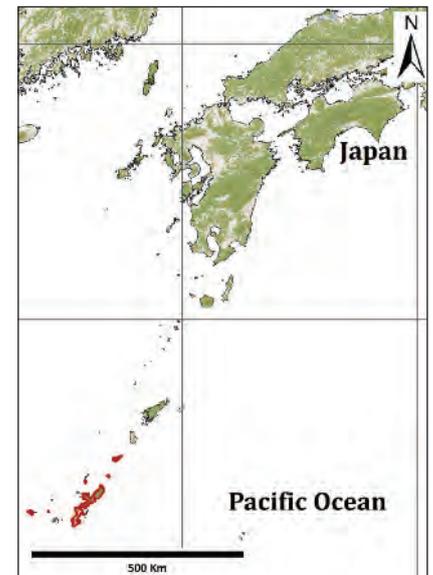
VU B2ab(ii,iii)

Guatemala, Mexico

The subspecies is found in cloud and oak forests, between 1500-2400m, often along rivers and streams but it is not abundant across its range and does not form pure stands. Throughout its range it is under threat from habitat loss and degradation. It is a protected species in Mexico and listed as a Category 2 threatened species by CONAP (Consejo Nacional de Áreas protegidas) in Guatemala.

Refs: 2, 17, 18, 21, 30, 39, 40, 41, 49

Acer oblongum var. *itoanum* Hayata
(1911)



EN B1b(i,ii,iii); C1+2a(i)

Japan (Nansei-Shoto)

Found in subtropical evergreen forests on only six islands of Ryukyu (i.e. Oki-erabu, Yoron, Okinawa, Izena, Tonaki, and Kume, in Kagoshima and Okinawa prefectures), Japan (Shimabuku 1997). Under continued threat from habitat loss and quality due to land development, road construction and forest harvesting.

Assessor: Dr Ikuyo Saeki

Refs: 2, 9, 18, 30, 46, 56, 57, 69

Acer oblongum var. *omeiense* Fang & Soong (1979)



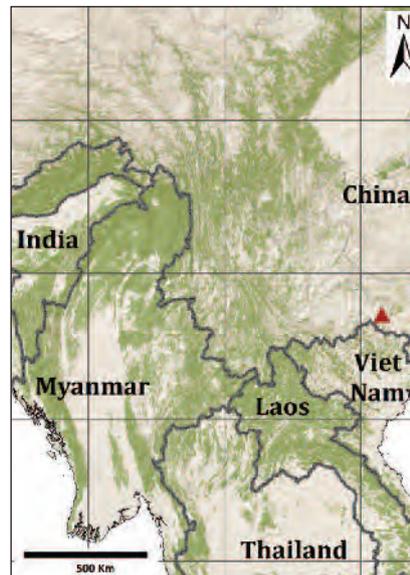
EN B1ab(iv)
 China (Sichuan)
 An evergreen acer recorded in a protected area in Sichuan which is also a popular tourist site and is under threat from associated impacts including hotel construction.
 Refs: 1, 22, 30

Acer oligocarpum Fang & Hu (1979)
 DD
 China (Xizang, Yunnan)
 Refs: 1, 2, 30



Acer pentaphyllum leaves and seeds in Muli County, Sichuan (Yousheng Chen)

Acer paihengii Fang (1966)



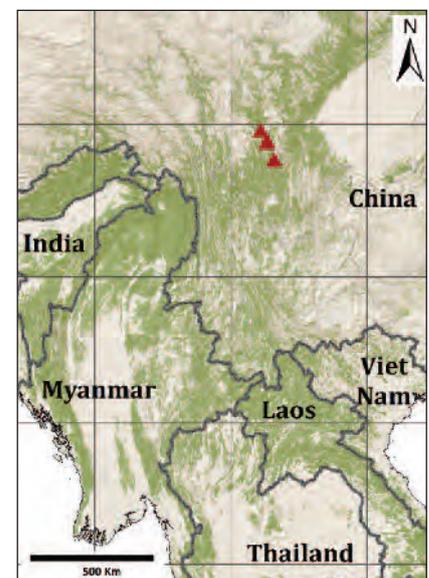
CR B1ab(iv,v)+2ab(iv,v)
 China (Yunnan)
 Occurs in broad-leaf forests on limestone and has a very restricted distribution in south-east Yunnan, with an area of occupancy of 8km².
 Refs: 1, 16, 30, 34, 48

Acer pauciflorum Fang (1932)



EN A2cd
 China (Anhui, Fujian, Zhejiang)
 An attractive species which occurs in open degraded woodland in southern Anhui and Zhejiang at 500-1000m; it is under pressure from continued habitat loss and degradation.
 Refs: 1, 2, 16, 18, 30, 34, 48

Acer pentaphyllum Diels (1931)



CR C1
 China (Sichuan)
Acer pentaphyllum Diels. (CR C1) is a very rare maple. Despite its tenderness it is highly valued by maple collectors for its deep green five-lobed leaves and elegant form. It first came to the attention of western botanists when it was documented by Joseph Rock in 1929 during a National Geographic sponsored expedition to China. Found only in a series of high altitude valleys between 2300 and 2900m near Muli in south west Sichuan, the four small populations consist of fewer than 200 trees.

Of the four populations, two will be submerged if planned dam construction goes ahead and a third is already under significant threat due to the construction of a new road directly through it. In addition to these threats, the populations

are all thought to be under pressure from overgrazing, firewood collection and increasing rural populations. The fourth population has not been visited recently, but it too is thought to be at risk.

The regeneration of the populations is currently very poor, which is possibly due to grazing pressure since the trees are producing good viable seed but these fail to establish. With some degree of protection from grazing it is believed that these populations could recover to a degree, however the additional threat from construction projects remains. An integrated conservation plan for the species involving all the stakeholders in the area is urgently needed.

Refs: 1, 2, 16, 18, 19, 22, 30, 34, 48

Acer pentapomicum Stewart ex Brandis (1874)

DD

Afghanistan, India, Pakistan, Tajikistan
This species occurs over a wide area but is thought to be locally scarce and is not currently known in cultivation.

Refs: 2, 18, 20, 30, 34, 35, 44

Acer pictum subsp. ***pubigerum*** (Fang) Chen (2008)



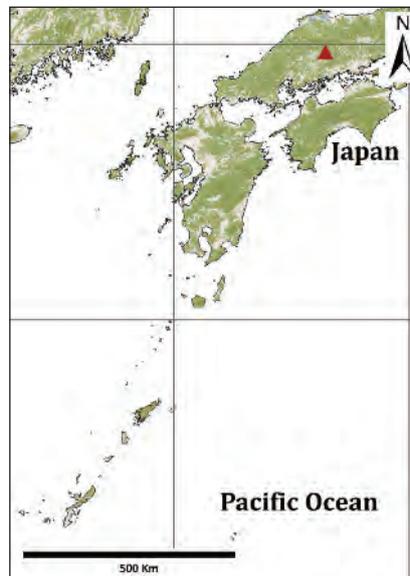
VU A2c

China (Anhui, Zhejiang)

Recorded from broadleaf forests between 700-1200m in southern Anhui and Zhejiang. It is known to occur in protected areas, but outwith these it is under threat from urbanisation and human pressure leading to habitat loss and degradation.

Refs: 1, 30

Acer pictum subsp. ***taishakuense*** (Ogata) Ohashi (1993)



VU D1+2

Japan (Honshu)

Although the subspecies occurs within a protected area, it has a very small population with possibly fewer than 1000 mature trees in an extremely restricted distribution on limestone along Taishaku-kyo valley (Hiroshima prefecture, western Honshu, Japan).

Assessor: Dr Ikuyo Saeki

Refs: 9, 30, 56, 58, 59, 70

Acer pilosum Maximowicz (1880)



VU A2c

China (Gansu, Nei Mongol, Ningxia, Shaanxi, Shanxi)

Occurs in low rainfall area, along the Yellow River, at risk from desertification, falling water table and browsing animals. There have been no recent collections (since 1950) and further investigation is needed.

Refs: 1, 2, 16, 30, 48

Acer pinnatinervium Merrill (1941)



VU A2c

China (Xizang, Yunnan), India, Lao People's Democratic Republic, Myanmar, Thailand, Viet Nam

Occurs from Xizang in China to Thailand in mixed forests over a broad altitudinal range (500-2400m) but under threat from habitat loss; recorded as Endangered in China. It is also likely to be found in northern Laos, but is currently unrecorded there.

Refs: 1, 15, 30, 47, 48



Acer pinnatinervum in Gongshan County, Yunnan (Yousheng Chen)

Acer platanoides subsp.

turkestanicum (Pax) de Jong (1988)

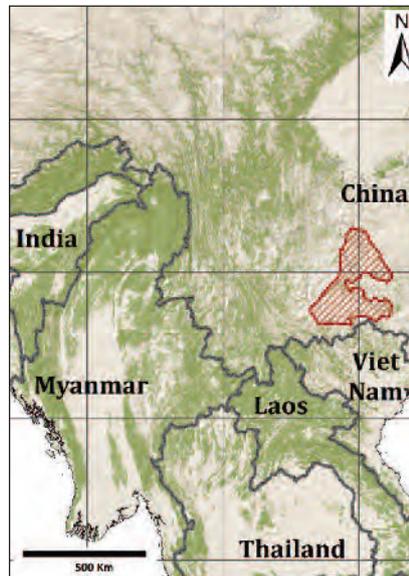
DD

Afghanistan, Islamic Republic of Iran, Pakistan, Tajikistan, Turkmenistan, Uzbekistan

This acer is rare in cultivation and thought to be rare in the wild. However there is a lack of sufficient field data to fully assess the current conservation status.

Refs: 2, 3, 18, 20, 30, 34, 35, 43, 44

Acer poliophyllum Fang & Wu (1979)



EN A2c

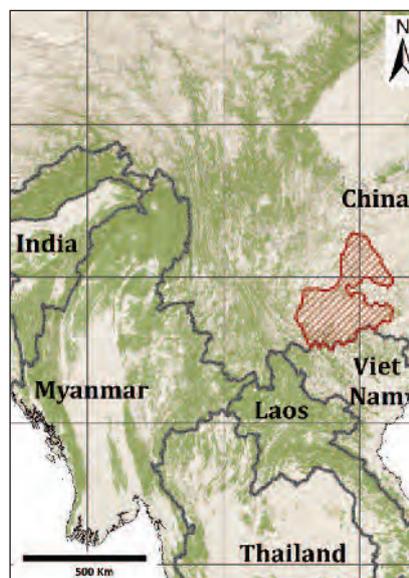
China (Guizhou, Yunnan)

Fragmented distribution in degraded mixed forests in south-west Guizhou and south-east Yunnan, China, between 1000-1800m with an area of occupancy of 1386km².

Refs: 1, 16, 30, 48

Acer pubipetiolatum var.

pingpienense Fang & Hu (1966)



VU A3c

China (Guizhou, Yunnan)

Recorded from 3 localities in south-west Guizhou and Yunnan. Occurs on limestone slopes between 800-1500m in degraded habitat with an area of occupancy of 2880km².

Refs: 1, 30

Acer pubipetiolatum var.

pubipetiolatum



VU A2c

China (Yunnan)

Recorded from 6 locations in western Yunnan in valleys between 1900-2600m in degraded mixed forests.

Refs: 1, 30



Acer pycnanthum flowers

(Westonbirt Arboretum)

Acer pycnanthum Koch (1864)



VU C1

Japan (Honshu)

A rare acer primarily restricted to discrete seepage and floodplain ecosystems in Gifu, Nagano and Aichi prefectures around Mount Ena but also found in Omachi City, Nagano prefecture. There are an estimated 1000 mature individuals remaining distributed between approximately 60 localities. The size of individual populations is typically small – often less than 20 individuals, with the largest consisting of just 300. These populations are under threat from habitat loss to development and expansion of commercial forestry.

Assessor: Dr Ikuyo Saeki

Refs: 2, 9, 18, 30, 34, 46, 47, 51, 52, 53, 54, 55, 68

Acer shihweii Chun & Fang (1966)

DD

China (Guizhou)

Only known from one collection and further research is required to confirm its taxonomic status. However, it is listed as Critically Endangered in the Chinese Species Red List (2004).

Refs: 1, 2, 16, 30, 48

Acer sikkimense Miquel (1867)

DD

Bhutan, China (Xizang, Yunnan), India, Myanmar, Nepal, Viet Nam

A snakebark maple which is considered Vulnerable in China, but also found in additional countries where its conservation status is unknown.

Refs: 1, 2, 4, 16, 18, 30, 34, 47, 48

Acer sino-oblongum Metcalf (1932)



EN B1ab(iii)+2ab(iii)

China (Guangdong)

An evergreen acer which occurs at low altitudes (0-200m) and is only known from 5 populations in Guangdong. Due to proximity of the populations to urban areas and the coast, urbanisation and habitat loss are the main threat to the remaining area of occupancy (442km²).

Refs: 1, 2, 16, 18, 30, 34, 47, 48



Acer sinopurpurascens leaves

(Westonbirt Arboretum)

Acer sinopurpurascens Cheng (1931)



VU A2c

China (Anhui, Hubei, Jiangxi, Zhejiang)

An acer with a fragmented distribution in mixed forests between 700-1000m across a heavily developed area of south east China. It is difficult to propagate and is rare in cultivation but is noted for its flowers.

Refs: 1, 2, 16, 30, 34, 48

Acer skutchii Rehder (1936)



EN B2ab(ii,iii,iv)

Guatemala, Mexico (Chiapas, Coahuila, Jalisco, Tamaulipas)

Occurs as 5 disjunct populations, 4 in Mexico and 1 in Guatemala in cloud forest and along rivers in rainforest. Local uses include it as a source of sugar and also for construction. Previously known as and still considered by some to be *Acer saccharum* ssp. *skutchii*. Listed as threatened in Mexico and as a Category 2 threatened species by CONAP (Consejo Nacional de Áreas protegidas) in Guatemala.

Refs: 18, 30, 32, 33, 34, 40, 41, 47, 49

Acer sutchuenense Franchet (1894)



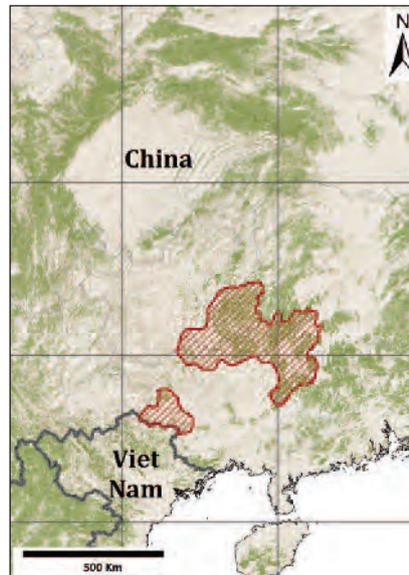
EN A2c

China (Hubei, Hunan, Sichuan)

Occurs in small fragmented populations in central China, some of which occur in protected areas of mixed forests between 1000-2500m.

Refs: 1, 2, 16, 18, 30, 47, 48

Acer sycopseoides Chun. (1932)



EN A2c

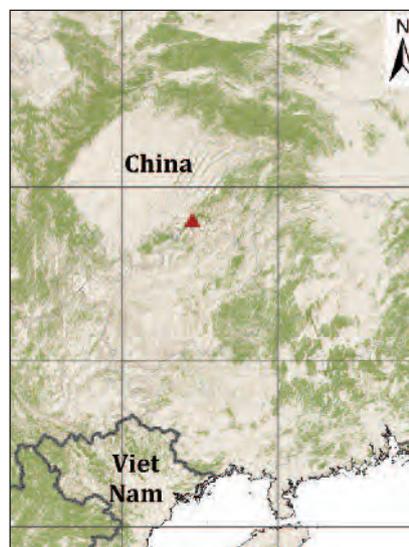
China (Guangxi, Guizhou)

Recorded from forests in small populations at relatively low altitudes and under threat from habitat loss and degradation. Has not been collected recently although it has been looked for, but more extensive search is required before revising its conservation status higher than Endangered.

Refs: 1, 2, 16, 30

Acer tenellum var. *septemlobum*

(Fang & Soong) Fang & Soong (1979)



CR B1ab(ii,v)+2ab(ii,v)

China (Sichuan)

Found in very small population in mixed forests between 1400-1700m, in Nanchuan County of Sichuan with an area of occupancy of 9km². The area is heavily developed and there is considerable pressure on the remaining population; it is not known in cultivation.

Refs: 1, 2, 16, 30, 48

Acer tenellum var. *tenellum* Pax

(1889)



EN A2c

China (Hubei, Sichuan)

Recorded from very small populations in mixed forests in valleys between 1200-1900m in western Hubei and eastern Sichuan. It is not known in cultivation.

Refs: 1, 30, 48



Acer tenellum samara (Westonbirt Arboretum)

Acer thomsonii Miquel (1867)

DD

Bhutan, China (Xizang, Yunnan), India (Assam, Manipur, Sikkim), Myanmar, Nepal, Thailand

Listed as Critically Endangered in China, however this represents only a minor part of the full range of the species.

Refs: 1, 4, 15, 16, 18, 30, 38, 48



Acer thomsonii (Yousheng Chen)

Acer tibetense Fang (1939)



EN B2ab(ii)

China (Xizang)

Recorded from a single county in south-east Xizang in mixed forests in valleys between 1600-2700m. There have been no recent expeditions to the area to confirm in detail its current status, but with an area of occupancy of 410km² and deforestation occurring in the area, the species is threatened.

Refs: 1, 2, 16, 30, 48

Acer tonkinense Lecomte (1912)

NT

China (Guangxi, Guizhou, Xizang, Yunnan), Lao People's Democratic Republic, Myanmar, Thailand, Viet Nam
Not common in China, where it occurs mostly outwith the protected area system and in agricultural areas, and is listed as Endangered. Also found in Myanmar, Thailand and northern Viet Nam, it is also likely to be found in Laos. It can be locally abundant but has a restricted distribution and under pressure from land use changes. The species nearly meets VU A2c.

Refs: 1, 2, 16, 30, 34, 37, 47, 48

Acer triflorum Komarov (1901)

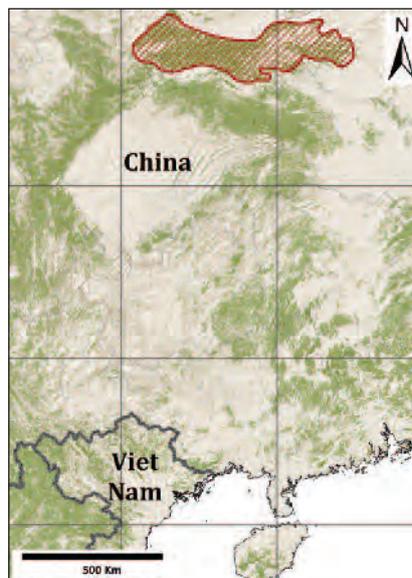
DD

China (Heilongjiang, Jilin, Liaoning), Democratic People's Republic of Korea, Republic of Korea

Some wild populations are threatened by poor seed viability. The species is listed as Vulnerable in China but occurs elsewhere.

Refs: 1, 2, 16, 18, 30, 34, 47, 48

Acer tsinlingense Fang & Hsieh (1966)



Acer tsinlingense in Zhuxi County, Hubei (Q. L. Gan)

VU A2c

China (Gansu, Henan, Shaanxi)

Occurs in sparse forests between 1200-1500m in south-east Gansu, south-west Henan and Shaanxi, in an area of habitat degradation and loss. The species is similar to *Acer sterculiaceum* ssp. *franchetii* and there is debate over its taxonomic status (Xu *et al.*, 2008).

Refs: 1, 16, 30, 34

Acer tutcheri var. ***shimadai*** Hayata

(1911)

DD

Taiwan

Very few herbarium specimens are known and there is some uncertainty about its current taxonomic status.

Refs: 1, 2, 30

Acer undulatum Pojark



CR B1ab(iii,v)+2ab(iii,v)

Turkey

Only known from one location; the top of Babadag Mountain near Fethiye in the province of Mugla, Turkey. With Fethiye being one of the top tourist destinations in Turkey and Babadag Mountain also being popular, combined with the species having an extent of occurrence of approximately 10km² - the species is of serious conservation concern. Further taxonomic research is required in order to confirm *Acer undulatum* is distinct from *Acer hyrcanum*.

Assessor: Prof. Dr Adil Güner

Refs: 12, 13, 65

Acer wangchii Fang (1966)

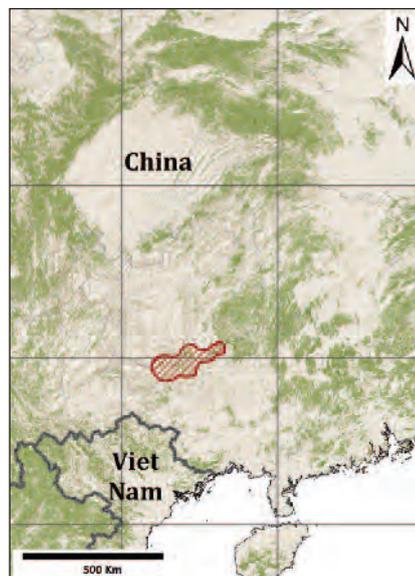
VU B1ab(iii)

China (Guangxi, Guizhou)

A very rare species known from 4 collected specimens in northern Guangxi and Guizhou. Occurs in an area of high habitat disturbance with an extent of occurrence of 18,940km². Further research would help establish whether this species is more threatened than Vulnerable. Listed as *Acer wangii* and Endangered by Chinese Species Red List (2004).

Refs: 1, 2, 16, 30, 48

Acer wardii Smith (1977)



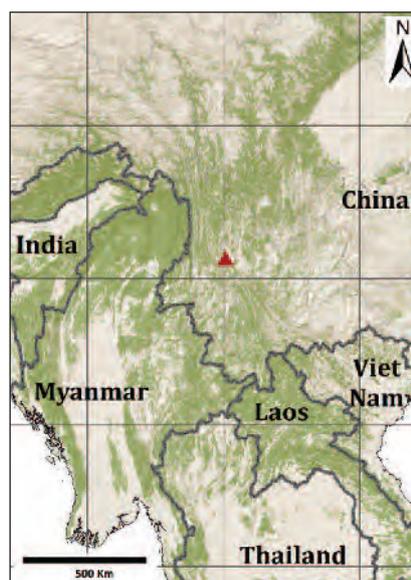
DD

China (Xizang, Yunnan), India (Assam), Myanmar

A snakebark maple listed as Endangered in China, but also found in India and Myanmar.

Refs: 1, 2, 15, 16, 18, 30, 47

Acer yangbiense Chen & Yang (2003)



CR B1ab(v)+2ab(v); D

China (Yunnan)

The highly threatened Yangbi Maple (*Acer yangbiense* Chen & Yang) is one of the newest maples to be named by scientists, and was only described in 2003. With a very restricted distribution, it is only known from a single area in a valley on the western slopes of Mt. Cangshan, Yangbi, northwest Yunnan, China. When the site was visited in 2002, the population consisted of no more than 10 trees near a small village. However when the location was revisited in 2007, only 4 trees were found to remain scattered in secondary forest.

In the spring of 2008, Yousheng Chen carried out hand pollination trials on the 4 Yangbi Maples. When the site was revisited later in 2008, it was found that the pollination had been successful with significant seed set. Some 3000 seeds were then collected for germination trials



Acer yangbiense seedlings in Beijing Botanic Garden (Yousheng Chen)

at both Beijing Botanic Garden and Kunming Botanic Garden to establish an *ex situ* conservation programme. By February 2009, germination had been very successful at both gardens making the future of the Yangbi Maple far more secure. Further research on these seedlings is currently being carried out to better understand the species and its genetic variation with the view to supporting reinforcement of the natural population and the long term conservation of this highly threatened maple.

Refs: 1, 16, 30, 48, 61, 62

Acer yinkunii Fang (1966)

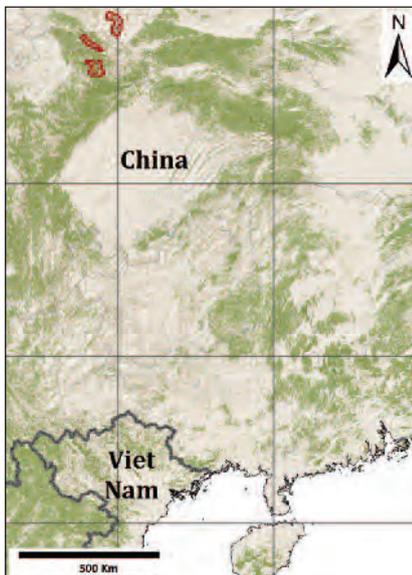
DD

China (Guangxi)

The species description is currently based on a single specimen and taxonomically it is close to *Acer fabri*. If the taxonomy is confirmed, it is likely that it is Endangered and is already so listed by the Chinese Species Red List (2004).

Refs: 1, 2, 16, 30, 48

Acer yui Fang (1939)



EN B2ab(ii,iv)

China (Gansu, Sichuan)

Recorded from mixed forests in valleys in southern Gansu and north-west Sichuan between 1800-2000m. The species has a fragmented distribution with an area of occupancy of 366km² and is under threat from continued habitat degradation and loss.

Refs: 1, 2, 16, 30, 48

EN B1ab(i,ii,iv)+2ab(i,ii,iv)

China (Yunnan), Viet Nam

Dipteronia species are closely related to acers and are placed in the same family (Aceraceae). This species is recorded from forests between 2000-2500m in south-east Yunnan. The fragmented population has an area of occupancy of 296km², potentially its distribution could extend in to northern Viet Nam. The species is under threat from extensive deforestation; it is grown for its ornamental value and as a source of oil.

Refs: 1, 14, 16, 30, 34, 48

Dipteronia sinensis Oliver (1889)

NT

China (Gansu, Guizhou, Henan, Hubei, Hunan, Shaanxi, Shanxi, Sichuan)

Occurs in scattered populations in mountane areas of central and south-west China. It is under threat from deforestation and poor regeneration. It nearly meets VU A2c.

Refs: 1, 14, 16, 18, 30, 34, 48

Dipteronia dyeriana Henry (1903)



Dipteronia sinensis leaves (Douglas Gibbs)

MAPLES EVALUATED AS LEAST CONCERN

Acer acuminatum Wallich ex D. Don (1825)
China, India, Nepal, Pakistan
Refs: 1, 2, 4, 18, 20, 30, 34, 35, 48

Acer amplum subsp. ***amplum***
China
Refs: 1, 30, 34, 48

Acer amplum subsp. ***bodinieri***
(Léveillé) Chen (2008)
China, Viet Nam
Refs: 1, 30, 34, 48

Acer amplum subsp. ***tientaiense***
(Schneider) Chen (2008)
China
Although few specimens have been collected, it is thought to be widespread and relatively common.
Refs: 1, 18, 30, 34

Acer argutum Maximowicz (1867)
Japan
Refs: 2, 9, 18, 30, 34, 47

Acer barbatum Michx. (1803)
United States of America
Refs: 2, 18, 30, 34, 45, 47

Acer barbinerve Maximowicz ex Miquel (1867)
China, Democratic People's Republic of Korea, Russian Federation
Closely related to *Acer argutum* and recorded as Near Threatened on the China Species Red List (2004), but also found in Russia and North Korea. Not thought to be common in cultivation.
Refs: 1, 2, 16, 18, 30, 34, 47, 48

Acer buergerianum var. ***buergerianum***
Miquel (1865)
China
An important species to horticulture in China, Japan, Korea and Taiwan where it is used in gardens, landscaping and bonsai.
Refs: 1, 2, 18, 30, 34

Acer caesium Wallich ex Brandis (1874)
China, India, Nepal, Pakistan
Occurs in mountain forests in Sichuan and Yunnan provinces, China at 2000-3000m where it is listed as Near Threatened. This species has a disjunct distribution and does not occur in Sikkim or Bhutan but is reported from the western part of Nepal and also Kashmir.
Refs: 1, 2, 4, 16, 18, 20, 30, 34, 35, 47

Acer campbellii var. ***campbellii***
Bhutan, China, India, Myanmar, Nepal, Viet Nam
Occurs over a wide area, often near rivers and streams and up to relatively high altitudes. In north India and Nepal it may be under localised pressure and as a result be locally threatened.
Refs: 1, 2, 18, 30, 37

Acer campbellii var. ***serratifolium***
Banerji (1961)
Bhutan, China, India, Nepal
As with the other variety of *Acer campbellii*, the conservation status of this variety is Least Concern over its range but may be locally under threat in north India and Nepal.
Refs: 1, 30

Acer campestre L. (1753)
Continental Europe, UK, Western Asia and North Africa
Very commonly growing as a shrub, thriving in thickets, sometimes as a tree in the hills or plains, often as undergrowth in forests. *Acer campestre* is one of the few European species, widespread and indigenous to almost all European countries, except Scandinavia and Finland. It is rare in the southern parts of Spain and Portugal, but occurs in North Africa and western Asia.
Refs: 2, 3, 18, 30, 34, 42, 43, 44

Acer capillipes Maximowicz (1867)
Japan
Red Snakebark Maple is widely valued to horticulture due to the attractive striped bark and autumnal leaf colour.
Refs: 2, 9, 18, 30, 34

Acer cappadocicum subsp. ***cappadocicum*** Gleditsch (1785)
Armenia, Azerbaijan, Bhutan, China, Georgia, India, Islamic Republic of Iran, Nepal, Pakistan, Turkey
Listed as Vulnerable in China but it occurs over a huge range from Turkey to China.
Refs: 1, 2, 4, 16, 18, 30, 34, 42, 43, 44, 47

Acer cappadocicum subsp. ***sinicum***
(Rehder) Handel-Mazzetti (1933)
China
A common subspecies endemic to China.
Refs: 1, 16, 18, 30, 34, 47

Acer carpinifolium Siebold & Zuccarini (1875)
Japan
Refs: 2, 9, 18, 30, 34, 47

Acer caudatum Wallich (1831)
Bhutan, China, India, Myanmar, Nepal
Native to alpine forests over a broad altitudinal range (1700-4000m) across large parts of China, Myanmar and the Himalayas.
Refs: 1, 2, 4, 15, 16, 18, 30, 34, 35, 47

Acer circinatum Pursh (1814)
Canada, United States of America
Refs: 2, 18, 30, 34, 45, 47, 49

Acer cissifolium (Siebold & Zuccarini) Koch (1864)
Japan
Refs: 2, 9, 30, 34, 47

Acer cordatum var. ***cordatum*** Pax (1889)
China
Refs: 1, 2, 30

Acer cordatum var. ***dimorphifolium***
(Metcalf) Chen (2008)
China
Refs: 1, 30

Acer coriaceifolium Lévillé (1912)

China
An evergreen tropical acer from China and Taiwan.
Refs: 1, 2, 16, 30, 34

Acer crataegifolium Siebold & Zuccarini (1845)

Japan
Common in temperate deciduous forests, usually growing in open places such as along mountain paths, streams and in young secondary forests. It is a snakebark maple but rare in cultivation.
Refs: 2, 9, 18, 30, 34, 47

Acer davidii Franchet (1885)

China, Myanmar
A popular species known for its snake-like bark and autumnal leaf colour.
Refs: 1, 2, 15, 16, 18, 30, 34, 47

Acer diabolicum Blume ex Koch (1864)

Japan
Assessor: Dr Ikuyo Saeki
Refs: 2, 9, 58

Acer distylum Siebold & Zuccarini (1845)

Japan
Refs: 2, 9, 18, 30, 34, 47

Acer duplicatoserratum var. ***chinense*** Chang (1990)

China
Refs: 1, 2, 30

Acer elegantulum Fang & Chiu (1979)

China
An Acer from mountainous forests and valleys in southern and eastern China, but debate exists with regards to this species relationship to *Acer pubinerve* from which it is difficult to distinguish (Xu *et al.*, 2008). Listed as Vulnerable in the Chinese Species Red List (2004).
Refs: 1, 2, 16, 30, 34

Acer erianthum Schwerin (1901)

China
Refs: 1, 2, 16, 18, 30, 34, 47

Acer fabri Hance (1884)

China, Viet Nam
Refs: 1, 2, 16, 18, 30, 34, 37, 47

Acer flabellatum Rehder (1905)

China, Myanmar, Viet Nam
Refs: 1, 16, 18, 30, 34, 36, 37, 47

Acer forrestii Diels (1912)

China, Viet Nam
A snakebark maple listed as Near Threatened in the Chinese Species Red List (2004).
Refs: 1, 16, 18, 30, 34, 47

Acer glabrum var. ***diffusum*** (Greene) Smiley (1971)

United States of America
Refs: 7, 8, 18, 30, 45, 47

Acer glabrum var. ***douglasii*** (Hook.)

Dippel (1892)
Canada, United States of America
Refs: 2, 18, 30, 34, 45, 47, 49

Acer glabrum var. ***glabrum***

Canada, United States of America
Refs: 2, 7, 8, 18, 34, 45, 47

Acer glabrum var. ***neomexicanum***

(Greene) Kearney & Peebles (1939)
United States of America
Refs: 7, 8, 30, 34, 45, 47, 49

Acer glabrum var. ***torreyi*** (Greene)

Smiley (1921)
United States of America
Refs: 18, 30, 34, 45, 47

Acer grandidentatum Nutt. (1938)

Canada, Mexico, United States of America
This taxon is considered by some to be a synonym of *Acer saccharum* subsp. *grandidentatum* (Nutt.) Desmarais.
Refs: 2, 7, 18, 30, 34, 45, 47, 49

Acer heldreichii Orphanides ex Boissier (1856)

Albania, Armenia, Bulgaria, Georgia, Greece, Montenegro, Serbia, Turkey
Refs: 2, 3, 18, 30, 34, 47

Acer henryi Pax (1889)

China
Refs: 1, 2, 16, 18, 30, 34, 47

Acer hyrcanum Fisher & Meyer (1837)

Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Georgia, Greece, Islamic Republic of Iran, Lebanon, Montenegro, Serbia, Syrian Arab Republic, Turkey, Ukraine
Refs: 2, 3, 18, 30, 34, 43, 44, 47

Acer japonicum Thunberg ex Murray (1784)

Japan
A common acer in Japan. *Acer japonicum* is found extensively in cultivation with many cultivars known although not nearly as many as *Acer palmatum*. However, the true form of the species is not readily available.
Refs: 1, 2, 9, 18, 30, 34, 47

Acer laevigatum var. ***laevigatum***

Bhutan, China, India, Myanmar, Nepal, Viet Nam
Refs: 1, 2, 4, 18, 30, 37

Acer laevigatum var. ***salweenense***

(Smith) Cowan ex Fang (1939)
China, Myanmar
Refs: 1, 2, 18, 30, 47

Acer laurinum Hasskarl (1843)

Cambodia, China (Guangxi, Hainan, Xizang, Yunnan), India (Assam), Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Nepal, Philippines, Thailand, Viet Nam
A significant evergreen tropical tree (25-30m tall) occurring over a wide area and the only acer known to naturally occur in the southern hemisphere. However, despite its range and significance it has been subject to relatively little taxonomic research and potentially could be more than one species or subspecies.
Refs: 1, 2, 16, 18, 30, 34, 36, 37, 38, 48

Acer laxiflorum Pax (1902)

China
Refs: 1, 16, 18, 30, 34, 47

- Acer longipes*** Franchet ex Rehder (1905)
China
Listed as Vulnerable in the Chinese Species Red List (2004).
Refs: 1, 2, 16, 18, 30, 34, 47
- Acer lucidum*** Metcalf (1932)
China
Widely distributed but overall not a common species and listed as Vulnerable in the Chinese Species Red List (2004).
Refs: 1, 2, 16, 18, 30, 48
- Acer macrophyllum*** Pursh (1814)
Canada, United States of America
Refs: 2, 18, 30, 34, 47, 49
- Acer mandshuricum*** Maximowicz (1867)
China, Democratic People's Republic of Korea, Republic of Korea, Russian Federation
Refs: 1, 2, 18, 30, 34, 47
- Acer maximowiczianum*** Miquel (1867)
China, Japan
Very fragmented distributed in China, but with some good sized populations.
Refs: 1, 2, 18, 30, 34, 47, 48
- Acer maximowiczii*** Pax (1899)
China
Refs: 1, 16, 18, 30, 34, 47
- Acer micranthum*** Siebold & Zuccarini (1845)
Japan
Komine Maple (*Acer micranthum*) is a snakebark maple only occasionally grown outside of Japan.
Refs: 2, 9, 18, 30, 34, 47
- Acer monspessulanum*** L. (1753)
Albania, Andorra, Bosnia and Herzegovina, Bulgaria, Croatia, France, Germany, Greece, Italy, Lebanon, Portugal, Republic of Macedonia, Montenegro, Romania, Serbia, Slovenia, Spain, Turkey
Refs: 2, 3, 18, 30, 34, 47
- Acer morifolium*** Koidzumi (1914)
Japan
Restricted to Yakushima Island in the Ryukyu chain of islands. Although this snakebark maple is very restricted in distribution (400km²), it is locally abundant and not considered to be under threat.
Assessor: Dr Ikuyo Saeki
Refs: 2, 9, 30, 34, 47
- Acer negundo* subsp. *californicum*** (Torrey & Gray) Wesmael (1890)
United States of America
Refs: 2, 18, 30, 34, 45, 47
- Acer negundo* subsp. *interius*** (Britton) A. & D. Loeve (1954)
Canada, United States of America
Refs: 2, 18, 30, 34, 45, 47, 49
- Acer negundo* subsp. *negundo*** L. (1753)
Canada, Guatemala, Mexico, United States of America
Acer negundo has become naturalised in China and invasive in Australia along watercourses, in wet forests, along roadsides and in disturbed sites with moist soil. In its native range, Manitoba Maple or Box Elder is utilised for both its timber and also as a source of maple syrup.
Refs: 2, 18, 30, 34, 45, 47, 49
- Acer nigrum*** Michx. f.
Canada, United States of America
This maple is considered by some to be a synonym of *Acer saccharum* subsp. *nigrum* (F. Michx.) Desmarais. It is commonly known as Black Maple and is utilised for its timber and also as a source of Maple Syrup.
Refs: 7, 18, 30, 34, 45, 47, 49
- Acer nipponicum*** Hara (1938)
Japan
Refs: 2, 9, 18, 30, 34, 47
- Acer oblongum* var. *oblongum*** Wallich ex D.C. (1824)
Bhutan, China, India, Lao People's Democratic Republic, Myanmar, Nepal, Thailand, Viet Nam
Refs: 1, 30
- Acer obtusifolium*** Sibthorp & Smith (1809)
Cyprus, Israel, Lebanon, Palestinian Territory, Syrian Arab Republic, Turkey
Refs: 2, 34
- Acer oliverianum*** Pax (1889)
China, Taiwan, Viet Nam
Refs: 1, 2, 16, 18, 30, 34, 36, 47
- Acer opalus*** Miller (1766)
Albania, Algeria, Croatia, France, Germany, Greece, Hungary, Italy, Malta, Montenegro, Morocco, Serbia, Slovenia, Spain, Switzerland
Refs: 2, 3, 18, 34, 47
- Acer palmatum*** Thunberg ex Murray (1784)
Japan, Republic of Korea, Taiwan
Widespread in Japan, Korea, Taiwan and eastern China, but listed as Vulnerable in China. Commonly referred to as Japanese Maple, this acer has been in cultivation for centuries and its numerous cultivars are widely available.
Refs: 1, 2, 9, 16, 18, 30, 34, 47
- Acer paxii*** Franchet (1886)
China
Very common along rivers in montane forests, but listed as Vulnerable in Chinese Species Red List (2004).
Refs: 1, 2, 16, 18, 30, 34, 47, 48
- Acer pectinatum* subsp. *pectinatum***
Bhutan, China, India, Myanmar, Nepal
A snakebark maple from the Himalayas.
Refs: 1, 2, 18, 30, 34
- Acer pectinatum* subsp. *taronense*** (Handel-Mazzetti) Murray (1977)
Bhutan, China, India, Myanmar
A snakebark maple from the Himalayas.
Refs: 1, 2, 4, 18, 30, 34, 47

Acer pensylvanicum L. (1753)

Canada, United States of America
Striped Maple (*Acer pensylvanicum*) is the only snakebark maple which is from North America, all other snakebark maples are from Asia.
Refs: 2, 18, 30, 34, 45, 47, 49

Acer pictum subsp. ***dissectum***

(Wesm.) H. Ohashi (1993)
Japan
Assessor: Dr Ikuyo Saeki
Refs: 9, 30, 59

Acer pictum subsp. ***glaucum*** (Koidz.)

H. Ohashi (1993)
Japan
Assessor: Dr Ikuyo Saeki
Refs: 9, 30, 58, 59

Acer pictum subsp. ***macropterum***

(Fang) Ohashi (1993)
China
Limited distribution but quite common and occurs at high elevation.
Refs: 1, 30, 34, 59

Acer pictum subsp. ***mayrii***

Japan, Russian Federation
Refs: 9, 18, 30, 58, 59

Acer pictum subsp. ***mono***

(Maximowicz) Ohashi (1993)
China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea, Russian Federation
Refs: 1, 9, 18, 30, 34, 47

Acer pictum subsp. ***pictum***

Democratic People's Republic of Korea, Japan, Republic of Korea
Refs: 1, 9, 18, 30, 34, 59

Acer pictum subsp. ***savatieri*** (Pax) H.

Ohashi (1993)
Japan
Assessor: Dr Ikuyo Saeki
Refs: 9, 30, 58, 59

Acer pictum subsp. ***tricuspis*** (Rehder)

Ohashi (1993)
China
Refs: 1, 30, 34, 59

Acer platanoides subsp. ***platanoides***

L. (1753)
Continental Europe, Scandinavia and Western Asia
Norway Maple is a common ornamental tree with many cultivars and widely used in urban environments. It has become naturalised in North America where it is considered invasive and a threat to native forests.
Refs: 2, 18, 30, 34

Acer pseudoplatanus L. (1753)

Continental Europe and The Caucasus
Sycamore (*Acer pseudoplatanus*) is a popular ornamental tree, widely grown in gardens and urban environments due to its pollution tolerance, and grown commercially for its timber. It has naturalised north of its native range in Europe (e.g. UK and Scandinavia), also in North America, New Zealand and in Australia.
Refs: 2, 3, 18, 30, 34, 42

Acer pseudosieboldianum (Pax)

Komarov (1904)
Republic of Korea, Russian Federation
Refs: 1, 2, 16, 18, 30, 34, 47, 48

Acer pubinerve Rehder (1907)

China
Debate exists with regards to this species' relationship to *Acer elegantulum* from which it is difficult to distinguish (Xu *et al.*, 2008).
Refs: 1, 16, 30, 34

Acer robustum Pax (1902)

China
Recorded as Near Threatened in the Chinese Species Red List (2004).
Refs: 1, 2, 16, 18, 30, 34, 48

Acer rubrum L. (1753)

Canada, United States of America
Red Maple (*Acer rubrum*) is widely utilised for its timber.
Refs: 2, 30, 34, 45, 47, 49

Acer rufinerve Siebold & Zuccarini

(1845)
Japan
A Japanese snakebark maple which is commonly grown in gardens with several cultivars available.
Refs: 1, 2, 9, 18, 30, 34, 47

Acer saccharinum L. (1753)

Canada, United States of America
Refs: 2, 18, 30, 34, 45, 47, 49

Acer saccharum Marsh. (1785)

Canada, United States of America
Sugar maple (*Acer saccharum*) is grown for both timber and as a source of maple syrup.
Refs: 2, 18, 30, 34, 45, 47, 49

Acer sempervirens L. (1753)

Greece, Lebanon, Turkey
Refs: 2, 3, 18, 30, 34, 47

Acer serrulatum Hayata (1911)

Taiwan
Very common in forest at low to medium altitude, but listed as Vulnerable in the Chinese Species Red List (2004).
Refs: 1, 5, 16, 30, 34, 47, 48

Acer shenkanense Fang (1981)

China
Refs: 1, 30, 34, 48

Acer shirasawanum Koidzumi (1911)

Japan
Refs: 2, 9, 18, 30, 34, 47

Acer sieboldianum Miquel (1865)

Japan
Refs: 2, 9, 18, 30, 34, 47

Acer sinense Pax (1889)

China

This taxon is considered by some to be a synonym of *Acer campbellii* subsp. *sinense* (Pax) de Jong.

Refs: 1, 16, 18, 30, 34, 47

Acer spicatum Lam. (1786)

Canada, United States of America

Refs: 2, 18, 30, 34, 45, 47, 49

Acer stachyophyllum Hiern (1875)

Bhutan, China, India, Myanmar, Nepal

Refs: 1, 2, 4, 16, 18, 30, 34, 47

Acer sterculiaceum subsp. ***franchetii***

(Pax) Murray (1969)

China, Viet Nam

Refs: 1, 2, 18, 30, 34, 35, 47

Acer sterculiaceum subsp.***sterculiaceum*** Wallich (1830)

Bhutan, China, India

Refs: 1, 2, 4, 18, 30, 35

Acer tataricum subsp. ***aidzuense***

(Franchet) de Jong (1988)

Japan

Refs: 2, 9, 18, 30, 34

Acer tataricum subsp. ***ginnala***

(Maximowicz) Wesmael (1890)

China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea, Russian Federation

Refs: 1, 2, 18, 30, 34, 42, 47

Acer tataricum subsp. ***semenovii***

(Regel & Herder) Murray (1982)

Afghanistan, China, Russian Federation, Tajikistan, Turkmenistan, Uzbekistan

Refs: 1, 2, 18, 30, 34, 42, 44

Acer tataricum subsp. ***tataricum*** L.

(1753)

Austria, Hungary, Montenegro, Romania, Serbia, Turkey, Ukraine

Refs: 2, 18, 30, 34, 47

Acer tataricum subsp. ***theiferum***

(Fang) Chen & de Jong (2008)

China

Refs: 1, 30

Acer tegmentosum Maximowicz (1857)

China, Democratic People's Republic of Korea, Republic of Korea, Russian Federation

A snakebark maple listed as Vulnerable in the Chinese Species Red List (2004).

Refs: 1, 2, 16, 18, 30, 34, 42, 47, 48

Acer truncatum Bunge (1833)

China, Democratic People's Republic of Korea, Republic of Korea

Recorded as Near Threatened by the Chinese Species Red List (2004), but one of the more common *Acers* in China.

Refs: 1, 2, 16, 18, 30, 34, 47

Acer tschonoskii Maxim. (1886)

Japan

Acer tschonoskii, a snakebark maple, is considered by some to include two subspecies, but in this publication *A. tschonoskii* subsp. *koreanum* is considered to be a synonym of *A. komarovii* leaving *A. tschonoskii* Maxim. subsp. *tschonoskii* to be treated as *A. tschonoskii* Maxim.

Refs: 2, 9, 18, 30

Acer tutcheri var. ***tutcheri*** Duthie (1908)

China

Refs: 1, 30

Acer ukurunduense Trautvetter &

Meyer (1856)

China, Democratic People's Republic of Korea, Japan, Republic of Korea, Russian Federation

Listed as Vulnerable in China but occurs more widely. This taxon is considered by some to be a subspecies of *Acer caudatum*, i.e. *Acer caudatum* subsp. *ukurunduense* (Trautvetter & Meyer) Murray.

Refs: 1, 9, 16, 18, 30, 34, 47

Acer velutinum Boissier (1846)

Armenia, Azerbaijan, Georgia, Islamic Republic of Iran, Russian Federation, Turkey

Refs: 2, 18, 30, 34, 43, 44, 47

Acer wilsonii Rehder (1905)

China, Myanmar, Thailand, Viet Nam

Recorded as Vulnerable in China, but found more widely.

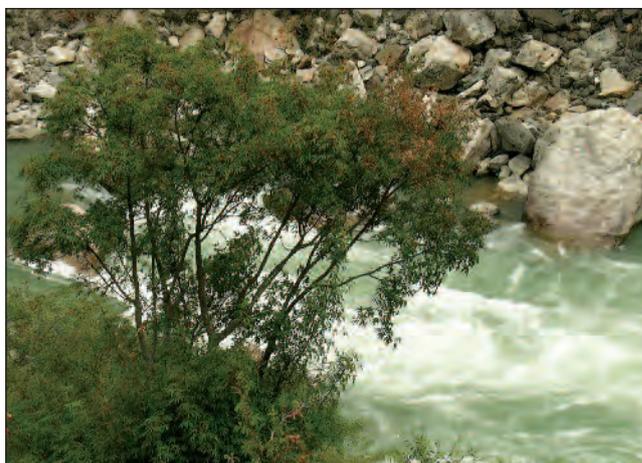
Refs: 1, 15, 16, 18, 30, 34, 38, 47

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Acer pentaphyllum in Kangding County, Sichuan (Yousheng Chen)

* Biodiversity occurrence data was accessed through GBIF Data Portal (http://data.gbif.org/datasets/resource/dataset_number) on 16/05/2008 in support of the conservation assessments [dataset number is given in brackets]:

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Leaves and flower of *Acer miyabei* var. *shibatai* in Nagano prefecture, central Honshu, Japan (Ikuyo Saeki)

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ANNEX 1

IUCN RED LIST CATEGORIES AND CRITERIA

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time-frame appropriate to the taxon's life cycle and life form.

EXTINCT IN THE WILD (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time-frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)

A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

THE CRITERIA FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

- A. Reduction in population size based on any of the following:
 1. An observed, estimated, inferred or suspected population size reduction of $\geq 90\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
 2. An observed, estimated, inferred or suspected population size reduction of $\geq 80\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may

not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of $\geq 80\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
 4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 80\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 100 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at only a single location.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 2. Area of occupancy estimated to be less than 10 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at only a single location.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.

- c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.

C. Population size estimated to number fewer than 250 mature individuals and either:

1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, (up to a maximum of 100 years in the future) OR
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 50 mature individuals, OR
 - (ii) at least 90% of mature individuals in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 50 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction in the wild:

- A. Reduction in population size based on any of the following:
1. An observed, estimated, inferred or suspected population size reduction of $\geq 70\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 3. A population size reduction of $\geq 50\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 50\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 5000 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at no more than five locations.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 2. Area of occupancy estimated to be less than 500 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at no more than five locations.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
- C. Population size estimated to number fewer than 2500 mature individuals and either:
1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, (up to a maximum of 100 years in the future) OR
 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 250 mature individuals, OR
 - (ii) at least 95% of mature individuals in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.
- D. Population size estimated to number fewer than 250 mature individuals.
- E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).
- VULNERABLE (VU)**
- A taxon is Vulnerable when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:
- A. Reduction in population size based on any of the following:
1. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

- (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
2. An observed, estimated, inferred or suspected population size reduction of $\geq 30\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
 3. A population size reduction of $\geq 30\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
 4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 30\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 20,000 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at no more than 10 locations.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 2. Area of occupancy estimated to be less than 2000 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at no more than 10 locations.
- b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 10,000 mature individuals and either:
1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, (up to a maximum of 100 years in the future) OR
 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 1000 mature individuals, OR
 - (ii) all mature individuals are in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.
- D. Population very small or restricted in the form of either of the following:
1. Population size estimated to number fewer than 1000 mature individuals.
 2. Population with a very restricted area of occupancy (typically less than 20 km²) or number of locations (typically five or fewer) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.
- E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.



The Red List of Maples

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