

The Red List of Oaks 2020

Christina Carrero, Diana Jerome, Emily Beckman, Amy Byrne, Allen J. Coombes, Min Deng, Antonio González Rodríguez, Hoang Van Sam, Eyen Khoo, Ngoc Nguyen, Iyan Robiansyah, Hernando Rodríguez Correa, Julia Sang, Yi-Gang Song, Joeri Strijk, John Sugau, Weibang Sun, Susana Valencia-Ávalos and Murphy Westwood





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The Morton Arboretum

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December 2020

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Quercus invaginata, LC (Béatrice Chassé)

IUCN RED LIST CATEGORIES

- EX** Extinct
- EW** Extinct in the Wild
- CR** Critically Endangered
- EN** Endangered
- VU** Vulnerable
- NT** Near Threatened
- LC** Least Concern
- DD** Data Deficient
- NE** Not Evaluated

The Red List of Oaks 2020 publication would not be possible without contributions from hundreds of experts from around the world. Thank you to all who acted as a co-assessor, reviewer, contributor, or facilitator on the assessments covered by this report. All credits can be found on individual species assessment profiles on the IUCN Red List (iucnredlist.org). Special thanks to all who attended or contributed to Red List trainings or oak assessment review sessions, including the IUCN Global Tree Specialist Group meeting at The Morton Arboretum (USA, 2015), the oak taxonomy workshop at Jardín Botánico de la Benemérita Universidad Autónoma de Puebla (Mexico, 2017), the Southeast Asian Botanic Garden Network Fagaceae workshop at Pha Tad Ke Botanic Garden (Lao PDR, 2018), the International Oak Society triennial conference at the University of California, Davis (USA, 2018), and the IUCN Global Tree Specialist Group meeting at La Selva Biological Station (Costa Rica, 2019). Thank you also to the many networks that facilitated and contributed to these assessments, including members of the IUCN Global Tree Specialist Group, International Oak Society, Oaks of the Americas Conservation Network, Southeast Asian Botanic Garden Network, and many others. Our thanks go to the current and previous members of the Global Tree Conservation Program and Center for Tree Science at The Morton Arboretum, who contributed to this project over the years: Silvia Alvarez-Clare, Chuck Cannon, Mariah Casmey, Nicole Cavender, Rick Condit, Audrey Denvir, Gerry Donnelly, Gwen Gallagher, Vildan Gorener, Andrew Hipp, Sean Hoban, Lisa Kenny, Chai-Shian Kua, Matt Lobdell, Fin Malone, Margie Siefert, Jessica Turner-Skoff, and Katherine Wenzell. Thanks also to the team of Red List experts from BGCI and the Global Tree Assessment, who provided guidance, reviews, and coordination support for this important effort: Megan Barstow, Emily Beech, Katharine Davies, Yvette Harvey-Brown, Ryan Hills, Abby Meyer, Sara Oldfield, Malin Rivers, and Paul Smith. Finally, thank you to the team at the IUCN Red List Unit, who have contributed valuable expertise throughout this process: Craig Hilton-Taylor, Caroline Pollock, and Anna Puttick.

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LIST OF ACRONYMS

- BGCI** Botanic Gardens Conservation International
- CBD** Convention on Biological Diversity
- CEPF** Critical Ecosystem Partnership Fund
- FFI** Fauna & Flora International
- GCCO** Global Conservation Consortium for Oak
- GSPC** Global Strategy for Plant Conservation
- GTA** Global Threat Assessment
- GTC** Global Trees Campaign
- GTSG** Global Tree Specialist Group
- IOS** International Oak Society
- IUCN** International Union for Conservation of Nature
- SSC** Species Survival Commission
- SIS** Species Information Service

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Quercus engelmannii, *EN* (Frank McDonough)



Quercus opaca, *DD* (Béatrice Chassé)



Quercus boyntonii, *CR* (Sean Hoban)

FOREWORD

What sort of times are these / When talking about trees
is almost a crime / As there are so many atrocities
left unspoken?

Bertolt Brecht wrote these lines in 1939 in the second stanza of his poem, "To Posterity". And I think he was right – not just for yesterday and the times he was living in but for today and the times we are living in.

But I believe that we can also talk about trees. Indeed, that we must also talk about trees – and whales and butterflies and storks and oceans and deserts and forests and everything that makes this world beautiful and wondrous.

The Red List of Oaks 2020 is about talking about trees in the context of the devastating effects of rapid climate change and massive habitat disruption/destruction, all of which is the result of an economic system that, we are told, is the only possible one. Whether that is true or not, positive change on that front doesn't seem likely in the near future and therefore conservation is one of the active alternatives for those who care.

The Morton Arboretum has been caring about trees for a very long time and this publication is one of the many fruits of their commitment to the genus *Quercus*.

As I have spent the better – and it has indeed been the best – part of nearly the past twenty years traveling around the world looking for oaks and growing them here in Southwest France at the Arboretum des Pouyouleix, I am perpetually in awe of the incredible diversity and adaptability of the species that compose this genus. Leaving no stone unturned, as it were, they are found in nearly every ecosystem on Earth: from deserts to coastal shores and lowlands, from high mountain tops to river valleys, cloud forests, alluvial plains, prairie grasslands, and



Quercus xalapensis, LC (Allen Coombes)



Quercus brandegeei, EN (The Morton Arboretum)

tropical jungles. And yet, in spite of their extraordinary evolutionary and ecological success that spans fifty-six million years, today many of them have dubious futures, as the work that has resulted in this publication reveals.

Ex situ collections play a key role in the conservation strategies developed herein. Nevertheless, one can't help thinking: will not the world be a much sadder place if the only oak trees left on Earth are those in collections?

As I write this Foreword, I recall a drawing that I saw many years ago depicting a forest that had been entirely cut down with the exception of one tree left standing in the middle, preserved in a glass cage, with tourists milling around it taking photographs. I asked myself at the time, what is the artist trying to say? Don't be a conservation tourist? Or, in more modern terms, don't be a virtual conservationist?

Similarly, we must not let the information in this publication remain only that, for then it will not serve its purpose, which, it seems to me, is to inspire awareness and action on the broadest possible scale.

In doing so perhaps we can at least hope that we shall have a brighter poem to leave to posterity than the one left to us by Bertolt Brecht.



Béatrice Chassé

Arboretum des Pouyouleix

Editor, *International Oaks*

Former President (2009-2015), International Oak Society

EXECUTIVE SUMMARY

The *Red List of Oaks 2020* provides and analyzes IUCN Red List assessments for the estimated 430 species in the genus *Quercus*—the most complete and comprehensive global analysis of extinction risk for oaks. The only previous global assessment of oaks was published in 2007 and included just 175 species (~40% of the genus; Oldfield and Eastwood, 2007). In 2015, The Morton Arboretum established a partnership with the IUCN/SSC Global Tree Specialist Group to assess all oak species by 2020, including reassessments of the species in the 2007 publication, in support of the Global Tree Assessment (GTA) initiative.

Of the 430 oak species assessed, 217 (41%) are of conservation concern. This includes 112 species assessed as Critically Endangered, Endangered, or Vulnerable (i.e., “threatened” according to the IUCN definition), as well as 105 species assessed as Data Deficient or Near Threatened. Thirty-one percent of oaks are estimated to be threatened with extinction, following IUCN’s method for calculating threat proportions incorporating Data Deficient species. Oak species are native to 90 countries, predominantly in the Northern Hemisphere,

with highest species richness in Mexico (164 species), China (117), the United States (91), and Vietnam (49). These countries also have the highest number of threatened species at 32, 36, 16, and 20, respectively. Major threats to oak species globally include land use change, a changing climate, and native and non-native pests and diseases. Landscape level changes are often due to habitat conversion for agriculture or urbanization, logging, or alterations in fire regimes.

This publication establishes a baseline for the state of oaks globally, provides insights on patterns of diversity and threats, and presents a survey of global *ex situ* collections of oaks. Conservationists, researchers, and oak enthusiasts should use this information to prioritize species and regions for scientifically informed conservation action. Many collaborative conservation programs and initiatives for oaks are already underway around the world, but more effort and resources are urgently needed to reverse the decline in oak populations and alleviate threats. Through informed, integrated, *in situ* and *ex situ* conservation action targeted in the global centers of diversity for oaks, these iconic and ecologically important trees can be saved.



Quercus glaucoides, LC (Béatrice Chassé)

INTRODUCTION

Quercus, commonly known as oaks, is the largest genus of the Fagaceae family and one of the largest genera of all tree families (Valencia-Ávalos, 2004). There are an estimated 430 species of oaks globally (see the Taxonomy section of Methods), with several new species being described every year. The majority of oaks are large trees growing to 20-30 meters, but there is extraordinary morphological and ecological diversity across the various regions and ecosystems where they grow (Menitsky, 2005). From small shrubs growing on dry, sandy soils in the western United States and montane regions in Mexico, to towering trees in the canopy of the tropical forests of Southeast Asia (Menitsky, 2005; Nixon, 2006), the current global diversity of oaks is the result of geographic and ecological diversification within wide-ranging lineages over 56 million years of evolution (Hipp *et al.*, 2020). Oak diversity in North America was shaped by the radiation of oaks in cooler, drier climates as broad-leaved temperate forests evolved during the long global cool-down from the early Eocene onward (Hipp *et al.*, 2018; Cavender-Bares, 2019). Within Mexico, oaks diversified later as they migrated southward and into the mountains (Hipp *et al.*, 2018). Southeast Asian oak diversity and portions of the European oak flora were driven by changing climate and the uplift of the Himalayas (Hipp *et al.*, 2020; Deng *et al.*, 2018; Jiang *et al.*, 2019). Kremer and Hipp (2020) attribute the high species diversity and success of oaks to: 1) high genetic diversity within populations and species, 2) rapid migration and high adaptability, 3) high rates of ecological diversity within clades and convergent solutions to ecological problems across clades, and 4) hybridization and introgression.

The global distribution of oaks also overlaps substantially with biodiversity hotspots, as recognized by the Critical Ecosystem Partnership Fund (CEPF). CEPF defines biodiversity hotspots as regions that contain at least 1,500 species of vascular plants found nowhere else on Earth and that have lost at least 70% of their native vegetation. There are 36 recognized biodiversity hotspots that meet this criteria (<https://www.cepf.net/our-work/biodiversity-hotspots>) including at least 18 where oak species are found. Thus, oaks are associated with regions of the planet characterized by rich biodiversity, but also severe habitat loss.

Oaks are a valuable genus ecologically, economically, and culturally. They are keystone species in many ecosystems including the oak-pine woodlands of Mexico, hardwood forests of eastern North America, and the broadleaved forests of Southeast Asia. They contribute countless ecosystem services, providing habitat and food for birds and small mammals as well as providing carbon sources for edible fungi (Logan, 2005; Cavender-Bares, 2016, 2019). In North America alone, oaks support over 500 species of moths and butterflies, making *Quercus* the most ecologically important plant group for Lepidopteran insects (Tallamy and Shropshire, 2009). Oaks are also economically important, used for timber, fuel, furniture, ship building, livestock

Box 1: Global Tree Assessment (GTA)



There are nearly 60,000 tree species globally, and the Global Tree Assessment aims to provide conservation assessments of the world's tree species by 2020. Despite the importance of trees, many are threatened by overexploitation and habitat destruction, as well as by pests, diseases, drought and their interaction with global climate change. In order to estimate the impact of such threats to trees there is an urgent need to conduct a complete assessment of the conservation status of the world's tree species – the Global Tree Assessment. The Global Tree Assessment, led by BGI and the IUCN SSC Global Tree Specialist Group, prioritizes the tree species at greatest risk of extinction. The Global Tree Assessment provides information to ensure that conservation efforts are directed at the right species so that no tree species becomes extinct. www.globaltreeassessment.org.

feed, dyes and tannins, charcoal, and food for local and indigenous peoples. They are also a charismatic and culturally significant tree, commonly found in folklore and mythology, and recognized and loved worldwide for their often large stature, recognizable leaves, and iconic acorns. Oaks appear on the national flags of Mexico, San Marino, and many other counties and states, and are recognized as the national tree of many countries, including the United States.

Despite the global ecological and economic importance of oaks, they are difficult to conserve. Oaks are considered “exceptional species” as they produce seeds that cannot be seed-banked through conventional conditions of low humidity and temperature (Kramer and Pence, 2012; Walters and Pence, 2020). They produce copious amounts of tannins, making tissue culture extremely challenging, and some species are difficult to propagate vegetatively through grafting (Kramer and Pence, 2012; Brennan *et al.*, 2017). Though there is ongoing research to improve conservation methods for oaks, including cryopreservation and *in-vitro* propagation, the primary and most reliable protection for oaks currently is through *ex situ* collections (Westwood *et al.*, 2020). Oak species abundance across many biodiversity hotspots, their ecological, economical, and cultural importance, and the challenges encountered in preserving species constitute a compelling case for the urgent and coordinated conservation of oaks globally. The first step toward collaborative conservation is prioritization of species and conservation actions, and *The Red List of Oaks 2020* provides vital information for such conservation planning and action.

The Global Strategy for Plant Conservation (2011-2020), a program of the Convention on Biological Diversity, outlines 16 targets towards collaborative, international plant conservation, including Target 2: “An assessment of the conservation status of all known plant species, as far as possible, to guide conservation action.” The Global Tree Assessment (GTA; Box 1) was spearheaded by the IUCN Global Tree Specialist Group (GTSG), and seeks to meet this target by collaborating with partners globally to assess all tree species of the world by the end of 2020. A partnership was established in 2015 between GTSG and The Morton Arboretum to assess all the oaks globally. *The Red List of*

Oaks (Oldfield and Eastwood, 2007) was the first effort to evaluate the threat status of the world’s oaks, but included just 175 of the 430 oak species. These assessments were never formally published on the IUCN Red List of Threatened Species (iucnredlist.org), and are now out of date. The Morton Arboretum completed assessments for all oaks native to the United States, detailing their extinction risks in the 2017 publication, *The Red List of US Oaks* (Jerome *et al.*, 2017), and assisted in completing European oak assessments by the end of 2018. Between 2018 and 2020, the remaining assessment efforts targeted oak species native to Mexico/Central America and Asia.

Box 2: Oaks as a Model System

Translated and adapted from “Introduction; Importance of Oaks” originally written by Susana Valencia-Ávalos for *Manual de propagación de Quercus: Una guía fácil y rápida para cultivar encinos en México y América Central*. (Rodríguez-Acosta and Coombes, 2020).

Species of the genus *Quercus*, known as encinos in Mexico and Central America, have been connected to human development since the time of the caves, playing an important role in folklore, mythology, religion and everyday life. The genus is very broad and comprises more than 400 species worldwide. Its greatest country level diversity is in Mexico, where there are more than 160 species. Many Mexican oak species present a high degree of hybridization and in turn show high variation and rapid radiation, adaptation to new habitats and diversification, and a complicated taxonomy qualifying them as a “model system” to understand evolutionary, biogeographic and ecological aspects in plants.

Since their appearance in the late Paleocene (ca. 55 Ma), the oaks have survived a series of biotic and abiotic changes, showing great diversity and survival to unfavorable periods. Hybridization and introgression in oaks are recurring mechanisms and sources of genetic variation of great importance in the adaptive evolution and diversification of the genus. Related to their adaptation, oaks are studied in order to find evidence of evolutionarily adapted characters in response to drought and marked winters, freezing, as well as to identify adaptive changes that could occur in the future in view of global climate change.

The dominance of oaks in many ecosystems has made it possible to know their biogeographic distribution, define areas of high species richness, and to identify barriers to their distribution and possible migration routes, all of which can be extrapolated to many species that are associated with them, and therefore oaks are considered a model clade. Model clades are very well studied lineages from which abundant phylogenetic, genetic, functional, ecological and evolutionary data have been generated, which allow us to understand general concepts and processes (mainly ecological and evolutionary) that can potentially be applied to other groups and systems and thus lead to adequate conservation and ecosystem management decision-making.

The way in which oak species cope with different climatic conditions makes it possible to propose them as candidates for regeneration of communities. Some species can be pioneers in secondary successions, such as the soil-forming *Quercus urbani*, while others can only establish in sites with mature soils, such as species of the mountain rainforest. Therefore, properly choosing the species to regenerate is essential to produce quality results.

Mexico, as the holder of the world's greatest richness of oak species and endemism, has a great commitment in the knowledge and protection of this group. In this commitment, it is necessary to take into account the limited environmental requirements in which most endemic oaks develop, their long life cycle, and the global warming that makes them more vulnerable, suggesting that some of them may be at risk of extinction. Taking into account its predominant role in terrestrial ecosystems, if an oak species disappears, the threat or disappearance will also extend to the species associated with it.

The Red List of Oaks 2020 reevaluates every species from the 2007 report, includes all species from the Red List of US Oaks, and assesses for the first time the remaining 60% of the species in the genus *Quercus*. We provide a synthesis of the genus at a global scale, examining geographic trends, patterns of diversity and threat, and an overview of the state of *ex situ* collections of oaks. This study also provides deeper analyses of oak species

diversity and conservation at regions of high richness and threat: Mexico/Central America (Box 2), China/Southeast Asia (Box 3), and the United States. Full assessments for reported oak species (excluding 14 species whose assessments will be available in 2021 and are included in all analyses) can be found on the official IUCN Red List website (iucnredlist.org/).

Box 3: Ecology and taxonomy of *Quercus* in Asia: the importance of molecular studies

Joeri Sergej Strijk

The oaks of Asia are important ecological, economical, and cultural elements, occurring in a wide range of habitat types, mostly in mid-high elevation forests, but with significant extensions into the warm tropical lowlands. Continental Asia is home to ~200 species of *Quercus*. Compared to Europe/N. Africa (~30 species) and the Americas (~220 species), it ranks as the world's second hotspot of oak diversity (Govaerts and Frodin, 1998). Temperate and (sub-) tropical forests in greater Southeast Asia and China hold by far the majority of these species (Strijk, 2020), and new species are being reported regularly (Binh *et al.*, 2018 a, b, c). Oaks are spread throughout five of the ten major biodiversity hotspots in Asia (most notably in the mountains of Central Asia, the Himalayas, Indo-Burma, Japan and the Western Sundas - Indonesia, Malaysia and Brunei). Their wood, leaves and fruits are sought after for use in construction, as fuel, for industrial use, as ornamentals, in rituals and occasionally for consumption.

Over the past decades, China and tropical Southeast Asia have seen tremendous change, with urbanization, logging and land conversion for monoculture crops (e.g., banana, eucalypts, maize, palm oil, pulses, rice, rubber and teak) taking place at unprecedented scales (Dixon *et al.*, 2002; Sodhi *et al.*, 2004; Squires, 2014). Asia's rapidly expanding urban population is placing intense pressure on the remaining natural resources, as witnessed by the growing numbers of oaks (and many other regional flagship species) appearing on the IUCN Red List in recent years (IUCN, 2020).

Evolutionary divergence and ecological adaptation of oaks in Asia differs markedly from the radiation in the Americas, where large numbers of species have adapted to temperate and xeric environments (le Hardÿ de Beaulieu and Lamant, 2010). In Asia, species ranges of oaks appear to be smaller, especially in warm wet evergreen forests towards the Equator.

Furthermore, species and populations of oaks in Asia are spread out over both continental and insular areas, which provided isolation and opportunities for past speciation, and continues to fragment species' populations today. The complex diversity and geography of Asia poses significant challenges to locate, assess and conserve species and genetic diversity of oaks.

A revision of the infrageneric classification, taking into account much of the recent molecular work in oaks, has resolved many of the issues in the taxonomic and evolutionary framework originally based solely on morphological characters (Loudon, 1838; Ørsted, 1871; Camus, 1939-1954; Menitsky, 2005; Denk *et al.*, 2017). The new classification synthesizes morphological traits, molecular-phylogenetics and the evolutionary history of the oaks, resolving the group into two subgenera and eight sections. In China and Southeast Asia, both subgenera (*Quercus* and *Cerris*) are present but only the latter occurs with all sections (sects. *Cyclobalanopsis*, *Ilex* and *Cerris*). Of subgenus *Quercus*, only section *Quercus* occurs, mostly in the temperate and subtropical zone (Huang *et al.*, 1999).

Following a prolonged period of marker-based phylogenetics and reconstruction of historical biogeographic patterns (e.g., Menitsky, 2005; Denk and Grimm, 2010; Hubert *et al.*, 2014; Xing *et al.*, 2014), rapid technological advances in genome sequencing have now moved studies of oak evolution firmly into the genomic era. Novel genome-wide survey techniques, such as comparative skimming (Hinsinger and Strijk, 2019), MIG-seq (Suyama and Matsuki, 2015; Binh *et al.*, 2018 a; Strijk *et al.*, 2020) and RADseq analyses (Hipp *et al.*, 2015; Fitz-Gibbon *et al.*, 2017; Deng *et al.*, 2018; Jiang *et al.* 2019) are providing exciting advances into understanding oak and Fagaceae evolution. As whole genomes are being sequenced for each of the oak sections, a comprehensive reconstruction of oak genomic evolution will be within reach (Hipp *et al.*, 2020), explaining how geography, time and opportunity led to global diversification of one of the world's most enigmatic tree groups.

METHODS



Quercus honbaensis, CR (S. Tagane)

TAXONOMY

There is no current, comprehensive, single treatment for the genus *Quercus*. As a large, cosmopolitan, morphologically diverse genus, *Quercus* is taxonomically challenging and species delimitations are much debated. As such, the taxonomic backbone for this project is the result of consultation with many taxonomic experts, and largely follows several key floras and checklists: *Flora of North America* (Nixon, 1997), *Diversidad del género Quercus* (Fagaceae) en México (Valencia-Ávalos, 2004), *Oaks of Asia* (Menitsky, 2005), *Flora of China* (Huang *et al.*, 1999), The Plant List (2013), NatureServe (2015), *A Checklist of Woody Plants from Eastern Asia* (Ma, 2017), The USDA PLANTS Database (2017), *Oaks of the World* (Hélandot, 2020), and World Checklist of Selected Plant Families (Govaerts *et al.*, 2020).

Our knowledge of the genus *Quercus* continues to evolve with the advent of new technologies in molecular biology and morphological analysis. Many new oak species are being described every year, especially in centers of oak diversity like Mexico/Central America, and China/Southeast Asia. As such, this report represents the state of threat for a consensus checklist of the world's oak species, to the best of our knowledge, with the currently available data.

COUNTRY LEVEL OCCURRENCE

Country level distribution for each oak species was gathered from various sources including *Flora of North America* (Nixon, 1997), *Flora of China* (Huang *et al.*, 1999), *A Checklist of Woody Plants from Eastern Asia* (Ma, 2017), GlobalTreeSearch (BGCI, 2020), *Oaks of the World* (Hélandot, 2020), and World Checklist of Selected Plant Families (Govaerts *et al.*, 2020), as well as herbaria records, primarily from Global Biodiversity Information Facility

(GBIF: gbif.org/), and peer-reviewed journal articles. Country level occurrence data was recorded based on IUCN's country list, which follows the United Nations Statistics Division. Full methods and the list of countries, territories, and regions recognized by IUCN are available in the assessment tools resource on the IUCN website ([iucnredlist.org/resources/country-codes](https://www.iucnredlist.org/resources/country-codes)). Countries analyzed in this report align with those listed on the IUCN Red List country codes webpage, and do not necessarily reflect the political opinions of the authors or organizations associated with this report.

RED LIST ASSESSMENT PROCESS

All species assessments followed the methodology of the IUCN Red List of Threatened Species as outlined in the *IUCN Red List Categories and Criteria*, Version 3.1 (IUCN, 2012) and detailed in the *Guidelines for Using the IUCN Red List Categories and Criteria*, Version 14 (IUCN Standards and Petitions Committee, 2019). Information regarding species distribution, occurrence, population size, habitat and ecology, use and trade, threats, conservation, and ecosystem services was collected from a variety of sources including floras (primarily those listed in the methods sections for taxonomy and country level occurrence), published and unpublished literature, contributions from taxonomic and regional experts, and herbaria and botanic garden records.

All oak species were evaluated for threats according to the standardized codes following the IUCN Red List threats classification scheme ([iucnredlist.org/resources/threat-classification-scheme](https://www.iucnredlist.org/resources/threat-classification-scheme)). Occurrence points were gathered from Global Biodiversity Information Facility (GBIF: gbif.org/), iNaturalist (<https://www.inaturalist.org/>), collections reported in published literature, and herbaria records provided by regional experts. The Extent of Occurrence (EOO) and Area of Occupancy (AOO) as reported in the distribution section of each assessment were calculated using the Geospatial Conservation Assessment Tool (GeoCAT: geocat.kew.org/). All references are cited for each species assessment and available on the Red List website at [iucnredlist.org](https://www.iucnredlist.org).

Based on the best available data and expert input, every oak species was assessed against the IUCN Red List categories and criteria (Appendix A) and classified into one of the following IUCN Red List categories (Figure 1): Extinct (EX), Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC), or Data Deficient (DD). Species assessed as Critically Endangered, Endangered, and Vulnerable are considered threatened. Species of conservation concern are those assessed as any of the three threatened categories, Near Threatened, or Data Deficient. Near Threatened species are those that meet most but not all of the criteria for a threatened category, while Data Deficient species do not have enough information available to be placed in another category.

Threatened species (i.e., CR, EN, and VU) must meet at least one of five criteria: A) Population reduction; B) Geographic range; C) Small population size and decline; D) Very small or restricted population; or E) Quantitative analysis (Appendix A).

Assessments were completed using the IUCN Species Information Service (SIS), an online portal for recording and managing assessment and taxonomy data. Each completed assessment was reviewed by at least one additional person knowledgeable about the plant group, region, and/or Red List methodology. Assessments were submitted to the Red List through SIS and reviewed by a member of the Red List Unit before being published.

REPORTING PROPORTION THREATENED

Estimates of threatened species are calculated following IUCN's *Guidelines for Reporting on Proportion Threatened* (IUCN, 2016). The mid-point is the "percentage of threatened species among those for which threat status could be determined" and accounts for the estimated proportion of Data Deficient species reassessed as threatened in the future if current Red List category trends for the genus are maintained. The mid-point is reported as the most likely threatened estimate, calculated as $[(CR+EN+VU)/(Assessed-DD)]*100$. The reported range includes the lower bound and upper bound, which indicate the extreme potentials of threatened species in the genus. The lower bound estimates threat percentages assuming that no Data Deficient species will be reassessed as threatened in the future, whereas the upper bound estimates threat percentages assuming all Data Deficient species



Quercus microphylla, LC (Béatrice Chasse)

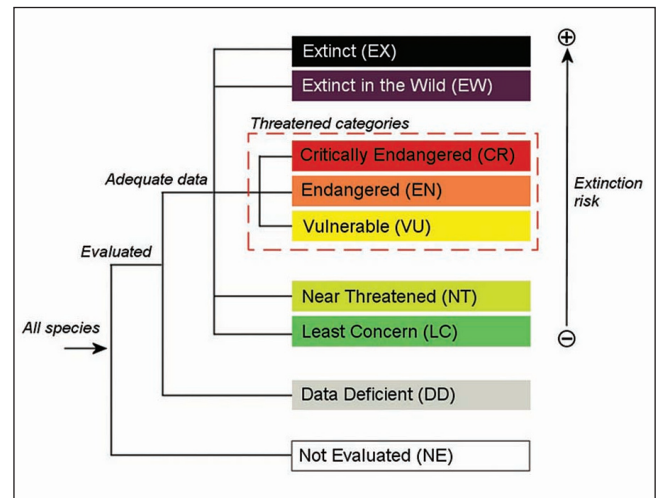


Figure 1. Structure of the IUCN Red List categories (version 3.1; IUCN, 2012).

will be reassessed as threatened. The lower bound is calculated as $[(CR+EN+VU)/Assessed]*100$ and the upper bound is calculated as $[(CR+EN+VU+DD)/Assessed]*100$. Unless otherwise noted, all reported threat percentage estimates represent the mid-point calculation.

PHYLOGENETIC ANALYSIS

The 430 assessed species were matched to the most recent phylogenetic studies of oaks (Denk *et al.*, 2017; Hipp *et al.*, 2020). Thirty-five species assessed for this report were not included in either of these phylogenetic studies. For these species, a literature review was conducted to determine their section and/or regional oak experts were consulted to assign a section (A. Coombes and J. Strijk, pers. comm.).

EX SITU COLLECTIONS DATA

The number of *ex situ* collections for each assessed species was determined by combining existing datasets from four sources: 1) a 2017 *ex situ* survey conducted by The Morton Arboretum for the *Conservation Gap Analysis of Native U.S. Oaks* (Beckman *et al.*, 2019); 2) a 2019 survey conducted for a project funded through the Institute of Museum and Library Services (award #MA-30-18-0273-18 to S. Hoban *et al.*, results in prep.); 3) a 2020 survey funded by the USDA Forest Service (cooperative agreement #16-CA-11132546-045 to M. Westwood, results in prep.) and Fondation Franklinia to support the conservation work of the Global Conservation Consortium for Oak; and 4) records held in BGCI's PlantSearch database of plants in cultivation (https://tools.bgci.org/plant_search.php; accessed May, 2020). Species records were checked for taxonomic synonyms and organized to remove duplicate institutions. The final combined dataset was analyzed to determine the number of *ex situ* collections holding each oak species.

RESULTS

THREAT STATUS

This publication reports, for the first time, the most comprehensive, up-to-date Red List status of oaks globally, including about 230 species never before assessed in any publication. A total of 430 species of oaks were evaluated using the IUCN Red List of Threatened Species methodology, and their published assessments can be found here: <https://bit.ly/32V1tyV> (14 species will be published in the spring 2021 IUCN Red List update).

An estimated 31% of oaks are threatened with extinction (considering Data Deficient species, lower bound: 26%; midpoint estimate 31%; upper bound: 42%). Forty-one percent of oaks are considered to be of conservation concern, assessed as either Critically Endangered, Endangered, Vulnerable, Near Threatened, or Data Deficient (Figure 2; Table 1). The majority of threatened and Near Threatened oak species (122) are assessed under criterion B, which considers geographic range size and reduction as calculated by species' Extent of Occurrence (EOO) and/or Area of Occupancy (AOO; Table 2).

The section of the genus *Quercus* with the highest proportion majority of threatened oaks is *Cyclobalanopsis* (Figure 3), which are exclusively found in east and Southeast Asia (Menitsky, 2005). Nine oaks entered the IUCN Red List already Critically Endangered and possibly extinct or possibly extinct in the wild, all of which are endemic to southern China and Southeast Asia and all but one of which is in section *Cyclobalanopsis*.



Quercus georgiana, EN (The Morton Arboretum)

| IUCN Red List Category | Number of species |
|----------------------------|-------------------|
| Critically Endangered (CR) | 32 |
| Endangered (EN) | 57 |
| Vulnerable (VU) | 23 |
| Near Threatened (NT) | 38 |
| Data Deficient (DD) | 67 |
| Least Concern (LC) | 213 |
| TOTAL | 430 |

Table 1. Number of oak species in each IUCN Red List category.

| IUCN Red List Criteria | Number of species |
|---|-------------------|
| Criterion A (Population size reduction) | 6 |
| Criterion B (Geographic range in the form of Extent of Occurrence (EOO) and/or Area of Occupancy (AOO)) | 122 |
| Criterion C (Small population size and decline) | 6 |
| Criterion D (Very small or restricted population) | 19 |
| Criterion E (Quantitative analysis) | 0 |

Table 2. Number of Critically Endangered, Endangered, Vulnerable, and Near Threatened oak species assessed under each of the five Red List criteria. Some species are assessed under more than one criterion.

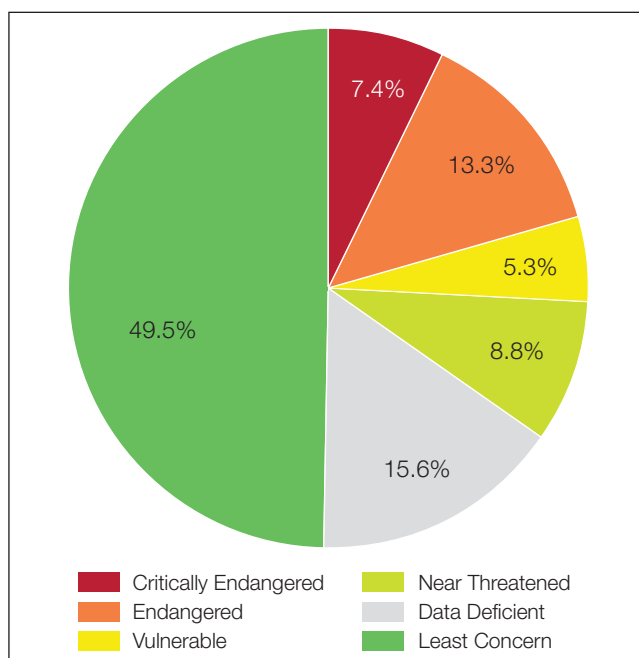


Figure 2. Percentage of 430 oak species assessed in each IUCN Red List category.

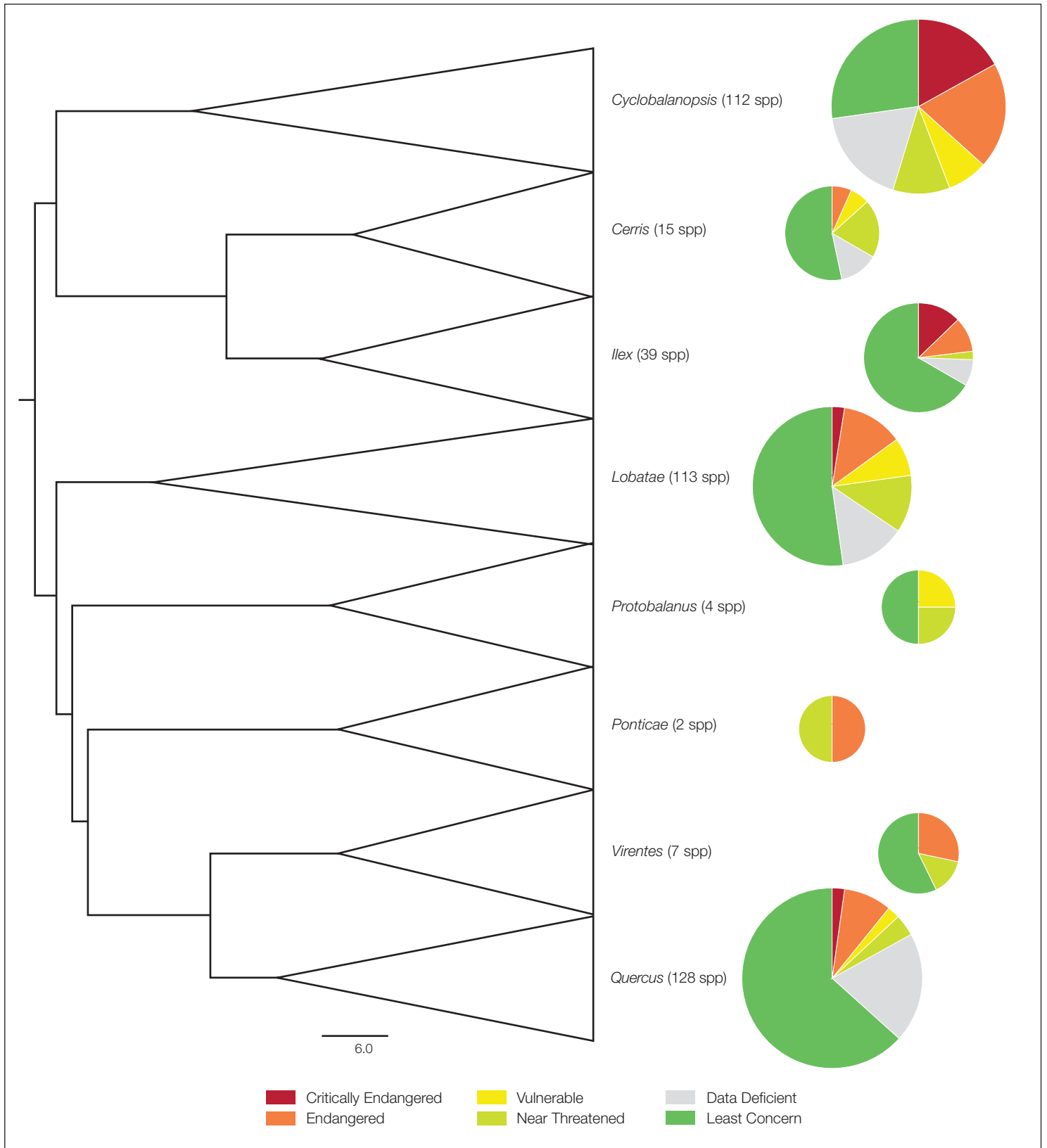


Figure 3. Proportion of species in each IUCN Red List category for the eight sections of the genus *Quercus*. Section nomenclature is from Denk et al. (2017). Framework phylogeny adapted, with authors' permission, from an analysis of genomic data from Hipp et al. (2020), and all sections are supported with high statistical support. Branch lengths are in units of millions of years (based on fossil calibration). In parentheses is the number of species per section assessed for the IUCN Red List. The size of the pie chart is roughly proportional to the size of the section, based on the number of species assessed in this report.

GEOGRAPHIC ANALYSIS

Oaks are native to 90 countries (Figure 4), with 243 endemic oak species occurring in 20 countries (Figure 5). Countries with the highest oak species richness are Mexico (164 species, 99 endemics), China (117 species, 58 endemics), and the US (91 species, 41 endemics). Threatened oak species occur in 31 countries (Figure 6), with the most threatened species in China (36 species), Mexico (32), Vietnam (20), the US (16), and Malaysia (9).



Quercus scytophylla, LC (Béatrice Chassé)



Quercus liaoi, DD (Béatrice Chassé)

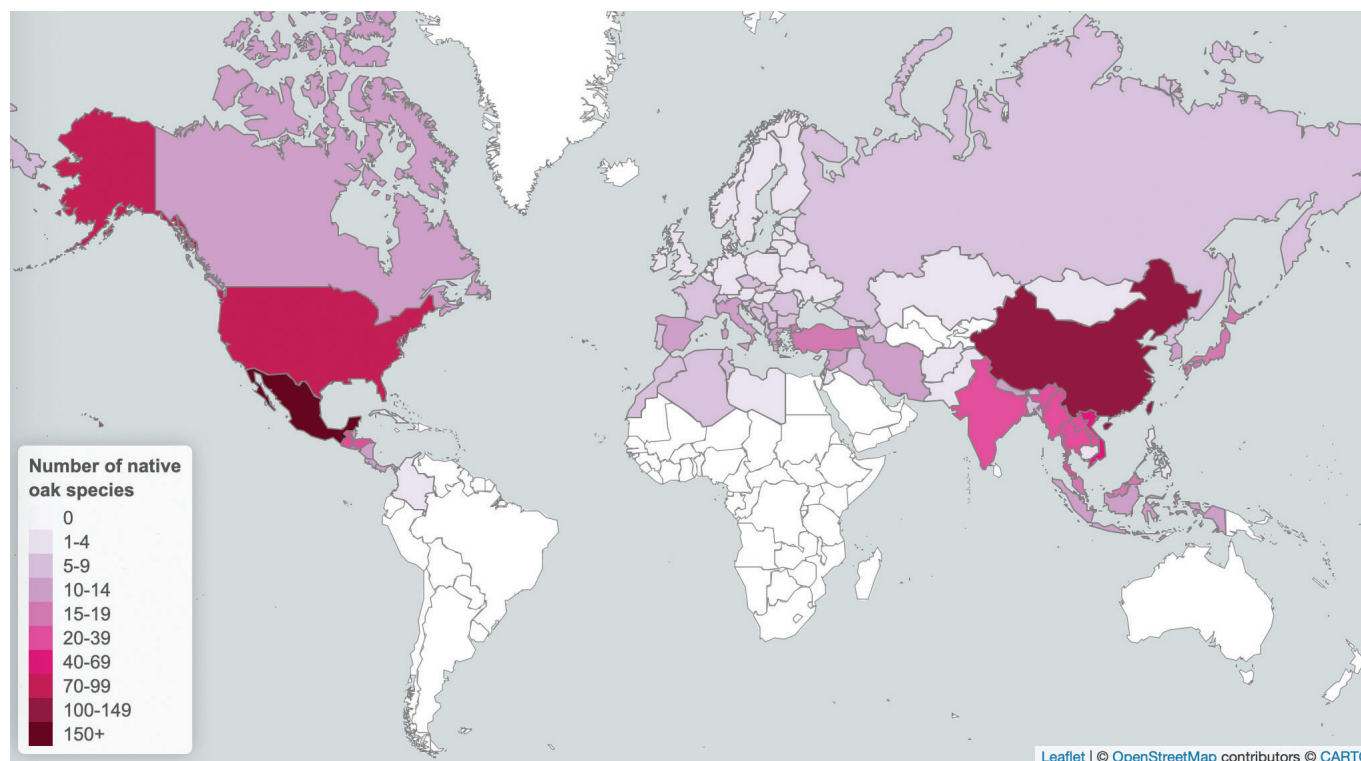


Figure 4. Native oak species richness by country or territory.

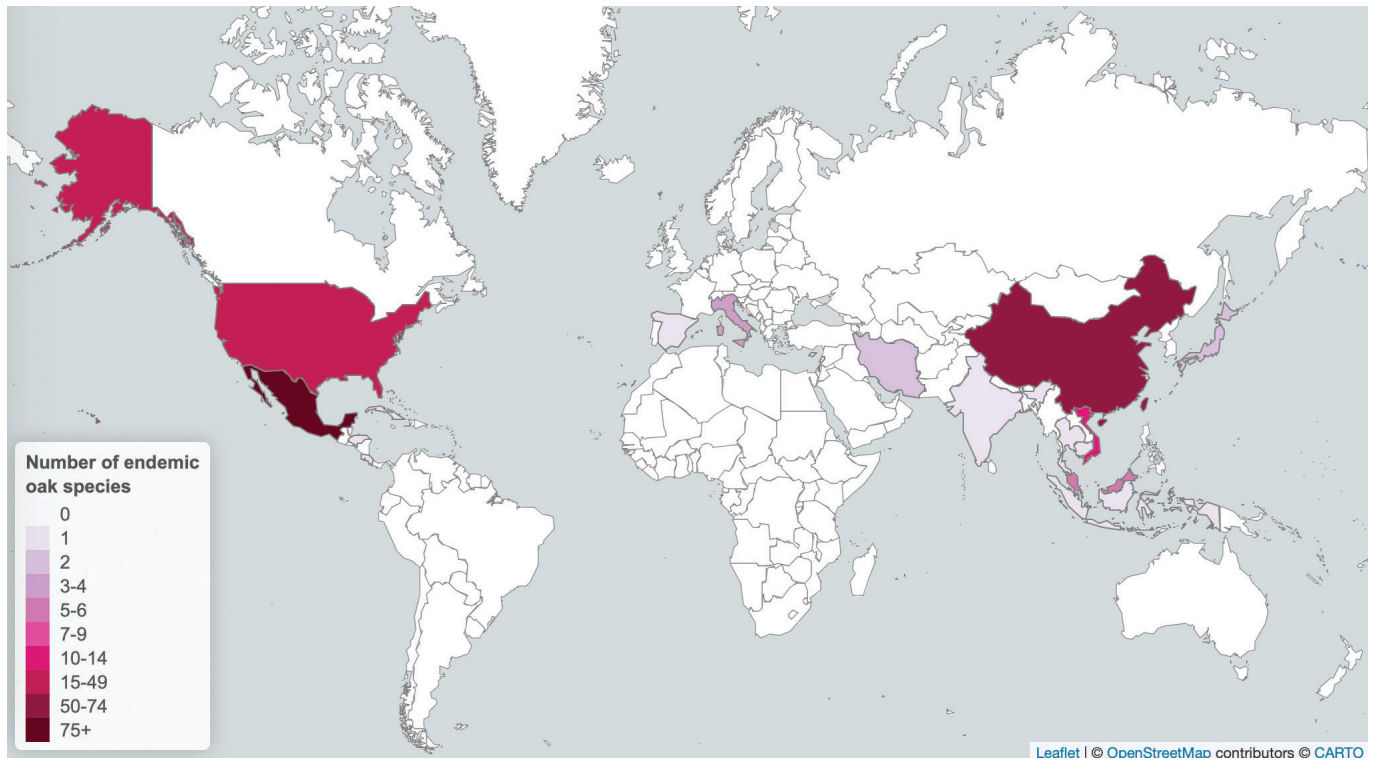


Figure 5. Endemic oak species richness by country or territory.

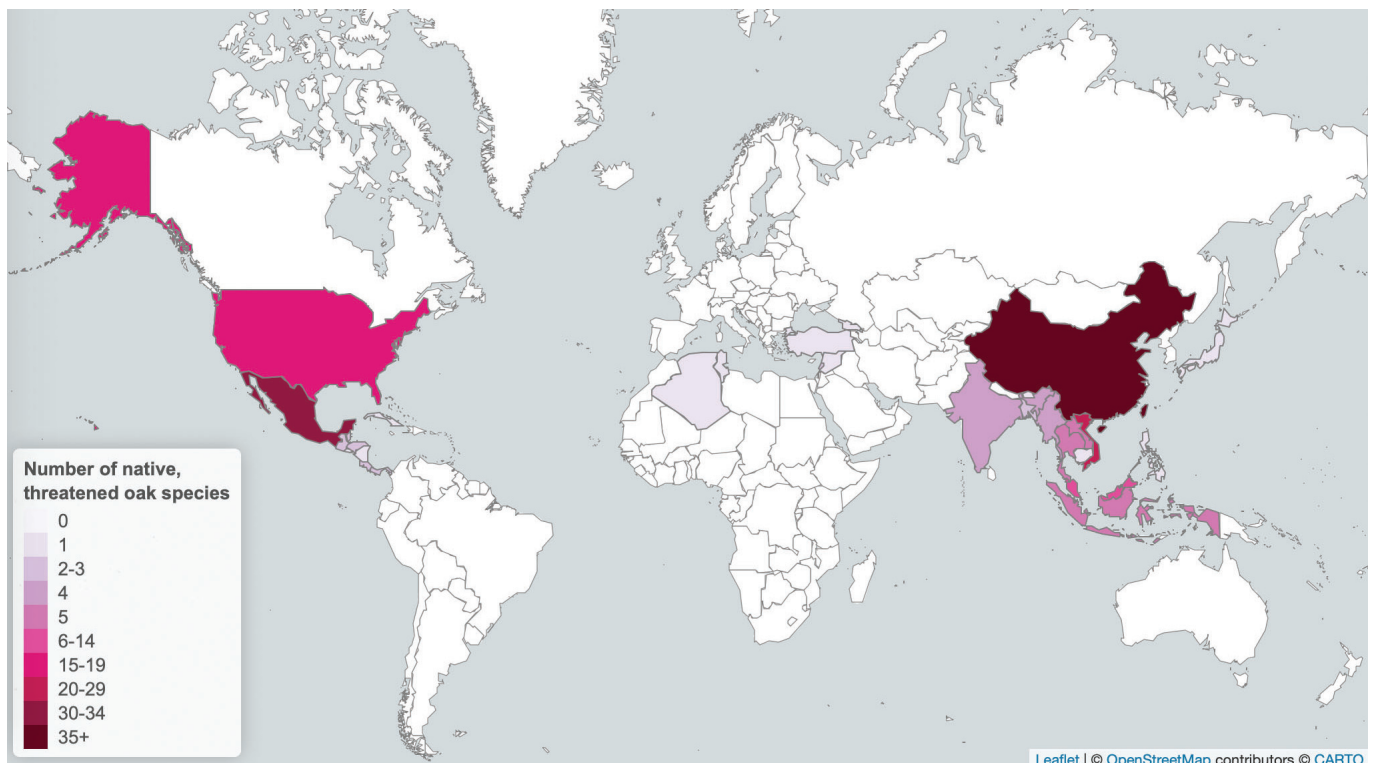


Figure 6. Threatened oak species richness by country or territory. Threatened oaks are those assessed as Critically Endangered, Endangered, or Vulnerable.

MAJOR THREATS

The most common threats to oaks globally are agriculture and aquaculture (impacting 226 species, including 84 threatened species), biological resource use (144, 63), and residential and commercial development (109, 49; Figure 7). For oaks threatened by biological resource use, this is most commonly the result of

logging and wood harvesting. Threat pressures differ in frequency based on region and country; agriculture and aquaculture is the most common threat in Asia, Europe, and Mexico and Central America, whereas invasive pests and diseases is the most common threat in the United States (Figure 8; Table 3).

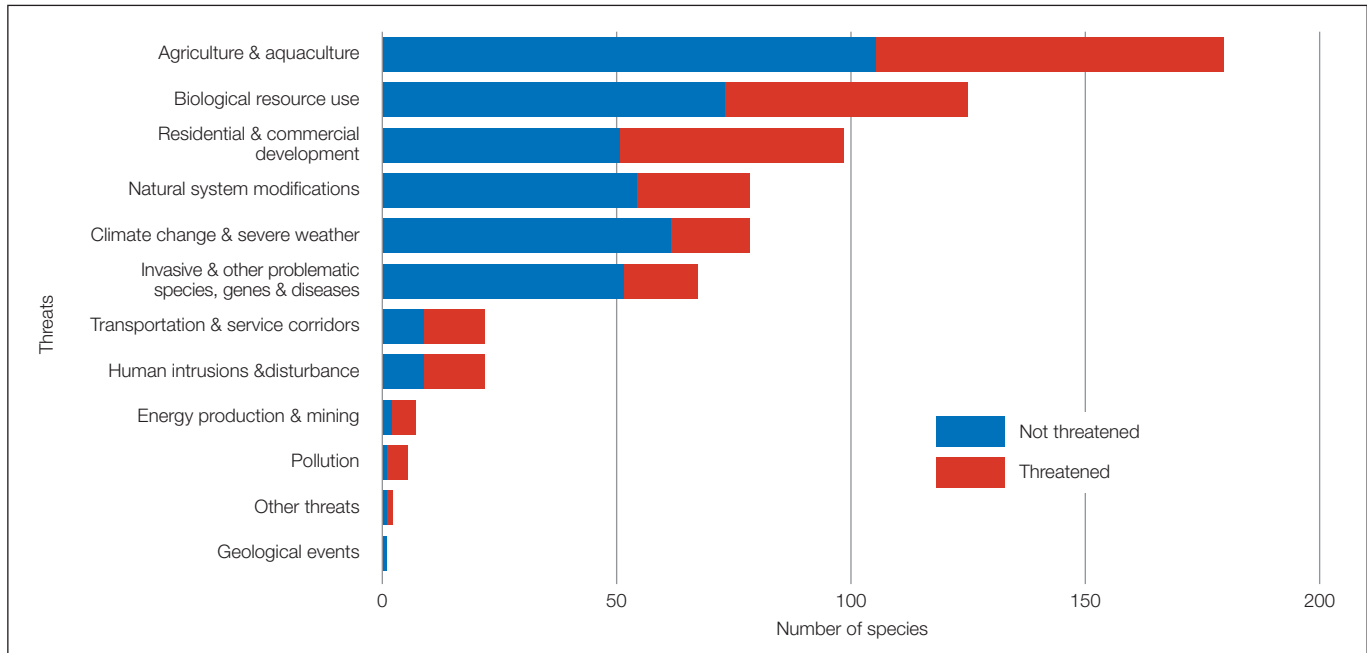


Figure 7. Most common threats to threatened (Critically Endangered, Endangered, or Vulnerable) and not threatened (Near Threatened, Least Concern, and Data Deficient) oak species.

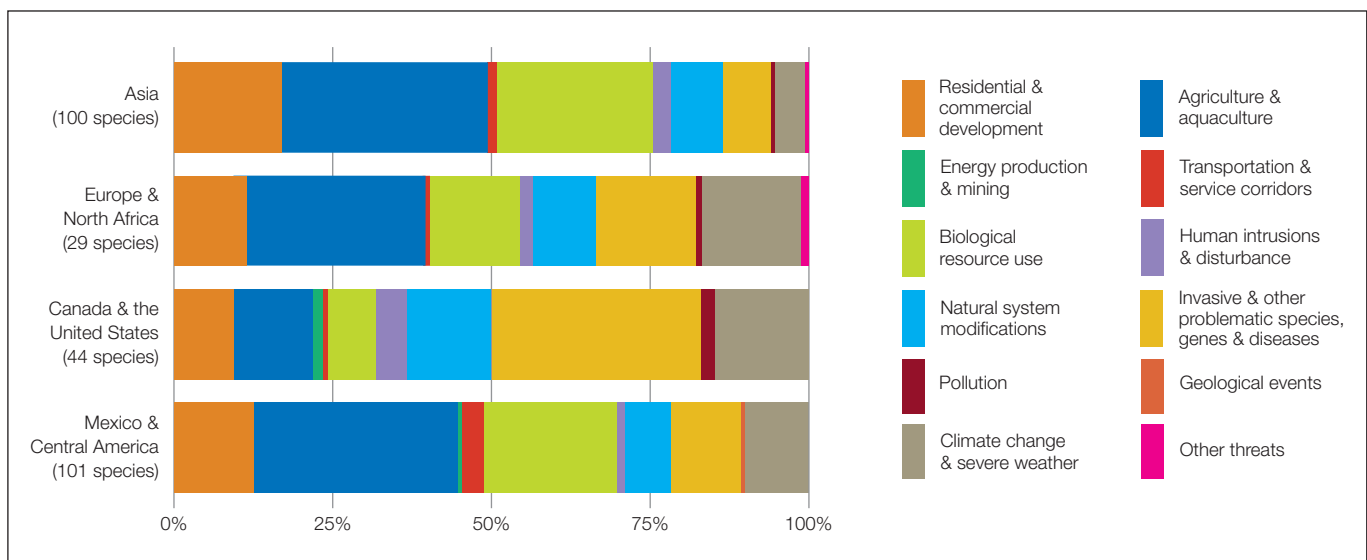


Figure 8. Most common threats to oak species, by geographic region. Species may be coded with more than one threat, but only those species with at least one coded threat are included in this analysis. Some species are included in more than one region. The oaks of Cuba (1 species) and Colombia (1 species) are included in Mexico & Central America.

| Country/Territory | Threatened oak species | Total oak species | Most common threat(s) |
|----------------------|------------------------|-------------------|--|
| China | 36 | 117 | Agriculture & aquaculture |
| Mexico | 32 | 164 | Agriculture & aquaculture |
| Vietnam | 20 | 49 | Biological resource use |
| United States | 16 | 91 | Invasive & other problematic species, genes & diseases |
| Malaysia | 9 | 19 | Agriculture & aquaculture |
| Indonesia | 5 | 14 | Agriculture & aquaculture |
| Lao PDR | 5 | 24 | Agriculture & aquaculture |
| Thailand | 5 | 33 | Agriculture & aquaculture |
| India | 4 | 21 | Agriculture & aquaculture, Biological resource use |
| Myanmar | 4 | 27 | Agriculture & aquaculture |
| Lebanon | 2 | 7 | Agriculture & aquaculture |
| Bangladesh | 2 | 9 | Agriculture & aquaculture, Biological resource use |
| Brunei Darussalam | 1 | 5 | Agriculture & aquaculture |
| Bhutan | 1 | 9 | Agriculture & aquaculture |
| Cuba | 1 | 1 | Agriculture & aquaculture, Energy production & mining, Natural system modifications |
| Algeria | 1 | 6 | Agriculture & aquaculture |
| Georgia | 1 | 5 | Agriculture & aquaculture, Biological resource use |
| Japan | 1 | 15 | Agriculture & aquaculture |
| Cambodia | 1 | 3 | Biological resource use |
| Nicaragua | 1 | 10 | Agriculture & aquaculture |
| Costa Rica | 3 | 12 | Agriculture & aquaculture, Biological resource use |
| Hong Kong (China) | 3 | 8 | Residential & commercial development, Agriculture & aquaculture, Biological resource use |
| Honduras | 3 | 20 | Agriculture & aquaculture, Biological resource use |
| Panama | 3 | 10 | Biological resource use |
| Belize | 2 | 11 | Agriculture & aquaculture |
| Guatemala | 2 | 26 | Agriculture & aquaculture |
| Philippines | 1 | 1 | Agriculture & aquaculture, Natural system modifications |
| El Salvador | 1 | 15 | Agriculture & aquaculture |
| Syrian Arab Republic | 1 | 10 | Agriculture & aquaculture |
| Tunisia | 1 | 5 | Agriculture & aquaculture |
| Turkey | 1 | 17 | Biological resource use |

Table 3. Most common threat(s) to oak species, by country/territory. Of the 90 countries with native oak species, only the 31 countries/territories with at least one threatened species are shown.



Quercus kingiana, EN (*S. Sirimongkol*)



Quercus lobbii, EN (*Jean-Louis Hélerdot*)

EX SITU REPRESENTATION

There are 296 oak species reported in the *ex situ* collections of botanic gardens and arboreta globally, with the majority of species (165) held in 20 collections or fewer (Figure 9). Nearly one-third of oak species (134) are not reported in any *ex situ* collection globally, including 58 species (51%) of threatened oaks (Table 4).



Quercus glabrescens, LC (Béatrice Chassé)



Quercus planipocula, LC (Béatrice Chassé)

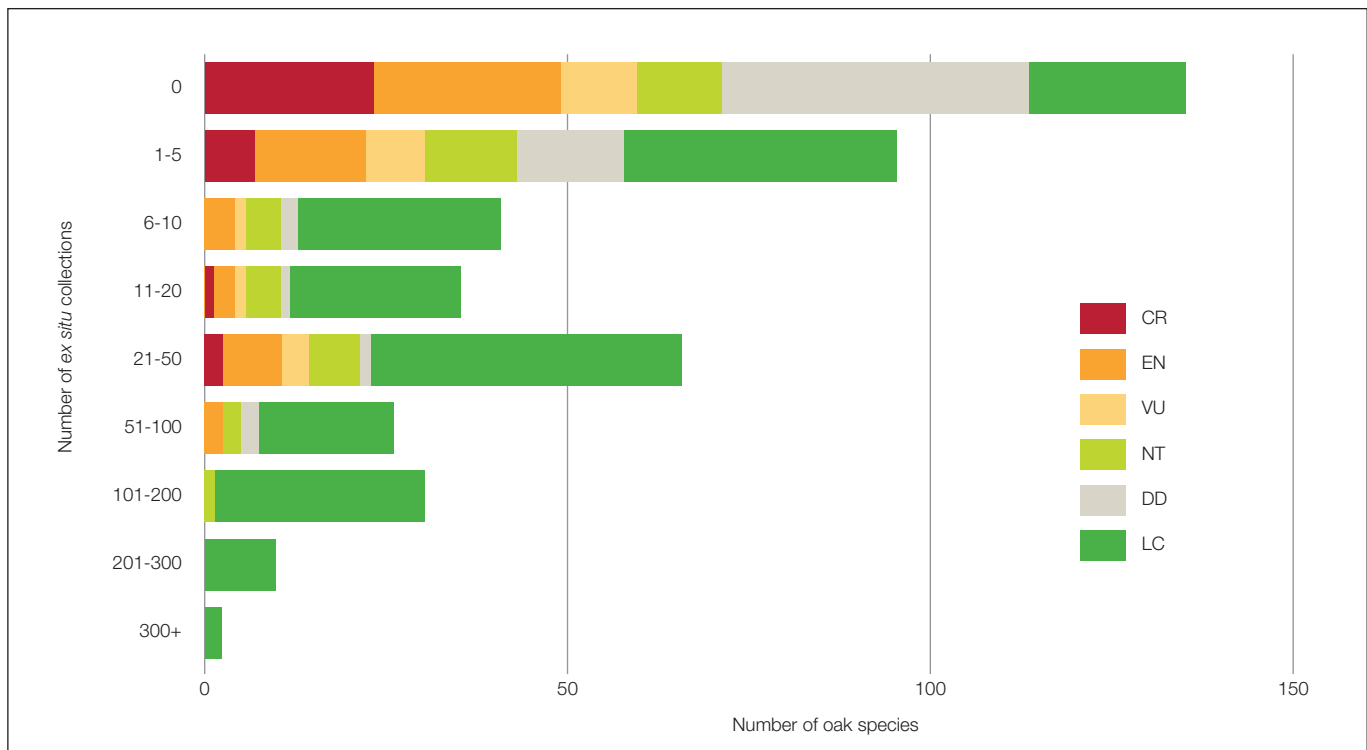
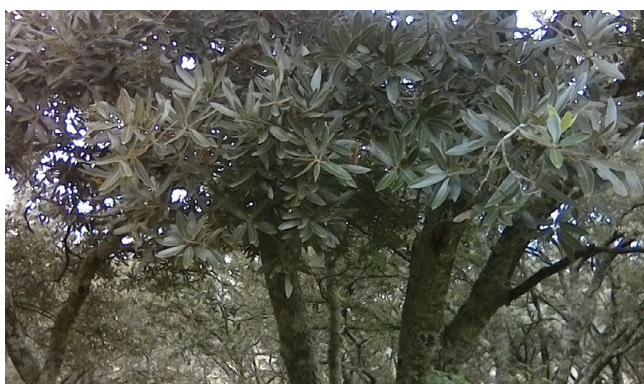


Figure 9. Number of oak species in *ex situ* collections, by IUCN Red List category.

| Country/ Territory | Threatened oak species | Total oak species | Most common threat(s) |
|----------------------|------------------------|-------------------|--|
| China | 36 | 117 | Agriculture & aquaculture |
| Mexico | 32 | 164 | Agriculture & aquaculture |
| Vietnam | 20 | 49 | Biological resource use |
| United States | 16 | 91 | Invasive & other problematic species, genes & diseases |
| Malaysia | 9 | 19 | Agriculture & aquaculture |
| Indonesia | 5 | 14 | Agriculture & aquaculture |
| Lao PDR | 5 | 24 | Agriculture & aquaculture |
| Thailand | 5 | 33 | Agriculture & aquaculture |
| India | 4 | 21 | Agriculture & aquaculture, Biological resource use |
| Myanmar | 4 | 27 | Agriculture & aquaculture |
| Costa Rica | 3 | 12 | Agriculture & aquaculture, Biological resource use |
| Honduras | 3 | 20 | Agriculture & aquaculture, Biological resource use |
| Hong Kong (China) | 3 | 8 | Residential & commercial development, Agriculture & aquaculture, Biological resource use |
| Panama | 3 | 10 | Biological resource use |
| Bangladesh | 2 | 9 | Agriculture & aquaculture, Biological resource use |
| Belize | 2 | 11 | Agriculture & aquaculture |
| Guatemala | 2 | 26 | Agriculture & aquaculture |
| Lebanon | 2 | 7 | Agriculture & aquaculture |
| Algeria | 1 | 6 | Agriculture & aquaculture |
| Bhutan | 1 | 9 | Agriculture & aquaculture |
| Brunei Darussalam | 1 | 5 | Agriculture & aquaculture |
| Cambodia | 1 | 3 | Biological resource use |
| Cuba | 1 | 1 | Agriculture & aquaculture, Energy production & mining, Natural system modifications |
| El Salvador | 1 | 15 | Agriculture & aquaculture |
| Georgia | 1 | 5 | Agriculture & aquaculture, Biological resource use |
| Japan | 1 | 15 | Agriculture & aquaculture |
| Nicaragua | 1 | 10 | Agriculture & aquaculture |
| Philippines | 1 | 1 | Agriculture & aquaculture, Natural system modifications |
| Syrian Arab Republic | 1 | 10 | Agriculture & aquaculture |
| Tunisia | 1 | 5 | Agriculture & aquaculture |
| Turkey | 1 | 17 | Biological resource use |

Table 4. Threatened oak species (Critically Endangered, Endangered, and Vulnerable) not reported in any ex situ collections. *Species assessment to be published in the first IUCN Red List update of 2021.



Quercus confertifolia, LC (Béatrice Chassé)



Quercus praeco, LC (Béatrice Chassé)

CONCLUSIONS AND CONSERVATION RECOMMENDATIONS



Quercus kiukangensis, EN (Béatrice Chassé)

Nearly one-third of all oak species are threatened with extinction and more than forty percent are considered of conservation concern. Regions with high numbers of native and threatened species include Mexico & Central America, China & Southeast Asia, and the United States. More specifically, China, Mexico, Vietnam, and the United States contain the highest number of threatened oaks. Although conservation of oaks in all parts of the world is necessary, conservation in these centers of diversity is the highest priority to ensure efficient, strategic protection for as many species as possible.

Analyses of global oak assessments show increasing current and projected threats to species, populations, and habitats. Pressures from land use change for agriculture, housing and urban area development, logging, natural system modifications, climate change, and invasive pests and diseases are identified as serious threats. Different regions require different strategies for protection based on threat; oak species in the United States show higher threats from climate change and invasive species, whereas concerns in Asia and Mexico and Central America are primarily due to deforestation from logging (coded as biological resource use), urbanization (residential and commercial development), and agriculture.

Living *ex situ* collections are an important method of oak conservation because oaks are “exceptional species” and cannot be seed banked through convention methods. Yet, the botanical

garden community is severely lacking in *ex situ* collections of high conservation quality. More than half of threatened oaks (58 species), predominantly from China and Southeast Asia, are not currently found in any *ex situ* collections globally. More than 130 of all oak species are not found in any *ex situ* collections and 34 species are only found in one collection. All threatened oak species not currently present in *ex situ* collections are listed in (Table 4) to help prioritize species for future collecting efforts. Without active and coordinated conservation efforts to increase oak richness and diversity in *ex situ* collections globally, many threatened species will face extinction.

It is helpful to classify centers of oak richness for native and threatened species both by region (following the natural distribution patterns of oaks) and country (as this is often the political unit at which conservation policies are made). The most common conservation recommendations across all Red List assessments for oaks include increasing *ex situ* collections, designating land and government protections for species *in situ*, and increased surveying of oaks in the wild to monitor populations, habitat, and threat trends. A preliminary summary of conservation efforts in the global centers of diversity – Mexico & Central America, China & Southeast Asia, and the United States – are provided below. Additional syntheses of current oak conservation initiatives and needs in the United States can be found in *The Red List of US Oaks* (Jerome *et al.*, 2017) and the *Conservation Gap Analysis of Native U.S. Oaks* (Beckman *et al.*, 2019).

MEXICO AND CENTRAL AMERICA

Mexico and Central America host the highest concentration of oak species in the world, with an estimate of 160 species, from which approximately 100 are endemic to Mexico, six are endemic to Central America, and 27 are shared between the two regions (the remaining species are shared between Mexico and the United States). Approximately 53% of these species are considered to have intermediate or large distributional range sizes (presence in three or more Mexican states), while about 60 species are restricted to only one or two Mexican states (Valencia-Á., 2004). This restricted distribution makes them particularly vulnerable to threats including habitat loss due to land use conversion, climate change, direct logging, and pest and diseases.

According to the recently published Global Forest Resources Assessment by the Food and Agriculture Organization of the United Nations (2015), the rate of annual loss of primary forest in Mexico has been decreasing over the last three decades. However, deforestation is still more than one hundred thousand hectares per year. This puts some oak species at risk, particularly those in areas such as Michoacán state where forest conversion to avocado orchards is rampant.

Box 4: Oaks of the Americas Conservation Network

The Oaks of the Americas Conservation Network (OACN) was born out of the International Workshop on Oak Conservation held in March 2016 in Morelia, Mexico, as a collaborative effort between The Morton Arboretum, the National Autonomous University of Mexico (UNAM), and University of Minnesota, in partnership with BGCI and FFI. OACN is a consortium of researchers and conservationists at universities, botanical gardens, arboreta, non-governmental organizations, and government agencies working to conserve threatened oak species throughout the Americas, with a focus on Latin America as a global hotspot for oak diversity. With an integrated approach to oak conservation in Mexico and Central America in mind, OACN pursues research and conservation projects that span a variety of species, audiences, and methodologies. These projects involve international collaboration across different sectors to maximize efficiency and effectiveness. Together, these projects will forge new partnerships, strengthen the network of engaged conservationists in an oak diversity hotspot, build knowledge and capacity, and result in direct conservation action for rare and threatened oak species (Denvir *et al.*, 2018).

Climate change is also a significant threat. All modeling studies in Mexico have found that areas climatically suitable for oaks will decrease in extents that vary from slight to dramatic, depending on the species (Gómez-Mendoza and Arriaga, 2007; Ramírez-Preciado *et al.*, 2019). Particularly worrisome are the possible interactions between climate change and emergent pests and diseases, such as those caused by the pathogen *Phytophthora cinnamomi* or the gall wasp *Andricus quercuslaurinus*, which seem to have had an increasing impact over the last decade (Sáenz-Romero *et al.*, 2020).



Quercus deserticola, LC (Béatrice Chassé)

Current, innovative technologies allow enhanced oak conservation efforts. Recent findings have provided a clear phylogenetic framework (Hipp *et al.*, 2020) to incorporate an evolutionary perspective on oak studies. Also, several authors have focused on the importance of *in situ* conservation strategies for oak diversity preservation; for example, Natural Protected Areas harbor ~84% of the Mexican oak species (Torres-Miranda *et al.*, 2011; Ramírez-Toro *et al.*, 2017). Finally, *ex situ* conservation strategies are prioritized, particularly by botanic gardens who protect ~36% of the oak species native to Mexico.

Highly threatened species and habitats have been identified and studied collaboratively with local communities using ecosystems management approaches (Montes-Hernández and López-Barrera, 2013). However, there is still a lot of work to do. The drivers for environmental degradation and diversity loss do not need to be coordinated to continue threatening biodiversity. Unlike such effects, the scientific community, decision-making actors, and invested citizens must act as a whole. Despite the development of several recent initiatives, including those from the Oaks of the Americas Conservation Network (OACN; Box 4), BGCI, and the Global Trees Campaign, current conservation actions are not enough.

Therefore, a new conservation science is urgently needed. We must find ways to enhance, improve, and merge current ecological and evolutionary knowledge, while also considering the needs of local communities, in order to achieve multidisciplinary approaches for oak conservation.

CHINA

One-third of Fagaceae species (~300) are distributed in China and account for 13.7% of the total area of natural forests in the country. Chinese oaks occur in a diversity of habitats including tropical rainforests, subtropical broadleaved evergreen forest, temperate deciduous broadleaved forest, and conifer forests, and range in elevation from 0 to 4500 meters.

Quercus species in China play an important role in regulating ecosystem function and maintaining community stability. Local people harvest Chinese oaks for timber, charcoal, the production of dyes, and starchy food. Currently, many Chinese oaks are threatened with extinction, primarily due to land use changes, unsustainable harvesting, climate change, soil erosion, and habitat destruction. During the last few hundred years and increasing in the last one hundred years, large areas of the oak forest in China have been cleared for agricultural crops, commercial crops, and monocrop economic forests. Additionally, oaks growing near the top of mountains with limited populations (e.g., *Quercus arbutifolia* and *Q. litseoides*) are especially threatened from habitat destruction, soil erosion, and climate change.

China is in need of increased conservation actions for oaks, as well as all genera of the Fagaceae family. However, the List of National Key Protected Wild Plants (First Group) issued by the National Forestry Bureau and Agriculture Ministry of China in 1999, only included three Fagaceae species: *Castanopsis concinna*, *Fagus hayatae* and *Formanodendron (Trigonoabalanus) doichangensis*. Only *C. concinna*, *Cyclobalanopsis sichouensis* (= *Quercus sichouensis*) and *Quercus bawanglingensis* are included in a draft list for promulgating (*Formanodendron doichangensis* and *Fagus hayatae* were deleted from the list in 1999). In 2004, Wang and Xie published the China Species Red List which included 93 oak species with limited occurrence data (less than 5). China later developed the conservation action concept of Plant Species with Extremely Small Populations (PSESP) in 2005, and national conservation actions have been launched based on the National 120 PSESP List released in 2012. Unfortunately, there were no Fagaceae species included in the list, and only *Cyclobalanopsis sichouensis* was included in the Provincial 62 PSESP List of Yunnan approved by the government in 2010. Huang (2014) reported that 207 Fagaceae species have been cultivated *ex situ* in China's major botanical gardens. Among these species, only eight are nationally evaluated as threatened: *Castanopsis kawakamii*, *Castanopsis rockii*, *Cyclobalanopsis dinghuensis* (= *Quercus dinghuensis*), *Cyclobalanopsis disciformis* (= *Quercus disciformis*), *Cyclobalanopsis sichouensis*, *Lithocarpus crytocarpus*, *Lithocarpus fordianus* and *Formanodendron doichangensis* (Qin *et al.*, 2017). Based on the report, only two species, *Cyclobalanopsis sichouensis* and *Formanodendron doichangensis*, are effectively conserved by *in situ* protection, *ex situ* preservation, and population reinforcement and reintroduction in the country (Sun, 2013; Sun *et al.*, 2011, 2016, 2019, and 2020; Xia *et al.*, 2016; Yang *et al.*, 2019). For the other threatened Fagaceae species, effective protective actions are urgently needed. Botanical gardens and nature reserves need to take immediate action to protect Chinese Fagaceae species.

SOUTHEAST ASIA

Southeast Asia is a regional hotspot of species richness with high species endemism (Koh *et al.*, 2013). The tropical climate, varied topography, and expansive land cover make this area ideal for development of rich and diverse plant life. For these reasons, it is also a region of high oak diversity and richness. Oaks in Southeast Asia occur from sea level to elevations of more than 3,000 meters, with the majority of species in mid-upper montane wet evergreen forests. Locally, oaks and other Fagaceae dominate the lower and middle forest strata in varying species assemblages over large areas. Similar to other Fagaceae in Asia, oaks are generally absent from areas with seasonal climate, although certain species have ranges that extend into high elevation summit zones (e.g., *Quercus lineata* and *Q. gemelliflora*). Soil type does not appear to be a major determining factor for oak presence as they are found on a wide variety of

Box 5: Southeast Asian Botanic Garden Network

The Southeast Asian Botanic Garden (SEABG) Network, established in 2004 with BGCI as secretariat, works to coordinate and promote the work of botanic gardens in the region. The goals of SEABG are to set standards among Southeast Asian botanic gardens, promote the exchange of technical expertise, connect members of the botanic garden community, and guide members in implementing the Convention on Biological Diversity (CBD), specifically the Global Strategy for Plant Conservation (GSPC), as well as the International Agenda for Botanic Gardens. For more information see bgci.org/our-work/where-we-work/asia/botanic-garden-networks-in-asia/



Quercus acerifolia, EN (Béatrice Chassé)

substrates. However, some species have a specific preference for podzolized soils (kerangas) or soils derived from ultrabasic bedrock, whereas calcareous soils are mostly lacking oak and other Fagaceae elements (Soepadmo and van Steenis, 1972).

There are an estimated 86 oak species native to the 11 countries comprising Southeast Asia (this definition excludes southern China). Nine of the 31 countries with threatened oak species are located in this region (Vietnam, Malaysia, Thailand, Lao PDR, Indonesia, Myanmar, the Philippines, Cambodia, and Brunei). With 36 threatened species (an estimated 48%), Southeast Asia is the most threatened region for oaks globally. Additionally, nine oak species have been assessed for the first time as Critically Endangered and possibly extinct or possibly extinct in the wild, and all are native to southern China and Southeast Asia (Appendices B and C).



Quercus scytophylla, LC (Béatrice Chassé)

These species have very small populations and/or restricted ranges and are primarily threatened by land conversion for logging, agriculture, and urbanization. They are listed as possibly extinct due to one or a combination of the following: few, unreadable, and/or misidentified herbaria records, inaccessible herbaria records due to a lack of capacity for local botanical communities, little to no recent surveying capacity, lack of strategic surveying due to minimal ecology/habitat knowledge, and/or doubt about species presence due to increased deforestation in the species' suspected locality. For example, a great proportion ($\geq 75\%$) of the herbaria collection data for Southeast Asian oaks came from the 1960s - 1990s, an era where active logging and land development led to greater accessibility and facilitated specimen collections. However, this poses a potential problem of collection locality bias, showing certain areas to have high number of species representation, while areas with similar habitat conditions but difficult accessibility showed low representation.

Southeast Asia is reported to have the highest relative rate of deforestation of any major tropical region (Sodhi *et al.*, 2004). Threats to forest areas in Southeast Asia are primarily a result of logging and rapid clearing for urbanization (Hughes, 2017). These threats also extend to oaks in the region, as seen in the results of this publication. Despite these severe threats, there has been minimal coordinated conservation action in the region to preserve threatened oak species. Though there have been changes in regulations in some regions of Southeast Asia to protect species, such as the prohibition of logging *Fagaceae* species in Sabah (Malaysia) and the increase of Totally Protected Areas (TPAs) by Sabah and Sarawak (Malaysia), challenges from a lack of shared information, funding, human resources, and collection bias (fertile specimens only) slow the progress of oak research, prioritization, and conservation action. Though much effort is invested in the management of *in situ* habitats where the majority of recorded species are found, there is still a need for the establishment of regional oak *ex situ* collections. At present, there is no regional *ex situ* effort focused specifically on the

Southeast Asian oaks to secure a significant proportion of their species and genetic diversity. For many species, propagation and growing requirements remain unknown, further complicating both studies of shrinking populations and *ex situ* conservation efforts. Conservation actions to protect oaks in this region must be collaborative, considerate of local expertise, and focus on increasing the survey of oaks in the wild, with the goal of monitoring populations, habitat, and threat trends and increasing oak *ex situ* collections in regional botanic gardens (Box 5).

THE UNITED STATES

With 91 native oak species, the US is a diversity center for *Quercus*. The *Conservation Gap Analysis of Native U.S. Oaks* (Beckman *et al.*, 2019) identified 28 of the 91 native oaks (31%) as species of conservation concern based on extinction risk, vulnerability to climate change, and lack of representation in *ex situ* collections (Beckman *et al.*, 2019). While some oak species of conservation concern have been the focus of collecting efforts, many are underrepresented in *ex situ* collections. Nine species of conservation concern are represented by fewer than 15 plants in collections and four species of concern are not found in any collections in North America (Beckman *et al.*, 2019). Fortunately, the US has resources and networks in place that provide a strong foundation to conduct oak conservation and research. *The Red List of US Oaks* (Jerome, *et al.*, 2017), which contains additional threat analyses for species in the US, and the *Conservation Gap Analysis of Native U.S. Oaks* (Beckman *et al.*, 2019), provides a roadmap for action, outlining priority conservation and research activities for the oak species of conservation concern. Botanic gardens and arboreta are the champions for native US oaks, with strong, well-resourced networks providing coordination and guidance, including support for *ex situ* collection and coordination through the American Public Gardens Association Plant Collections Network *Quercus* Multisite, guidelines available through the Center for Plant Conservation, and the recently established Global Conservation Consortium for Oak (GCCO; Box 6). These networks and resources provide a valuable base for the continued conservation of oaks in the US.



Quercus obtusata, LC (Béatrice Chassé)

Box 6: The Global Conservation Consortium for Oak

By Amy Byrne



**GLOBAL
CONSERVATION
CONSORTIUM**
OAK

Since no single institution can conserve all of the world's threatened oak species, a coordinated global network is needed

to ensure that threatened species are represented in *ex situ* collections and conserved in the wild, and that the institutions and experts in the global centers of diversity for oaks have the resources and conservation capacity to adequately conserve priority oak species. For these reasons, the Global Conservation Consortium for Oak (GCCO) was created. The GCCO is led by The Morton Arboretum (Illinois, USA) in collaboration with BGCI and dozens of other partners. The goal of the GCCO is to mobilize a coordinated network of institutions and experts who work collaboratively to develop and implement a comprehensive conservation strategy to prevent extinction of the world's oak species.

The objectives of the GCCO are to:

- Establish and foster a global network of oak experts
- Identify and prioritize species of greatest conservation concern through the IUCN Red List
- Establish and manage coordinated *ex situ* collections of high conservation value to support *in situ* action

- Undertake and facilitate applied research (e.g., conservation biology, population genetics, taxonomy)
- Ensure that threatened species are conserved *in situ*
- Build capacity to empower and mobilize in-country partners in centres of diversity to act for target species in these areas
- Increase public awareness and engagement in tree conservation
- Raise funding to scale up conservation action for target groups

Through the GCCO, partners and collaborators will have the tools and support needed to efficiently and effectively overcome challenges, catalyze action, and build capacity to conserve threatened oak species around the world.

Since launching in 2019, the GCCO has become well-established in the US, with five year work plan outlining goals and objectives for the US region, and working groups established to address key oak conservation activities such as cryopreservation, propagation, collecting, curation and conservation grove design. Virtual meetings have provided an opportunity for closer collaboration between members. As momentum builds in the US, the GCCO is working to replicate this model in Mexico, China, and Southeast Asia. For more information see bgci.org/our-work/projects-and-case-studies/a-global-conservation-consortium-for-oak/.



Quercus obtusata, LC (Béatrice Chassé)



Quercus repanda, LC (Béatrice Chassé)

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APPENDIX A:

SUMMARY OF THE IUCN RED LIST CRITERIA FOR THREATENED CATEGORIES (VERSION 3.1; IUCN)

| A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4 | | | |
|--|--|---|--|
| | Critically Endangered | Endangered | Vulnerable |
| A1 | ≥ 90% | ≥ 70% | ≥ 50% |
| A2, A3 & A4 | ≥ 80% | ≥ 50% | ≥ 30% |
| A1 Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased. | based on any of the following: | (a) direct observation [except A3] | |
| A2 Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible. | | (b) an index of abundance appropriate to the taxon | |
| A3 Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]. | | (c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality | |
| A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible. | | (d) actual or potential levels of exploitation (e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors | |
| B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy) | | | |
| | Critically Endangered | Endangered | Vulnerable |
| B1. Extent of occurrence (EOO) | < 100 km ² | < 5,000 km ² | < 20,000 km ² |
| B2. Area of occupancy (AOO) | < 10 km ² | < 500 km ² | < 2,000 km ² |
| AND at least 2 of the following 3 conditions: | | | |
| (a) Severely fragmented OR Number of locations | = 1 | ≤ 5 | ≤ 10 |
| (b) Continuing decline observed, estimated, inferred or projected in any of: (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: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals | | | |
| C. Small population size and decline | | | |
| | Critically Endangered | Endangered | Vulnerable |
| Number of mature individuals | < 250 | < 2,500 | < 10,000 |
| AND at least one of C1 or C2 | | | |
| C1 An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future): | 25% in 3 years or 1 generation (whichever is longer) | 20% in 5 years or 2 generations (whichever is longer) | 10% in 10 years or 3 generations (whichever is longer) |
| C2 An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions: | | | |
| (a) (i) Number of mature individuals in each subpopulation | ≤ 50 | ≤ 250 | ≤ 1,000 |
| (ii) % of mature individuals in one subpopulation = | 90–100% | 95–100% | 100% |
| (b) Extreme fluctuations in the number of mature individuals | | | |
| D. Very small or restricted population | | | |
| | Critically Endangered | Endangered | Vulnerable |
| D1 Number of mature individuals | < 50 | < 250 | D1. < 1,000 |
| D2 <i>Only applies to the VU category</i> Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time. | | | D2. typically: AOO < 20 km ² or number of locations ≤ 5 |
| E. Quantitative Analysis | | | |
| | Critically Endangered | Endangered | Vulnerable |
| Indicating the probability of extinction in the wild to be: | ≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.) | ≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.) | ≥ 10% in 100 years |

APPENDIX B:

FULL LIST OF EVALUATED QUERCUS SPECIES AND RED LIST CATEGORY: LISTED ALPHABETICALLY

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | Quercus section |
|--------------------------------------|------------------------|----------------------------------|--------------------------------------|---|-----------------|
| <i>Quercus acatenangensis</i> | LC | GT,MX,SV | 0 | - | Lobatae |
| <i>Quercus acerifolia</i> | EN | US | 44 | 3.2,2.3,2.7,1.2,5.3,4,1,3,8,4.1,6.1,1,2,9,4 | Lobatae |
| <i>Quercus acherdophylla</i> | DD | MX | 13 | - | Lobatae |
| <i>Quercus acrodonta</i> | LC | CN | 3 | - | Ilex |
| <i>Quercus acuta</i> | LC | CN,JP,KR,TW | 46 | - | Cyclobalanopsis |
| <i>Quercus acutifolia</i> | VU | BZ,GT,HN,MX | 34 | 2.3,4,11,2,11,1,2,1,4,5,3,4 | Lobatae |
| <i>Quercus acutissima</i> | LC | BT,CN,IN,JP,KP,KR,LA,MM,NP,TH,VN | 201 | 5.3,2 | Cerris |
| <i>Quercus aerea</i> | DD | MX | 0 | - | Lobatae |
| <i>Quercus afares</i> | VU | DZ,TN | 18 | 2.1,1,6,3,1,2,2,3,2,4,1 | Cerris |
| <i>Quercus affinis</i> | LC | MX | 23 | 2.1,2,5,3,3 | Lobatae |
| <i>Quercus agrifolia</i> | LC | MX,US | 94 | 2.3,3,1,1,7,1,3,5,3,2,2,1,3,8,4,2 | Lobatae |
| <i>Quercus ajoensis</i> | VU | MX,US | 5 | 11,2,8,2 | Quercus |
| <i>Quercus alba</i> | LC | CA,US | 234 | 7.1,2,8,2,2,1,1 | Quercus |
| <i>Quercus albicaulis</i> | CR | CN | 0 | 2.2,3,5,3,1,5,3,4 | Cyclobalanopsis |
| <i>Quercus albocincta</i> | LC | MX | 3 | - | Lobatae |
| <i>Quercus aliena</i> | LC | CN,JP,KP,KR,LA,MM,TH,TW | 101 | 7.1,3,2,2,1 | Quercus |
| <i>Quercus alnifolia</i> | LC | CY | 48 | 11,1,7,1,1 | Ilex |
| <i>Quercus alpscens</i> | DD | MX | 1 | - | Quercus |
| <i>Quercus annulata</i> | LC | CN,IN,MM,NP,VN | 0 | - | Cyclobalanopsis |
| <i>Quercus aquifolioides</i> | LC | BT,CN,MM | 6 | - | Ilex |
| <i>Quercus arbutifolia</i> | EN | CN,VN | 0 | 11,1,1,1 | Cyclobalanopsis |
| <i>Quercus argentata</i> | LC | ID,MY,SG | 3 | - | Cyclobalanopsis |
| <i>Quercus argyrotricha</i> | CR | CN | 4 | 6,3 | Cyclobalanopsis |
| <i>Quercus ariifolia*</i> | NT | MX | 1 | 11,2,11,3 | Quercus |
| <i>Quercus aristata</i> | LC | MX | 0 | 5.3,4,5,3,1,1,1,2,3,4,2,1,4 | Lobatae |
| <i>Quercus arizonica</i> | LC | MX,US | 31 | - | Quercus |
| <i>Quercus arkansana</i> | VU | US | 48 | 2.1,3,1,3,5,3,4,7,3,7,1,1,8,1,2,9,3,3,11,1,11,2 | Lobatae |
| <i>Quercus asymmetrica</i> | EN | CN,VN | 0 | 1.1,1,2,5,3,4,6,3 | Cyclobalanopsis |
| <i>Quercus aucheri</i> | LC | GR,TR | 13 | 6.1,5,3,5,11,1,1,3,1,1 | Ilex |
| <i>Quercus augustini</i> | LC | CN,MM,TH,VN | 4 | - | Cyclobalanopsis |
| <i>Quercus auricoma</i> | LC | CN,TH,VN | 0 | - | Cyclobalanopsis |
| <i>Quercus austrina</i> | VU | US | 25 | 2.1,2,2,1,3,3,1,5,3,1,8,2,1,11,2,6,1 | Quercus |
| <i>Quercus austrocochinchinensis</i> | VU | CN,LA,TH,VN | 0 | 8.2,2,1,1,5,3,3 | Cyclobalanopsis |
| <i>Quercus baloot</i> | LC | AF,PK | 7 | - | Ilex |
| <i>Quercus bambusifolia</i> | EN | CN,HK,VN | 4 | 12,1,2,1,3 | Cyclobalanopsis |
| <i>Quercus baniensis</i> | CR | VN | 0 | - | Cyclobalanopsis |
| <i>Quercus baolamensis</i> | CR | VN | 0 | - | Cyclobalanopsis |
| <i>Quercus baronii</i> | LC | CN | 16 | - | Ilex |
| <i>Quercus barrancana</i> | DD | MX | 0 | - | Quercus |
| <i>Quercus bawanglingensis</i> | CR | CN | 0 | 2.2,3,5,3,3 | Ilex |
| <i>Quercus bella</i> | NT | CN,VN | 1 | 2,2,2 | Cyclobalanopsis |
| <i>Quercus benthamii</i> | NT | CR,GT,HN,MX,NI,PA,SV | 15 | 5.3,1,2,1,3,2,3,3 | Lobatae |
| <i>Quercus berberidifolia</i> | LC | MX,US | 43 | 8.2,2,8,2,2,8,2,2,8,2,2,8,2,2,8,2,2 | Quercus |
| <i>Quercus bicolor</i> | LC | CA,US | 220 | 7.1,1,5,3,5,8,2,2,8,2,2,11,1 | Quercus |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | Quercus section |
|----------------------------------|------------------------|---|--------------------------------------|-------------------------------------|------------------------|
| <i>Quercus bidoupensis</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus blakei</i> | LC | CN,HK,LA,VN | 1 | 5.3.5 | <i>Cyclobalanopsis</i> |
| <i>Quercus blaoensis</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus boyntonii</i> | CR | US | 21 | 9.4,1.3,5.3,1.6,1 | <i>Quercus</i> |
| <i>Quercus braianensis</i> | VU | LA,VN | 0 | 2.1.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus brandegeei</i> | EN | MX | 9 | 2.3.2,1.3,11.2,5.3.1 | <i>Virentes</i> |
| <i>Quercus brandisiana</i> | LC | LA,MM,TH | 0 | 2.1.1,5.3.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus brantii</i> | LC | IQ,IR,SY,TR | 23 | 5.3.3,8.4.1 | <i>Cerris</i> |
| <i>Quercus breedloveana*</i> | DD | MX | 0 | - | <i>Lobatae</i> |
| <i>Quercus brevicealyx</i> | DD | CN,LA,TH | 0 | 2.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus buckleyi</i> | LC | US | 51 | 8.2.2,8.4.2 | <i>Lobatae</i> |
| <i>Quercus bumelioides</i> | LC | CR,GT,HN,MX,NI,PA | 1 | 2.3.4,2.1.4,5.3.5 | <i>Lobatae</i> |
| <i>Quercus calophylla</i> | LC | GT,MX | 16 | 2.1.2,1.1 | <i>Lobatae</i> |
| <i>Quercus cambodiensis</i> | CR | KH | 0 | 1.1,5.3.5 | <i>Lobatae</i> |
| <i>Quercus camusiae</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus canariensis</i> | DD | DZ,ES,MA,PT,TN | 83 | 7.1.1,5.3.2,2.2.2,11.2 | <i>Quercus</i> |
| <i>Quercus canbyi</i> | LC | MX | 39 | 2.1.2,7.1.1,2.3.2 | <i>Lobatae</i> |
| <i>Quercus carduchorum</i> | DD | IR | 0 | 8.1.1,11.3,11.2 | <i>Cerris</i> |
| <i>Quercus carmenensis</i> | EN | MX,US | 3 | 8.2.2,2.3.2 | <i>Quercus</i> |
| <i>Quercus castanea</i> | LC | GT,MX,SV | 25 | 1.1,2.3.4,2.1.4 | <i>Lobatae</i> |
| <i>Quercus castaneifolia</i> | NT | AZ,IR | 105 | 2.1.4,2.3.4 | <i>Cerris</i> |
| <i>Quercus cedrosensis</i> | VU | MX,US | 2 | 6.2,7.1.3,4.1,5.3.1 | <i>Protobalanus</i> |
| <i>Quercus centenaria*</i> | DD | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus cerris</i> | LC | AL,AT,BA,BG,CH,CZ,ES,FR,GR,HR,HU,IT,LB,ME,MK,PT,RO,RS,SI,SK,SY,TR | 211 | 2.1.1 | <i>Cerris</i> |
| <i>Quercus championii</i> | LC | CN,TW | 6 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus chapensis</i> | DD | CN,VN | 3 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus chapmanii</i> | LC | US | 16 | 7.1.2,6.1,1.1 | <i>Quercus</i> |
| <i>Quercus chenii</i> | NT | CN | 38 | 2.1.4,1.1,5.3.5 | <i>Cerris</i> |
| <i>Quercus chevalieri</i> | DD | CN,VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus chihuahuensis</i> | LC | MX,US | 5 | 2.3.2,6.1,7.1.3 | <i>Quercus</i> |
| <i>Quercus chrysocalyx</i> | DD | CN,KH,LA,TH,VN | 1 | 5.3.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus chrysolepis</i> | LC | MX,US | 82 | 1.1,7.1.2 | <i>Protobalanus</i> |
| <i>Quercus chrysotricha</i> | EN | MY | 0 | 5.3.5 | <i>Cyclobalanopsis</i> |
| <i>Quercus chungii</i> | LC | CN | 1 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus ciliaris</i> | LC | CN | 10 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus coahuilensis</i> | DD | MX | 0 | - | <i>Lobatae</i> |
| <i>Quercus coccifera</i> | LC | AL,BA,BG,CY,DZ,ES,FR,GR,HR,IL,IT,JO,LB,LY,MA,ME,MK,PS,PT,RS,SI,SY,TN,TR | 131 | 2.3.4,2.2.3,7.1.1 | <i>Ilex</i> |
| <i>Quercus cocciferoides</i> | LC | CN | 2 | - | <i>Ilex</i> |
| <i>Quercus coccinea</i> | LC | US | 216 | 8.4.2 | <i>Lobatae</i> |
| <i>Quercus coffeicolor</i> | DD | MX | 0 | - | <i>Lobatae</i> |
| <i>Quercus conduplicans</i> | DD | CN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus confertifolia</i> | LC | MX | 0 | 2.1.2,2.3.2,4.2 | <i>Lobatae</i> |
| <i>Quercus congesta</i> | LC | IT | 0 | 7.1.1,2.3.4,2.1.4,1.1 | <i>Quercus</i> |
| <i>Quercus convallata</i> | LC | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus conzattii</i> | LC | MX | 1 | - | <i>Lobatae</i> |
| <i>Quercus cornelius-mulleri</i> | LC | MX,US | 15 | 6.1 | <i>Quercus</i> |
| <i>Quercus corrugata</i> | LC | BZ,CR,GT,HN,MX,SV | 14 | - | <i>Quercus</i> |
| <i>Quercus cortesii</i> | NT | BZ,CR,GT,HN,MX,NI,PA,SV | 0 | 1.2,2.1.3 | <i>Lobatae</i> |
| <i>Quercus costaricensis</i> | VU | CR,HN,PA | 2 | 5.3.1,4.1,11.1,7.1.1,10.3,5.3.1,4.1 | <i>Lobatae</i> |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | Quercus section |
|---------------------------------|------------------------|-------------------------------------|--------------------------------------|--|-----------------|
| <i>Quercus crassifolia</i> | LC | GT,MX | 36 | 1.1,2.3.4,11.1 | Lobatae |
| <i>Quercus crassipes</i> | LC | MX | 32 | 5.3.1,2.3.3 | Lobatae |
| <i>Quercus crispifolia</i> | NT | GT,MX | 0 | 3.3,2.1.3 | Lobatae |
| <i>Quercus crispipilis</i> | NT | GT,MX | 7 | 5.3.2,11.1,2.3.3 | Lobatae |
| <i>Quercus cualensis</i> | EN | MX | 1 | 3.2,1.3,2.3,2.5,3.5 | Lobatae |
| <i>Quercus cupreata</i> | EN | MX | 4 | 1.1,2.3,2.5,3.1 | Lobatae |
| <i>Quercus daimingshanensis</i> | EN | CN | 0 | 1.1,2.1.4.4,1.5,3.1 | Cyclobalanopsis |
| <i>Quercus dalechampii</i> | DD | IT | 21 | - | Quercus |
| <i>Quercus dankiaensis</i> | CR | VN | 0 | - | Cyclobalanopsis |
| <i>Quercus delavayi</i> | LC | CN | 2 | - | Cyclobalanopsis |
| <i>Quercus delgadoana</i> | EN | MX | 9 | 2.1,2.5,3.1,5.3.3 | Lobatae |
| <i>Quercus delicatula</i> | EN | CN | 0 | 1.1 | Cyclobalanopsis |
| <i>Quercus deliquescens</i> | DD | MX | 3 | 2.3,2.1,1.1,2.4,2 | Quercus |
| <i>Quercus dentata</i> | LC | CN,JP,KR,MN,RU,TW | 168 | - | Quercus |
| <i>Quercus depressa</i> | LC | MX | 2 | 1.2,2.3,2.4,1.11,1.11,2.5,3.3 | Lobatae |
| <i>Quercus depressipes</i> | LC | MX,US | 1 | 5.3.5 | Quercus |
| <i>Quercus deserticola</i> | LC | MX | 9 | - | Quercus |
| <i>Quercus devia</i> | EN | MX | 0 | 2.3.2 | Lobatae |
| <i>Quercus dilacerata</i> | CR | VN | 0 | - | Cyclobalanopsis |
| <i>Quercus dinghuensis</i> | CR | CN | 1 | 1.1,5.3.1 | Cyclobalanopsis |
| <i>Quercus disciformis</i> | EN | CN | 2 | 1.1 | Cyclobalanopsis |
| <i>Quercus diversifolia</i> | EN | MX | 3 | 1.2,1.1 | Quercus |
| <i>Quercus dolicholepis</i> | LC | CN | 14 | - | Ilex |
| <i>Quercus dongfangensis</i> | DD | CN | 0 | 2.2.2 | Cyclobalanopsis |
| <i>Quercus donnaiensis</i> | CR | VN | 0 | - | Cyclobalanopsis |
| <i>Quercus douglasii</i> | LC | US | 63 | 2.3,2,11,2,8,1.1,1.1,7.1,2,8,2,2,8,2,2 | Quercus |
| <i>Quercus dumosa</i> | EN | MX,US | 30 | 1.3,7,1.3,1.1,6,1,8,2,2,8,2,2,8,2,2 | Quercus |
| <i>Quercus durata</i> | LC | US | 37 | - | Quercus |
| <i>Quercus durifolia</i> | NT | MX | 10 | 2.1,4,2,3,4,5,3.1 | Lobatae |
| <i>Quercus edithiae</i> | EN | CN,HK,VN | 0 | 1.1,5.3.1 | Cyclobalanopsis |
| <i>Quercus eduardi</i> | LC | MX | 7 | 5.3.1,2.3,4,11.1,2.1.4 | Lobatae |
| <i>Quercus edwardsiae</i> | DD | MX | 3 | - | Quercus |
| <i>Quercus elevaticostata</i> | DD | CN | 0 | - | Cyclobalanopsis |
| <i>Quercus ellipsoidalis</i> | LC | CA,US | 115 | 8.4,2,11.1 | Lobatae |
| <i>Quercus elliptica</i> | LC | BZ,GT,HN,MX,NI,SV | 5 | 8.4,2 | Lobatae |
| <i>Quercus elmeri</i> | NT | BN,ID,MY | 1 | 2.1,4,7,1.3 | Cyclobalanopsis |
| <i>Quercus emoryi</i> | LC | MX,US | 30 | 5.3.1,8,2,2,2,3,2,6,1,5,2,1,8,2,2,7.1,2,11.1 | Lobatae |
| <i>Quercus engelmannii</i> | EN | MX,US | 36 | 1.2,1.1,2,3,4,7,1.1,8,2,2,11.1,8,2,2 | Quercus |
| <i>Quercus engleriana</i> | LC | CN | 15 | - | Ilex |
| <i>Quercus eumorpha</i> | DD | MM,TH | 0 | - | Cyclobalanopsis |
| <i>Quercus fabrei</i> | LC | CN,HK | 31 | - | Quercus |
| <i>Quercus faginea</i> | LC | ES,MA,PT | 88 | 2.1,4,11,2,8,2,11,3,1,3 | Quercus |
| <i>Quercus falcata</i> | LC | US | 111 | 8.4,2 | Lobatae |
| <i>Quercus fimbriata</i> | CR | CN | 0 | 1.1 | Ilex |
| <i>Quercus flocculenta</i> | EN | MX | 3 | 1.1,5.3.3 | Lobatae |
| <i>Quercus floribunda</i> | LC | AF,IN,NP,PK | 3 | - | Ilex |
| <i>Quercus frainetto</i> | LC | AL,BA,BG,CZ,GR,HR,IT,MK,RO,RS,SK,TR | 132 | 2.1,4,8,3,5,3.1 | Quercus |
| <i>Quercus franchetii</i> | LC | CN,TH | 17 | - | Ilex |
| <i>Quercus frutex</i> | LC | MX | 8 | 8.4,1,11.5 | Quercus |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | <i>Quercus</i> section |
|-----------------------------------|------------------------|--|--------------------------------------|--|------------------------|
| <i>Quercus fuliginosa</i> | DD | CN | 0 | 2.1.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus fulva</i> | LC | MX | 2 | - | <i>Lobatae</i> |
| <i>Quercus furfuracea</i> | VU | MX | 5 | 5.3.4,5.3.1,2.3.3 | <i>Lobatae</i> |
| <i>Quercus fusiformis</i> | LC | MX,US | 39 | 5.3.3,2.3.4,8.2,8.4.2 | <i>Virentes</i> |
| <i>Quercus gaharuensis</i> | VU | ID,MY | 0 | 2.2.3.5,3.5.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus galeanensis</i> | EN | MX | 8 | 2.1.2,5.3.2,1.1,2.3.2 | <i>Lobatae</i> |
| <i>Quercus gambelii</i> | LC | MX,US | 76 | - | <i>Quercus</i> |
| <i>Quercus gambleana</i> | LC | BD,CN,IN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus garryana</i> | LC | CA,US | 79 | 2.3.2,8.2.2,8.2.2,8.2.2,8.1.2 | <i>Quercus</i> |
| <i>Quercus gemelliflora</i> | LC | BN,ID,MY | 5 | 2.2.2 | <i>Cyclobalanopsis</i> |
| <i>Quercus geminata</i> | LC | US | 28 | - | <i>Virentes</i> |
| <i>Quercus georgiana</i> | EN | US | 55 | 11.1,11.2,6.1,8.2.2 | <i>Lobatae</i> |
| <i>Quercus germana</i> | LC | MX | 27 | 2.3.3,2.3.2,5.3.1 | <i>Quercus</i> |
| <i>Quercus ghiesbreghtii</i> | DD | MX | 0 | - | <i>Lobatae</i> |
| <i>Quercus gilliana</i> | LC | CN | 0 | - | <i>Ilex</i> |
| <i>Quercus gilva</i> | LC | CN,JP,KR,TW | 35 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus glabrescens</i> | LC | MX | 16 | 5.3.2,2.3.3 | <i>Quercus</i> |
| <i>Quercus glauca</i> | LC | AF,BT,CN,HK,IN,JP,KP,KR,LA,MM,NP,TW | 111 | 2.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus glaucescens</i> | LC | MX | 0 | 7.1.3,5.3.5,2.1.4 | <i>Quercus</i> |
| <i>Quercus glaucoides</i> | LC | MX | 20 | 2.1.1,1.1,8.1.2 | <i>Quercus</i> |
| <i>Quercus gomeziana</i> | DD | BD,CN,MM,VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus gracilentia</i> | DD | CN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus graciliformis</i> | CR | MX,US | 21 | 6.1,7.2,8.8,2.2,7.1.3 | <i>Lobatae</i> |
| <i>Quercus gracilior*</i> | DD | HN | 0 | - | <i>Lobatae</i> |
| <i>Quercus grahamii</i> | DD | MX | 3 | - | <i>Lobatae</i> |
| <i>Quercus gravesii</i> | LC | MX,US | 36 | 7.2.2,2.3.2,11.2 | <i>Lobatae</i> |
| <i>Quercus greggii</i> | LC | MX | 27 | - | <i>Quercus</i> |
| <i>Quercus griffithii</i> | LC | BT,CN,IN,LA,MM,NP,TH,VN | 26 | 2.1.1 | <i>Quercus</i> |
| <i>Quercus grisea</i> | LC | MX,US | 39 | 2.3.2,2.1.2,5.3.1,11.1 | <i>Quercus</i> |
| <i>Quercus gulielmi-treleasei</i> | VU | CR,PA | 2 | 5.3.5 | <i>Lobatae</i> |
| <i>Quercus guyavifolia</i> | LC | CN | 10 | - | <i>Ilex</i> |
| <i>Quercus hartwissiana</i> | DD | BG,GE,RU,TR | 53 | 7.1.3,5.3.1,1.2 | <i>Quercus</i> |
| <i>Quercus havardii</i> | EN | US | 19 | 3.1,2.3.3,9.3.3 | <i>Quercus</i> |
| <i>Quercus helferiana</i> | LC | CN,IN,LA,MM,TH,VN | 0 | 5.3.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus hemisphaerica</i> | LC | US | 48 | 8.2.2 | <i>Lobatae</i> |
| <i>Quercus hinckleyi</i> | CR | MX,US | 12 | 8.2.2,8.2.2,11.1,2.3.4,4.1,1.3,8.2.1 | <i>Quercus</i> |
| <i>Quercus hintonii</i> | EN | MX | 3 | 2.1.2,1.1,2.3.2,4.1,5.3.1,7.1.1 | <i>Lobatae</i> |
| <i>Quercus hintonium</i> | VU | MX | 6 | 7.1.1,1.1,2.1.2 | <i>Lobatae</i> |
| <i>Quercus hirtifolia</i> | EN | MX | 7 | 5.3.3,1.2,4.1,2.3.2,11.2,11.1 | <i>Lobatae</i> |
| <i>Quercus honbaensis</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus hondae</i> | VU | JP | 2 | 2.1.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus humboldtii</i> | LC | CO,PA | 7 | 1.1,4.1,5.3.1 | <i>Lobatae</i> |
| <i>Quercus hypargyrea</i> | NT | CN | 21 | 1.1,5.3.5 | <i>Cyclobalanopsis</i> |
| <i>Quercus hypoleuroides</i> | LC | MX,US | 27 | - | <i>Lobatae</i> |
| <i>Quercus hypophaea</i> | NT | TW | 1 | 1.1,4.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus hypoxantha</i> | LC | MX | 5 | - | <i>Lobatae</i> |
| <i>Quercus ichnusae</i> | LC | IT | 0 | 2.3.4,7.1.1 | <i>Quercus</i> |
| <i>Quercus ignaciensis</i> | DD | MX | 0 | - | <i>Lobatae</i> |
| <i>Quercus ilex</i> | LC | AL,BA,CH,DZ,ES,FR,GR,HR,IT,LY,MA,ME,MT,RS,SI,TN,TR | 212 | 1.2,1.1,9.5,4.7,1.3,5.3.1,11.2,2.3.3,2.1.3,8.2 | <i>Ilex</i> |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | <i>Quercus</i> section |
|------------------------------|------------------------|-------------------------------|--------------------------------------|-------------------------------|------------------------|
| <i>Quercus ilicifolia</i> | LC | CA,US | 101 | 7.1.2,11.1 | Lobatae |
| <i>Quercus iltisii</i> | NT | MX | 0 | 5.3.4,4.1.1,1.2.3.4,2.1.4 | Lobatae |
| <i>Quercus imbricaria</i> | LC | US | 190 | 8.4.2,11.1 | Lobatae |
| <i>Quercus incana</i> | LC | US | 43 | 7.1.2,11.1 | Lobatae |
| <i>Quercus infectoria</i> | LC | AZ,CY,GR,IL,IQ,IR,LB,PS,SY,TR | 51 | 5.3.5,2.1.4,2.3.4 | Quercus |
| <i>Quercus inopina</i> | LC | US | 7 | 7.1.2,1.2.1,1.2.1.4 | Lobatae |
| <i>Quercus insignis</i> | EN | BZ,CR,GT,HN,MX,NI,PA | 27 | 2.1.2,2.3.2,5.3.1 | Quercus |
| <i>Quercus intricata</i> | LC | MX,US | 5 | 2.3.2,1.2.5,2.2,7.1.2,11.2 | Quercus |
| <i>Quercus invaginata</i> | LC | MX | 9 | - | Quercus |
| <i>Quercus ithaburensis</i> | LC | AL,GR,IL,IT,LB,SY,TR | 84 | 5.3.1,2.3.4,1.3.1.1 | Cerris |
| <i>Quercus jenseniana</i> | NT | CN | 3 | 5.3.5,2.1.4 | Cyclobalanopsis |
| <i>Quercus jinpinensis</i> | DD | CN | 0 | - | Cyclobalanopsis |
| <i>Quercus john-tuckeri</i> | LC | US | 22 | 1.1,7.1.2,2.3.2 | Quercus |
| <i>Quercus jonesii</i> | LC | MX | 2 | - | Lobatae |
| <i>Quercus kelloggii</i> | LC | MX,US | 68 | 5.3.2,7.1.2,7.1.1,8.2.2,8.2.2 | Lobatae |
| <i>Quercus kerangasensis</i> | VU | BN,ID,MY | 0 | 2.2.2,7.1.1 | Cyclobalanopsis |
| <i>Quercus kerrii</i> | LC | CN,KH,LA,MM,TH,VN | 1 | - | Cyclobalanopsis |
| <i>Quercus kinabaluensis</i> | EN | MY | 0 | 2.2.2,7.1.1 | Cyclobalanopsis |
| <i>Quercus kingiana</i> | EN | CN,LA,MM,TH | 0 | 1.1,2.1.4,2.2.3,5.3.1,5.3.3 | Ilex |
| <i>Quercus kiukiangensis</i> | EN | CN | 4 | 5.3.5,7.1.3 | Cyclobalanopsis |
| <i>Quercus kotschyana</i> | EN | LB | 0 | 2.3.2,5.3.1,11.1 | Quercus |
| <i>Quercus kouangsiensis</i> | EN | CN | 0 | 2.1.3,4.1,5.3.4 | Cyclobalanopsis |
| <i>Quercus laceyi</i> | LC | MX,US | 33 | 11.1 | Quercus |
| <i>Quercus laeta</i> | LC | MX | 25 | 11.1 | Quercus |
| <i>Quercus laevis</i> | LC | US | 29 | 2.2.2,8.4.2,11.1 | Lobatae |
| <i>Quercus lamellosa</i> | NT | BT,CN,IN,MM,NP,TH | 11 | 2.1.4,5.3.3,5.3.4,7.1.3 | Cyclobalanopsis |
| <i>Quercus lanata</i> | LC | BT,CN,IN,MM,NP,TH,VN | 7 | - | Ilex |
| <i>Quercus lancifolia</i> | LC | BZ,CR,GT,HN,MX,NI,PA,SV | 10 | 1.2,2.3.3 | Quercus |
| <i>Quercus langbianensis</i> | NT | VN | 0 | - | Cyclobalanopsis |
| <i>Quercus laurifolia</i> | LC | US | 70 | 8.4.1,8.4.2 | Lobatae |
| <i>Quercus laurina</i> | LC | GT,MX,SV | 30 | 7.1.1,5.3.5,2.3.1 | Lobatae |
| <i>Quercus lenticellata</i> | EN | TH | 0 | 5.3.5,7.1.3 | Cyclobalanopsis |
| <i>Quercus liaoi</i> | DD | TW | 1 | - | Cyclobalanopsis |
| <i>Quercus libani</i> | LC | IQ,IR,SY,TR | 88 | 8.4.1 | Cerris |
| <i>Quercus liboensis</i> | EN | CN | 2 | 1.1,2.1.3 | Cyclobalanopsis |
| <i>Quercus liebmannii</i> | LC | MX | 8 | 2.3.2 | Quercus |
| <i>Quercus lineata</i> | LC | BD,CN,ID,IN,LA,MY,TH,VN | 1 | 2.2.2 | Cyclobalanopsis |
| <i>Quercus litseoides</i> | VU | CN,HK | 1 | 11.1,1.3 | Cyclobalanopsis |
| <i>Quercus lobata</i> | NT | US | 82 | 1.1,2.1.1,7.1.2,2.3.2,11.1 | Quercus |
| <i>Quercus lobbii</i> | EN | BD,CN,IN | 0 | 5.3.5 | Cyclobalanopsis |
| <i>Quercus lodicosa</i> | EN | CN,IN,MM | 0 | 5.3.5 | Ilex |
| <i>Quercus longinux</i> | LC | TW | 12 | - | Cyclobalanopsis |
| <i>Quercus longispica</i> | LC | CN | 5 | - | Ilex |
| <i>Quercus look</i> | EN | LB,SY | 16 | 2.3.2,11.1 | Cerris |
| <i>Quercus lowii</i> | NT | MY | 0 | 2.2.2,7.1.1 | Cyclobalanopsis |
| <i>Quercus lungmaiensis</i> | CR | CN | 1 | 2.1.4 | Cyclobalanopsis |
| <i>Quercus lusitanica</i> | LC | ES,MA,PT | 33 | - | Quercus |
| <i>Quercus lyrata</i> | LC | US | 111 | 11.1 | Quercus |
| <i>Quercus macdougallii</i> | EN | MX | 0 | 2.3.2,5.3.4,7.1.1 | Quercus |
| <i>Quercus macranthera</i> | LC | AM,AZ,GE,IQ,IR,LB,RU,SY,TR | 100 | 11.2,2.3.1,8.1.1,8.2 | Quercus |
| <i>Quercus macrocalyx</i> | LC | CN,LA,VN | 6 | - | Cyclobalanopsis |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | <i>Quercus</i> section |
|-------------------------------|------------------------|-------------------------|--------------------------------------|---|------------------------|
| <i>Quercus macrocarpa</i> | LC | CA,US | 261 | 7.1,2,2,3,4 | <i>Quercus</i> |
| <i>Quercus magnoliifolia</i> | LC | MX | 5 | 11.1,7.1.1,5,3,2 | <i>Quercus</i> |
| <i>Quercus margarettae</i> | LC | US | 28 | 11.1 | <i>Quercus</i> |
| <i>Quercus marilandica</i> | LC | US | 101 | 8.4.1 | <i>Lobatae</i> |
| <i>Quercus maripoensis</i> | CR | CN | 1 | 1.1,5,3.1 | <i>Ilex</i> |
| <i>Quercus martinezii</i> | LC | MX | 1 | - | <i>Quercus</i> |
| <i>Quercus mcvaughii</i> | NT | MX | 1 | 1.1,2,3,4,2,1,4 | <i>Lobatae</i> |
| <i>Quercus meavei</i> | VU | MX | 1 | 5.3,3,1,2,4,1,2,3,2,11.1,11.2 | <i>Lobatae</i> |
| <i>Quercus melissae*</i> | DD | GT,MX | 0 | - | <i>Quercus</i> |
| <i>Quercus merrillii</i> | VU | ID,MY,PH | 0 | 2.2,2,7,1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus mespilifolia</i> | DD | BD,IN,LA,MM,TH,VN | 1 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus mexiae*</i> | DD | MX | 0 | - | <i>Lobatae</i> |
| <i>Quercus mexicana</i> | LC | MX | 43 | 1.1,2,3,4,11.1,2,1,4 | <i>Lobatae</i> |
| <i>Quercus michauxii</i> | LC | US | 115 | 8.2,2,8.2,2,8.2,2,8.2,2,8.2,2,8.2,2 | <i>Quercus</i> |
| <i>Quercus microphylla</i> | LC | MX | 11 | 7.1.2 | <i>Quercus</i> |
| <i>Quercus minima</i> | LC | US | 12 | 7.1,2,1.1,2,3,3,2,2,2 | <i>Virentes</i> |
| <i>Quercus miquihuanensis</i> | EN | MX | 12 | 5.3,1,2,3,2 | <i>Lobatae</i> |
| <i>Quercus miyagii</i> | LC | JP | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus mohriana</i> | LC | MX,US | 18 | - | <i>Quercus</i> |
| <i>Quercus mongolica</i> | LC | CN,JP,KP,KR,MN,RU | 150 | 5.3,2 | <i>Quercus</i> |
| <i>Quercus monimotricha</i> | LC | CN,MM | 10 | - | <i>Ilex</i> |
| <i>Quercus monnula</i> | CR | CN | 0 | 1.1,2,1.3 | <i>Quercus</i> |
| <i>Quercus montana</i> | LC | US | 165 | 8.1,2,8.2,2,8.2,2,8.2,2,8.2,2,11.1 | <i>Quercus</i> |
| <i>Quercus morii</i> | LC | TW | 18 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus motuoensis</i> | CR | CN | 0 | 1.1,2,1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus muehlenbergii</i> | LC | CA,MX,US | 184 | 8.2,2,7.1,1,8.1,2,8.2,2,8.2,2,11.1 | <i>Quercus</i> |
| <i>Quercus mulleri</i> | CR | MX | 0 | 5.3,4,4,1,2,2,3,2,1,4 | <i>Lobatae</i> |
| <i>Quercus myrsinifolia</i> | LC | CN,HK,JP,KR,LA,TH,TW,VN | 108 | 8.2,2 | <i>Cyclobalanopsis</i> |
| <i>Quercus myrtifolia</i> | LC | US | 24 | 7.1,2,1,2,1,1 | <i>Lobatae</i> |
| <i>Quercus nigra</i> | LC | US | 128 | 8.4.1 | <i>Lobatae</i> |
| <i>Quercus ningangensis</i> | DD | CN | 3 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus ningqiangensis</i> | DD | CN | 0 | - | <i>Quercus</i> |
| <i>Quercus nivea</i> | EN | MY | 0 | 2.2,2,7,1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus nixoniana</i> | EN | MX | 0 | 5.3,2,2,1,3,4,1 | <i>Lobatae</i> |
| <i>Quercus obconicus</i> | EN | CN | 0 | 2.2,2 | <i>Cyclobalanopsis</i> |
| <i>Quercus oblongata</i> | NT | BD,IN,MM,NP,PK,TH,VN | 16 | 5.3,1,5,3,2,2,1,4 | <i>Cyclobalanopsis</i> |
| <i>Quercus oblongifolia</i> | LC | MX,US | 23 | 2.3,2,8,2,2 | <i>Quercus</i> |
| <i>Quercus obtusata</i> | LC | MX | 27 | 5.3,5,2,3,4 | <i>Quercus</i> |
| <i>Quercus oglethorpensis</i> | EN | US | 47 | 8.1,2,8.1,2,8.1,2,2,1,4,2,2,2,1,2, 11,2,7,1.1,1,11,4,7,2,11 | <i>Quercus</i> |
| <i>Quercus oidocarpa</i> | NT | ID,MM,MY,TH,VN | 1 | 2.1,3,7,1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus oleoides</i> | NT | BZ,CR,GT,HN,MX | 12 | 1.1,5,3,1,2,3,2 | <i>Virentes</i> |
| <i>Quercus opaca</i> | DD | MX | 1 | - | <i>Quercus</i> |
| <i>Quercus oxyodon</i> | LC | BD,BT,CN,IN,MM,NP,TH | 15 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus oxyphylla</i> | NT | CN | 0 | 1.1,2,1.3 | <i>Ilex</i> |
| <i>Quercus pachyloma</i> | LC | CN,TW | 6 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus pacifica</i> | EN | US | 22 | 2.3,2,8.1,2,8.1,2,6,1,8.1,2,8.1,2,8.1,2, 1,3,9,5,4,5,3,1,3,2 | <i>Quercus</i> |
| <i>Quercus pagoda</i> | LC | US | 60 | 8.4,2,11,1 | <i>Lobatae</i> |
| <i>Quercus palmeri</i> | NT | MX,US | 29 | 1.1,11,1,1,11,2,8,2,1,1,3,7,1,3 | <i>Protobalanus</i> |
| <i>Quercus palustris</i> | LC | CA,US | 263 | 8.4,1,8,4,2,11,1 | <i>Lobatae</i> |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | <i>Quercus</i> section |
|-------------------------------------|------------------------|--|--------------------------------------|---|------------------------|
| <i>Quercus pannosa</i> * | LC | CN | 0 | - | <i>Ilex</i> |
| <i>Quercus parvula</i> | NT | US | 25 | 1.1,2.3.4.6.1.7.1.1.8.1.2,11.2 | <i>Quercus</i> |
| <i>Quercus pauciradiata</i> | DD | ES | 0 | 8.3,12.1,1.1 | <i>Quercus</i> |
| <i>Quercus paxtalensis</i> | DD | MX | 0 | 7.1.1.5.3.2,2.3.3 | <i>Lobatae</i> |
| <i>Quercus peduncularis</i> | LC | BZ,GT,HN,MX,SV | 8 | 11.1 | <i>Quercus</i> |
| <i>Quercus peninsularis</i> | NT | MX | 2 | 2.3.2 | <i>Lobatae</i> |
| <i>Quercus pentacycla</i> | DD | CN | 2 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus percoriacea</i> | EN | MY | 0 | 2.1.3,7.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus perpallida</i> | DD | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus persica</i> | NT | IQ,IR | 0 | 5.3.1,5.3.2 | <i>Cerris</i> |
| <i>Quercus petelotii</i> | EN | VN | 0 | 5.3.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus petraea</i> | LC | AL,AM,AT,AZ,BA,BE,BG,BY,CH,CZ,DE,DK,ES,FR,GB,GE,HR,HU,IE,IR,IT,LT,ME,MK,NL,NO,PL,RO,RS,RU,SI,SK,SY,TR,UA | 178 | 8.1.2,2.2.2.5.3.2,5.3.1,11.1.8.1.2 | <i>Quercus</i> |
| <i>Quercus phanera</i> | EN | CN | 1 | 1.1,2.1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus phellos</i> | LC | US | 180 | 8.4.1 | <i>Lobatae</i> |
| <i>Quercus phillyreoides</i> | LC | CN,JP,KP,KR | 105 | - | <i>Ilex</i> |
| <i>Quercus pinbianensis</i> | CR | CN | 0 | 2.2.2,2.1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus pinnativenulosa</i> | NT | MX | 6 | 1.1,2.1.2,5.3.4 | <i>Lobatae</i> |
| <i>Quercus planipocula</i> | LC | MX | 2 | 2.1.3,7.1.1 | <i>Lobatae</i> |
| <i>Quercus platycalyx</i> | DD | CN,VN | 0 | 2.2.2,1.1,5.3.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus poilanei</i> | LC | CN,TH,VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus polymorpha</i> | LC | GT,HN,MX,US | 47 | 5.2.1,5.3.1,11.1 | <i>Quercus</i> |
| <i>Quercus pontica</i> | EN | GE,TR | 91 | 2.3.1,5.3.1,5.3.2 | <i>Ponticae</i> |
| <i>Quercus porphyrogenita</i> * | DD | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus potosina</i> | LC | MX | 4 | 5.3.2,2.1.3,8.4.1,2.3.3 | <i>Quercus</i> |
| <i>Quercus praeco</i> | LC | MX | 1 | 5.3.5,2.3.4 | <i>Quercus</i> |
| <i>Quercus pringlei</i> | LC | MX | 8 | 2.3.2,7.1.1,2.1.2 | <i>Quercus</i> |
| <i>Quercus prinoides</i> | LC | CA,US | 70 | 11.1 | <i>Quercus</i> |
| <i>Quercus protoroburooides</i> * | DD | BG | 0 | - | <i>Quercus</i> |
| <i>Quercus pseudosetulosa</i> | CR | CN | 0 | 11.1 | <i>Ilex</i> |
| <i>Quercus pseudoverticillata</i> * | CR | MY | 0 | 2.2.2,7.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus pubescens</i> | LC | AL,AT,BE,BG,CH,CZ,DE,ES,FR,GR,HR,IT,MD,ME,MK,RO,RS,RU,SI,SK,TR,UA | 136 | 11.3,1.1,8.2,7.1.1 | <i>Quercus</i> |
| <i>Quercus pumila</i> | LC | US | 27 | 7.1.2 | <i>Lobatae</i> |
| <i>Quercus pungens</i> | LC | MX,US | 24 | - | <i>Quercus</i> |
| <i>Quercus purulhana</i> | NT | BZ,GT,HN,MX,NI | 0 | 7.1.1,5.3.2,1.1,2.3.3 | <i>Quercus</i> |
| <i>Quercus pyrenaica</i> | LC | ES,FR,MA,PT | 89 | 2.1.3,8.2.1,8.2.2,1.2,7.1.1,2.3.3,2.3.2,2.2.2,11.5,11.2 | <i>Quercus</i> |
| <i>Quercus quangtriensis</i> | VU | CN,LA,MM,TH,VN | 0 | 2.2.2,1.1,5.3.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus radiata</i> | EN | MX | 0 | 2.3.2,4.1,2.2.2 | <i>Lobatae</i> |
| <i>Quercus ramsbottomii</i> | EN | MM,TH | 0 | 2.1.4,2.2.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus rehderiana</i> | LC | CN,TH | 6 | - | <i>Ilex</i> |
| <i>Quercus rekonis</i> | DD | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus repanda</i> | LC | MX | 5 | - | <i>Quercus</i> |
| <i>Quercus resinosa</i> | LC | MX | 3 | 11.5 | <i>Quercus</i> |
| <i>Quercus rex</i> | LC | CN,IN,LA,MM,TH,VN | 2 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus robur</i> | LC | AL,AM,AT,AZ,BA,BE,BG,BY,CH,CZ,DE,DK,EE,ES,FI,FR,GB,GE,GR,HR,HU,IE,IR,IT,KZ,LT,LU,LV,MD,ME,MK,NL,NO,PL,PT,RO,RS,RU,SE,SI,SK,TR,UA | 332 | 8.1.2,5.3.2,1.1,2.3.4,2.2.3,11.4,11.3,11.2,11.1,2.1.4,8.3,8.1.2 | <i>Quercus</i> |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | <i>Quercus</i> section |
|--------------------------------|------------------------|----------------------------|--------------------------------------|-----------------------------------|------------------------|
| <i>Quercus robusta</i> | DD | MX,US | 2 | 7.1.3,6.1,11.4,11.2 | <i>Lobatae</i> |
| <i>Quercus rotundifolia</i> | LC | DZ,ES,FR,MA,PT | 47 | 2.1.2,2.3.2,11.2,11.3,7.1.1,8.1.2 | <i>Ilex</i> |
| <i>Quercus rubra</i> | LC | CA,US | 334 | 11.2,11.3,8.4.2 | <i>Lobatae</i> |
| <i>Quercus rubramenta</i> | VU | MX | 0 | 2.1.3,2.1.2,2.3.2 | <i>Lobatae</i> |
| <i>Quercus rugosa</i> | LC | GT,HN,MX,US | 70 | 11.1,5.2,1.7,1.1,5.3,1,1.1 | <i>Quercus</i> |
| <i>Quercus runcinatifolia</i> | EN | MX | 1 | 1.1,2.3,2.5,3.1 | <i>Lobatae</i> |
| <i>Quercus rupestris</i> | EN | VN | 0 | 5.3.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus rysophylla</i> | NT | MX | 53 | 5.3.5,1.2 | <i>Lobatae</i> |
| <i>Quercus sadleriana</i> | NT | US | 25 | 1.1,6.1,4.1,7.1,2.5,3.2,2.3,2,3.2 | <i>Ponticae</i> |
| <i>Quercus sagrana</i> | EN | CU | 1 | 7.1.1,2.3,3.2 | <i>Virentes</i> |
| <i>Quercus salicifolia</i> | LC | CR,GT,HN,MX,NI,PA,SV | 4 | 5.3.2,2.3.2 | <i>Lobatae</i> |
| <i>Quercus salicina</i> | LC | JP,KR | 44 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus saltillensis</i> | NT | MX | 7 | 2.3.2,2.1,1.1,1.1 | <i>Lobatae</i> |
| <i>Quercus sapotifolia</i> | LC | BZ,CR,GT,HN,MX,PA,SV | 2 | - | <i>Lobatae</i> |
| <i>Quercus sarahmariae*</i> | DD | CR | 0 | - | <i>Lobatae</i> |
| <i>Quercus saravanensis</i> | DD | CN,LA,TH | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus sartorii</i> | NT | MX | 24 | 2.3.2,11.5 | <i>Lobatae</i> |
| <i>Quercus schottkyana</i> | LC | CN | 19 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus scytophylla</i> | LC | MX | 8 | 5.3.1,2.3.3 | <i>Lobatae</i> |
| <i>Quercus sebifera</i> | LC | MX | 6 | 5.3.2,2.3.3 | <i>Quercus</i> |
| <i>Quercus segoviensis</i> | LC | GT,HN,MX,NI,SV | 0 | 2.3.2 | <i>Quercus</i> |
| <i>Quercus semecarpifolia</i> | LC | AF,CN,IN,NP,PK | 19 | - | <i>Ilex</i> |
| <i>Quercus semiserrata</i> | LC | BD,BT,CN,ID,IN,MM,MY,TH,VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus semiserratoides</i> | CR | CN | 2 | 2.2.2,5.3.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus senescens</i> | LC | CN | 5 | - | <i>Ilex</i> |
| <i>Quercus serrata</i> | LC | CN,JP,KP,KR,TW | 127 | 2.1.1,1.1 | <i>Quercus</i> |
| <i>Quercus sessilifolia</i> | LC | CN,JP,TH,TW | 23 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus setulosa</i> | LC | CN,LA,TH,VN | 0 | - | <i>Ilex</i> |



Quercus magnoliifolia, LC (Béatrice Chassé)



Quercus insignis, EN (Diego Gomez Hoyos)

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | Quercus section |
|----------------------------------|------------------------|-------------------------------|--------------------------------------|---|------------------------|
| <i>Quercus shangxiensis</i> | DD | CN | 0 | - | <i>Ilex</i> |
| <i>Quercus shennongii</i> | DD | CN | 0 | - | <i>Quercus</i> |
| <i>Quercus shingjenensis</i> | DD | CN | 0 | - | <i>Quercus</i> |
| <i>Quercus shumardii</i> | LC | CA,US | 173 | 8.4.2,11.1 | <i>Lobatae</i> |
| <i>Quercus sichouensis</i> | CR | CN | 1 | 2.1.4,5.3.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus sideroxyla</i> | LC | MX | 8 | 5.3.2,2.3.2,11.1,2.2.2 | <i>Lobatae</i> |
| <i>Quercus similis</i> | LC | US | 3 | 11.1 | <i>Quercus</i> |
| <i>Quercus sinuata</i> | LC | MX,US | 40 | - | <i>Quercus</i> |
| <i>Quercus skinneri</i> | NT | BZ,GT,HN,MX,SV | 5 | 5.3.1,2.3.3 | <i>Lobatae</i> |
| <i>Quercus sororia</i> | LC | MX | 0 | 1.1,2.3.3 | <i>Quercus</i> |
| <i>Quercus spinosa</i> | LC | CN,MM,TW | 17 | - | <i>Ilex</i> |
| <i>Quercus steenisii</i> | EN | ID | 0 | 2.1.4,5.3.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus stellata</i> | LC | US | 107 | 8.4.1,8.2.2 | <i>Quercus</i> |
| <i>Quercus stenophylloides</i> | LC | TW | 30 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus stewardiana</i> | LC | CN | 5 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus striatula</i> | LC | MX | 5 | 1.3,1.2 | <i>Quercus</i> |
| <i>Quercus suber</i> | LC | DZ,ES,FR,IT,MA,PT,TN | 197 | 2.1.4,8.2.1,8.2,7.3,7.1.1,11.2 | <i>Cerris</i> |
| <i>Quercus subsericea</i> | NT | BN,ID,MY | 3 | 2.2.2,7.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus subspathulata</i> | LC | MX | 7 | 5.3.3,5.3.1 | <i>Quercus</i> |
| <i>Quercus sumatrana</i> | NT | ID,MY | 0 | 2.2.2,7.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus supranitida</i> | DD | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus tarahumara</i> | LC | MX | 6 | 5.3.1,1.1 | <i>Lobatae</i> |
| <i>Quercus tardifolia</i> | DD | MX,US | 0 | - | <i>Lobatae</i> |
| <i>Quercus tarokoensis</i> | DD | TW | 6 | - | <i>Ilex</i> |
| <i>Quercus tatakaensis</i> | DD | TW | 5 | - | <i>Ilex</i> |
| <i>Quercus texana</i> | LC | US | 104 | 8.4.2,11.1 | <i>Lobatae</i> |
| <i>Quercus thomsoniana</i> | CR | BD,BT,IN | 0 | 1.1,5.3.4,2.1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus thorelii</i> | DD | CN,LA,TH,VN | 1 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus tiaoloshanica</i> | EN | CN | 0 | 2.2.2 | <i>Cyclobalanopsis</i> |
| <i>Quercus tinkhamii</i> | DD | MX | 3 | - | <i>Quercus</i> |
| <i>Quercus tomentella</i> | EN | MX,US | 33 | 2.1.2,8.1.2,8.1.2,2.3.2,8.1.2,8.2.2,8.2.2,8.2.2,8.1.2,8.1.2,8.1.2,8.1.2 | <i>Quercus</i> |
| <i>Quercus tomentosinervis</i> | CR | CN | 0 | 5.3.1,2.1.4,7.1.1,1.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus toumeyi</i> | DD | MX,US | 8 | 8.2.2 | <i>Quercus</i> |
| <i>Quercus toxicodendrifolia</i> | DD | MX | 1 | - | <i>Quercus</i> |
| <i>Quercus treubiana</i> | VU | ID,MY | 0 | 2.2.2,7.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus trinitatis</i> | DD | MX,SV | 0 | 5.3.2,2.1.3,5.3.4 | <i>Lobatae</i> |
| <i>Quercus trojana</i> | LC | AL,BA,BG,GR,HR,IT,ME,MK,RS,TR | 76 | 5.3.1 | <i>Cerris</i> |
| <i>Quercus trungkhanhensis*</i> | CR | VN | 0 | 6.3 | <i>Ilex</i> |
| <i>Quercus tsinglingensis</i> | DD | CN | 0 | - | <i>Quercus</i> |
| <i>Quercus tuberculata</i> | LC | MX | 7 | - | <i>Quercus</i> |
| <i>Quercus tuitensis</i> | VU | MX | 0 | 2.1.2,5.3.2,5.3.4 | <i>Lobatae</i> |
| <i>Quercus tungmaiensis</i> | EN | CN,IN | 3 | 1.1,2.1.3 | <i>Ilex</i> |
| <i>Quercus turbinella</i> | LC | MX,US | 54 | - | <i>Quercus</i> |
| <i>Quercus undata</i> | DD | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus ungeri</i> | DD | IR | 0 | - | <i>Cerris</i> |
| <i>Quercus urbani</i> | LC | MX | 1 | - | <i>Lobatae</i> |
| <i>Quercus utilis</i> | EN | CN | 2 | 1.1,4.1,5.3.1,5.3.4 | <i>Ilex</i> |
| <i>Quercus uxoris</i> | LC | MX | 7 | 5.3.1,2.1.2,4.1 | <i>Lobatae</i> |
| <i>Quercus vacciniifolia</i> | LC | US | 38 | 5.3.2,11.1,7.1.2 | <i>Protobalanus</i> |
| <i>Quercus valdinervosa</i> | NT | BN,ID,MY | 0 | 2.2.2,7.1.1 | <i>Cyclobalanopsis</i> |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | <i>Quercus</i> section |
|--------------------------------|------------------------|----------------------|--------------------------------------|------------------------|------------------------|
| <i>Quercus variabilis</i> | LC | CN,HK,JP,KP,KR,TW,VN | 137 | 6.3 | <i>Cerris</i> |
| <i>Quercus vaseyana</i> | LC | MX,US | 32 | - | <i>Quercus</i> |
| <i>Quercus velutina</i> | LC | CA,US | 182 | 11.2,8.4,2,8.1.2 | <i>Lobatae</i> |
| <i>Quercus verde</i> | DD | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus vestita</i> | DD | IN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus vicentensis</i> | VU | MX,SV | 1 | 5.3.5,1.1 | <i>Quercus</i> |
| <i>Quercus viminea</i> | LC | MX,US | 3 | 5.2.1,2.3.2,5.2.2,11.1 | <i>Lobatae</i> |
| <i>Quercus virginiana</i> | LC | US | 132 | 7.1.1,11.3,8.4.2 | <i>Virentes</i> |
| <i>Quercus vulcanica</i> | LC | SY,TR | 15 | 1.3 | <i>Quercus</i> |
| <i>Quercus wislizeni</i> | LC | MX,US | 64 | 2.3.2,11.1,7.1.2 | <i>Lobatae</i> |
| <i>Quercus wutaishanica</i> | LC | CN | 33 | - | <i>Quercus</i> |
| <i>Quercus xalapensis</i> | LC | GT,HN,MX,NI | 15 | - | <i>Lobatae</i> |
| <i>Quercus xanthoclada</i> | DD | LA,MM,VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus xanthotricha</i> * | EN | CN,LA | 0 | 2.1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus xuanlienensis</i> * | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus xylina</i> | NT | MX | 0 | 2.3.2,2.1.2 | <i>Quercus</i> |
| <i>Quercus yonganensis</i> | DD | CN | 0 | - | <i>Cyclobalanopsis</i> |

*Assessments to be published in the first IUCN Red List update of 2021

Data sources for Appendices B and C

Country/Territory distribution

Country/territory codes follow the International Organization for Standardization ISO-3166-1. A list of all countries and territories used in IUCN's Red List of Threatened Species can be found online ([iucnredlist.org/resources/country-codes](https://www.iucnredlist.org/resources/country-codes)).

Number of *ex situ* collections

Based on combined results from: 1) 2017 *ex situ* survey conducted by The Morton Arboretum (Beckman *et al.*, 2019); 2) 2019 survey conducted for a project funded through the Institute of Museum and Library Services (award #MA-30-18-0273-18); 3) 2020 survey funded by the USDA Forest Service (cooperative agreement #16-CA-11132546-045) and Fondation Franklinia to support the conservation work of the Global Conservation Consortium for Oak; and 4) records held in BGCI's PlantSearch database of plants in cultivation (tools.bgci.org/plant_search.php; accessed May, 2020).

Threat codes

Threat codes follow IUCN's Threats Classification Scheme (Version 3.2) found online ([iucnredlist.org/resources/threat-classification-scheme](https://www.iucnredlist.org/resources/threat-classification-scheme))

Quercus section

Assessed species were matched to the most recent phylogenetic studies of oaks (Denk *et al.*, 2017; Hipp *et al.*, 2020). Thirty-five species assessed for this report were not included in either of these phylogenetic studies. For these species, a literature review was conducted to determine their section and/or regional oak experts were consulted to assign a section (A. Coombes and J. Strijk, pers. comm.).



Quercus ajoensis, VU (Beth Fallon)



Quercus havardii, LC (Emily Beckman)

APPENDIX C:

FULL LIST OF EVALUATED QUERCUS SPECIES BY RED LIST CATEGORY

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | Quercus section |
|-----------------------------------|------------------------|----------------------|--------------------------------------|---|------------------------|
| <i>Quercus albicaulis</i> | CR | CN | 0 | 2.2,3,5,3.1,5,3.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus argyrotricha</i> | CR | CN | 4 | 6.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus baniensis</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus baolamensis</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus bawanglingensis</i> | CR | CN | 0 | 2.2,3,5,3.3 | <i>Ilex</i> |
| <i>Quercus bidoupensis</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus blaoensis</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus boyntonii</i> | CR | US | 21 | 9.4,1,3,5,3.1,6.1 | <i>Quercus</i> |
| <i>Quercus cambodiensis</i> | CR | KH | 0 | 1.1,5,3.5 | <i>Lobatae</i> |
| <i>Quercus camusiae</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus dankiaensis</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus dilacerata</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus dinghuensis</i> | CR | CN | 1 | 1.1,5,3.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus donnaiensis</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus fimbriata</i> | CR | CN | 0 | 1.1 | <i>Ilex</i> |
| <i>Quercus graciliformis</i> | CR | MX,US | 21 | 6.1,7,2,8,8.2,2,7,1.3 | <i>Lobatae</i> |
| <i>Quercus hinckleyi</i> | CR | MX,US | 12 | 8.2,2,8.2,2,11.1,2,3,4,4.1,1,3,8.2.1 | <i>Quercus</i> |
| <i>Quercus honbaensis</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus lungmaiensis</i> | CR | CN | 1 | 2.1.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus marlipoensis</i> | CR | CN | 1 | 1.1,5,3.1 | <i>Ilex</i> |
| <i>Quercus monnula</i> | CR | CN | 0 | 1.1,2,1.3 | <i>Quercus</i> |
| <i>Quercus motuoensis</i> | CR | CN | 0 | 1.1,2,1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus mulleri</i> | CR | MX | 0 | 5.3,4,4.1,2,2,3,2,1.4 | <i>Lobatae</i> |
| <i>Quercus pinbianensis</i> | CR | CN | 0 | 2.2,2,2,1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus pseudosetulosa*</i> | CR | CN | 0 | 11.1 | <i>Ilex</i> |
| <i>Quercus pseudoverticillata</i> | CR | MY | 0 | 2.2,2,7,1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus semiserratooides</i> | CR | CN | 2 | 2.2,2,5,3.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus sichouensis</i> | CR | CN | 1 | 2.1,4,5,3.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus thomsoniana</i> | CR | BD,BT,IN | 0 | 1.1,5,3,4,2,1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus tomentosinervis</i> | CR | CN | 0 | 5.3,1,2,1,4,7,1,1,1,1 | <i>Cyclobalanopsis</i> |
| <i>Quercus trungkhanhensis*</i> | CR | VN | 0 | 6.3 | <i>Ilex</i> |
| <i>Quercus xuanlienensis*</i> | CR | VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus acerifolia</i> | EN | US | 44 | 3,2,2,3,2,7,1,2,5,3,4,1,3,8,4,1,6,1,1,2,9,4 | <i>Lobatae</i> |
| <i>Quercus arbutifolia</i> | EN | CN,VN | 0 | 11,1,1,1 | <i>Cyclobalanopsis</i> |
| <i>Quercus asymmetrica</i> | EN | CN,VN | 0 | 1,1,1,2,5,3,4,6,3 | <i>Cyclobalanopsis</i> |
| <i>Quercus bambusifolia</i> | EN | CN,HK,VN | 4 | 12,1,2,1,3 | <i>Cyclobalanopsis</i> |
| <i>Quercus brandegeei</i> | EN | MX | 9 | 2,3,2,1,3,11,2,5,3,1 | <i>Virentes</i> |
| <i>Quercus carmenensis</i> | EN | MX,US | 3 | 8,2,2,2,3,2 | <i>Quercus</i> |
| <i>Quercus chrysotricha</i> | EN | MY | 0 | 5,3,5 | <i>Cyclobalanopsis</i> |
| <i>Quercus cualensis</i> | EN | MX | 1 | 3,2,1,3,2,3,2,5,3,5 | <i>Lobatae</i> |
| <i>Quercus cupreata</i> | EN | MX | 4 | 1,1,2,3,2,5,3,1 | <i>Lobatae</i> |
| <i>Quercus daimingshanensis</i> | EN | CN | 0 | 1,1,2,1,4,4,1,5,3,1 | <i>Cyclobalanopsis</i> |
| <i>Quercus delgadoana</i> | EN | MX | 9 | 2,1,2,5,3,1,5,3,3 | <i>Lobatae</i> |
| <i>Quercus delicatula</i> | EN | CN | 0 | 1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus devia</i> | EN | MX | 0 | 2,3,2 | <i>Lobatae</i> |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | Quercus section |
|-------------------------------|------------------------|----------------------|--------------------------------------|---|------------------------|
| <i>Quercus disciformis</i> | EN | CN | 2 | 1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus diversifolia</i> | EN | MX | 3 | 1.2,1.1 | <i>Quercus</i> |
| <i>Quercus dumosa</i> | EN | MX,US | 30 | 1.3,7.1.3,1.1,6.1,8.2,2.8.2,2.8.2.2 | <i>Quercus</i> |
| <i>Quercus edithiae</i> | EN | CN,HK,VN | 0 | 1.1,5.3.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus engelmannii</i> | EN | MX,US | 36 | 1.2,1.1,2.3,4.7.1.1,8.2.2,11.1,8.2.2 | <i>Quercus</i> |
| <i>Quercus flocculenta</i> | EN | MX | 3 | 1.1,5.3.3 | <i>Lobatae</i> |
| <i>Quercus galeanensis</i> | EN | MX | 8 | 2.1,2,5.3.2,1.1,2.3.2 | <i>Lobatae</i> |
| <i>Quercus georgiana</i> | EN | US | 55 | 11.1,11.2,6.1,8.2.2 | <i>Lobatae</i> |
| <i>Quercus havardii</i> | EN | US | 19 | 3.1,2.3,3.9,3.3 | <i>Quercus</i> |
| <i>Quercus hintonii</i> | EN | MX | 3 | 2.1,2,1.1,2.3,2.4,1.5,3.1,7.1.1 | <i>Lobatae</i> |
| <i>Quercus hirtifolia</i> | EN | MX | 7 | 5.3.3,1.2,4.1,2.3.2,11.2,11.1 | <i>Lobatae</i> |
| <i>Quercus insignis</i> | EN | BZ,CR,GT,HN,MX,NI,PA | 27 | 2.1,2,2.3,2,5.3.1 | <i>Quercus</i> |
| <i>Quercus kinabaluensis</i> | EN | MY | 0 | 2.2,2,7.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus kingiana</i> | EN | CN,LA,MM,TH | 0 | 1.1,2.1,4,2.2,3.5,3.1,5.3.3 | <i>Ilex</i> |
| <i>Quercus kiukiangensis</i> | EN | CN | 4 | 5.3,5,7.1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus kotschyana</i> | EN | LB | 0 | 2.3,2,5.3.1,11.1 | <i>Quercus</i> |
| <i>Quercus kouangsiensis</i> | EN | CN | 0 | 2.1,3,4,1,5.3.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus lenticellata</i> | EN | TH | 0 | 5.3,5,7.1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus liboensis</i> | EN | CN | 2 | 1.1,2.1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus lobbii</i> | EN | BD,CN,IN | 0 | 5.3.5 | <i>Cyclobalanopsis</i> |
| <i>Quercus lodicosa</i> | EN | CN,IN,MM | 0 | 5.3.5 | <i>Ilex</i> |
| <i>Quercus look</i> | EN | LB,SY | 16 | 2.3,2,11.1 | <i>Cerris</i> |
| <i>Quercus macdougalii</i> | EN | MX | 0 | 2.3,2,5.3,4,7.1.1 | <i>Quercus</i> |
| <i>Quercus miquihuanensis</i> | EN | MX | 12 | 5.3.1,2.3.2 | <i>Lobatae</i> |
| <i>Quercus nivea</i> | EN | MY | 0 | 2.2,2,7.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus nixoniana</i> | EN | MX | 0 | 5.3,2.2,1.3,4.1 | <i>Lobatae</i> |
| <i>Quercus obconicus</i> | EN | CN | 0 | 2.2.2 | <i>Cyclobalanopsis</i> |
| <i>Quercus oglethorpensis</i> | EN | US | 47 | 8.1,2,8.1,2,8.1,2,2.1,4,2,2.2,1,2,11.2,7.1.1,11.4,7,2.11 | <i>Quercus</i> |
| <i>Quercus pacifica</i> | EN | US | 22 | 2.3,2,8.1,2,8.1,2,6.1,8.1,2,8.1,2,8.1,2,1.3,9,5.4,5.3,1,3.2 | <i>Quercus</i> |
| <i>Quercus percoriacea</i> | EN | MY | 0 | 2.1,3,7.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus petelotii</i> | EN | VN | 0 | 5.3.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus phanera</i> | EN | CN | 1 | 1.1,2.1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus pontica</i> | EN | GE,TR | 91 | 2.3,1,5.3,1,5.3.2 | <i>Ponticae</i> |
| <i>Quercus radiata</i> | EN | MX | 0 | 2.3,2,4,1,2,2.2 | <i>Lobatae</i> |
| <i>Quercus ramsbottomii</i> | EN | MM,TH | 0 | 2.1,4,2,2.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus runcinatifolia</i> | EN | MX | 1 | 1.1,2,3,2,5.3.1 | <i>Lobatae</i> |
| <i>Quercus rupestris</i> | EN | VN | 0 | 5.3.4 | <i>Cyclobalanopsis</i> |
| <i>Quercus sagraana</i> | EN | CU | 1 | 7.1.1,2.3,3,3.2 | <i>Virentes</i> |
| <i>Quercus steenisii</i> | EN | ID | 0 | 2.1,4,5.3.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus tiaoloshanica</i> | EN | CN | 0 | 2.2.2 | <i>Cyclobalanopsis</i> |
| <i>Quercus tomentella</i> | EN | MX,US | 33 | 2.1,2,8.1,2,8.1,2,2,3,2,8.1,2,8.2,2,8.2.2,8.2,2,8.1,2,8.1,2,8.1,2,8.1.2 | <i>Quercus</i> |
| <i>Quercus tungmaiensis</i> | EN | CN,IN | 3 | 1.1,2.1.3 | <i>Ilex</i> |
| <i>Quercus utilis</i> | EN | CN | 2 | 1.1,4,1,5.3,1,5.3.4 | <i>Ilex</i> |
| <i>Quercus xanthotricha*</i> | EN | CN,LA | 0 | 2.1.3 | <i>Cyclobalanopsis</i> |
| <i>Quercus acutifolia</i> | VU | BZ,GT,HN,MX | 34 | 2.3,4,11.2,11.1,2,1,4,5.3.4 | <i>Lobatae</i> |
| <i>Quercus afares</i> | VU | DZ,TN | 18 | 2.1,1,6.3,1,2,2,3,2,4.1 | <i>Cerris</i> |
| <i>Quercus ajoensis</i> | VU | MX,US | 5 | 11.2,8.2 | <i>Quercus</i> |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | Quercus section |
|--------------------------------------|------------------------|-------------------------|--------------------------------------|---|-----------------|
| <i>Quercus arkansana</i> | VU | US | 48 | 2.1.3,1.3,5.3.4.7.3,7.1.1.8.1.2,9.3.3,11.1,11.2 | Lobatae |
| <i>Quercus austrina</i> | VU | US | 25 | 2.1.2,2.1.3,3.1.5.3.1,8.2.1,11.2,6.1 | Quercus |
| <i>Quercus austrocochinchinensis</i> | VU | CN,LA,TH,VN | 0 | 8.2.2,1.1,5.3.3 | Cyclobalanopsis |
| <i>Quercus braianensis</i> | VU | LA,VN | 0 | 2.1.4 | Cyclobalanopsis |
| <i>Quercus cedrosensis</i> | VU | MX,US | 2 | 6.2,7.1.3,4.1,5.3.1 | Protobalanus |
| <i>Quercus costaricensis</i> | VU | CR,HN,PA | 2 | 5.3.1,4.1,11.1,7.1.1,10.3,5.3.1,4.1 | Lobatae |
| <i>Quercus furfuracea</i> | VU | MX | 5 | 5.3.4,5.3.1,2.3.3 | Lobatae |
| <i>Quercus gaharuensis</i> | VU | ID,MY | 0 | 2.2.3,5.3.5,1.1 | Cyclobalanopsis |
| <i>Quercus guillemi-treleasei</i> | VU | CR,PA | 2 | 5.3.5 | Lobatae |
| <i>Quercus hintoniorum</i> | VU | MX | 6 | 7.1.1,1.1,2.1.2 | Lobatae |
| <i>Quercus hondae</i> | VU | JP | 2 | 2.1.4 | Cyclobalanopsis |
| <i>Quercus kerangasensis</i> | VU | BN,ID,MY | 0 | 2.2,2,7.1.1 | Cyclobalanopsis |
| <i>Quercus litseoides</i> | VU | CN,HK | 1 | 11.1,1.3 | Cyclobalanopsis |
| <i>Quercus meavei</i> | VU | MX | 1 | 5.3.3,1.2,4.1,2.3.2,11.1,11.2 | Lobatae |
| <i>Quercus merrillii</i> | VU | ID,MY,PH | 0 | 2.2,2,7.1.1 | Cyclobalanopsis |
| <i>Quercus quangtrienensis</i> | VU | CN,LA,MM,TH,VN | 0 | 2.2,2,1.1,5.3.4 | Cyclobalanopsis |
| <i>Quercus rubramenta</i> | VU | MX | 0 | 2.1.3,2.1.2,2.3.2 | Lobatae |
| <i>Quercus treubiana</i> | VU | ID,MY | 0 | 2.2,2,7.1.1 | Cyclobalanopsis |
| <i>Quercus tuitensis</i> | VU | MX | 0 | 2.1,2,5.3,2,5.3.4 | Lobatae |
| <i>Quercus vicentensis</i> | VU | MX,SV | 1 | 5.3.5,1.1 | Quercus |
| <i>Quercus ariifolia*</i> | NT | MX | 1 | 11.2,11.3 | Quercus |
| <i>Quercus bella</i> | NT | CN,VN | 1 | 2.2.2 | Cyclobalanopsis |
| <i>Quercus benthamii</i> | NT | CR,GT,HN,MX,NI,PA,SV | 15 | 5.3.1,2.1.3,2.3.3 | Lobatae |
| <i>Quercus castaneifolia</i> | NT | AZ,IR | 105 | 2.1.4,2.3.4 | Cerris |
| <i>Quercus chenii</i> | NT | CN | 38 | 2.1.4,1.1,5.3.5 | Cerris |
| <i>Quercus cortesii</i> | NT | BZ,CR,GT,HN,MX,NI,PA,SV | 0 | 1.2,2.1.3 | Lobatae |
| <i>Quercus crispifolia</i> | NT | GT,MX | 0 | 3.3,2.1.3 | Lobatae |
| <i>Quercus crispipilis</i> | NT | GT,MX | 7 | 5.3,2,11.1,2.3.3 | Lobatae |
| <i>Quercus durifolia</i> | NT | MX | 10 | 2.1,4,2.3,4,5.3.1 | Lobatae |
| <i>Quercus elmeri</i> | NT | BN,ID,MY | 1 | 2.1,4,7,1.3 | Cyclobalanopsis |
| <i>Quercus hypargyrea</i> | NT | CN | 21 | 1.1,5.3.5 | Cyclobalanopsis |
| <i>Quercus hypophaea</i> | NT | TW | 1 | 1.1,4.1 | Cyclobalanopsis |
| <i>Quercus iltisii</i> | NT | MX | 0 | 5.3.4,4.1,1.1,2.3.4,2.1.4 | Lobatae |
| <i>Quercus jenseniana</i> | NT | CN | 3 | 5.3.5,2.1.4 | Cyclobalanopsis |
| <i>Quercus lamellosa</i> | NT | BT,CN,IN,MM,NP,TH | 11 | 2.1,4,5.3,3.5,3.4,7.1.3 | Cyclobalanopsis |
| <i>Quercus langbianensis</i> | NT | VN | 0 | - | Cyclobalanopsis |
| <i>Quercus lobata</i> | NT | US | 82 | 1.1,2.1.1,7.1.2,2.3,2,11.1 | Quercus |
| <i>Quercus lowii</i> | NT | MY | 0 | 2.2,2,7.1.1 | Cyclobalanopsis |
| <i>Quercus mcvaughii</i> | NT | MX | 1 | 1.1,2.3,4,2.1.4 | Lobatae |
| <i>Quercus oblongata</i> | NT | BD,IN,MM,NP,PK,TH,VN | 16 | 5.3.1,5.3,2,2.1.4 | Cyclobalanopsis |
| <i>Quercus odocarpa</i> | NT | ID,MM,MY,TH,VN | 1 | 2.1.3,7.1.1 | Cyclobalanopsis |
| <i>Quercus oleoides</i> | NT | BZ,CR,GT,HN,MX | 12 | 1.1,5.3.1,2.3.2 | Virentes |
| <i>Quercus oxyphylla</i> | NT | CN | 0 | 1.1,2.1.3 | Ilex |
| <i>Quercus palmeri</i> | NT | MX,US | 29 | 1.1,11.1,11.2,8.2.1,1.3,7.1.3 | Protobalanus |
| <i>Quercus parvula</i> | NT | US | 25 | 1.1,2.3,4,6.1,7.1.1,8.1.2,11.2 | Quercus |
| <i>Quercus peninsularis</i> | NT | MX | 2 | 2.3.2 | Lobatae |
| <i>Quercus persica</i> | NT | IQ,IR | 0 | 5.3.1,5.3.2 | Cerris |
| <i>Quercus pinnativenulosa</i> | NT | MX | 6 | 1.1,2.1.2,5.3.4 | Lobatae |
| <i>Quercus purulhana</i> | NT | BZ,GT,HN,MX,NI | 0 | 7.1.1,5.3,2,1.1,2.3.3 | Quercus |
| <i>Quercus rysophylla</i> | NT | MX | 53 | 5.3.5,1.2 | Lobatae |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | Quercus section |
|--------------------------------|------------------------|----------------------|--------------------------------------|-----------------------------------|-----------------|
| <i>Quercus sadleriana</i> | NT | US | 25 | 1.1,6.1,4.1,7.1,2.5,3.2,2.3,2,3,2 | Ponticae |
| <i>Quercus saltillensis</i> | NT | MX | 7 | 2.3,2,2,1,1,1,1 | Lobatae |
| <i>Quercus sartorii</i> | NT | MX | 24 | 2.3,2,11,5 | Lobatae |
| <i>Quercus skinneri</i> | NT | BZ,GT,HN,MX,SV | 5 | 5.3,1,2,3,3 | Lobatae |
| <i>Quercus subsericea</i> | NT | BN,ID,MY | 3 | 2.2,2,7,1,1 | Cyclobalanopsis |
| <i>Quercus sumatrana</i> | NT | ID,MY | 0 | 2.2,2,7,1,1 | Cyclobalanopsis |
| <i>Quercus valdinervosa</i> | NT | BN,ID,MY | 0 | 2.2,2,7,1,1 | Cyclobalanopsis |
| <i>Quercus xylina</i> | NT | MX | 0 | 2.3,2,2,1,2 | Quercus |
| <i>Quercus acherdophylla</i> | DD | MX | 13 | - | Lobatae |
| <i>Quercus aerea</i> | DD | MX | 0 | - | Lobatae |
| <i>Quercus alpescens</i> | DD | MX | 1 | - | Quercus |
| <i>Quercus barrancana</i> | DD | MX | 0 | - | Quercus |
| <i>Quercus breedloveana*</i> | DD | MX | 0 | - | Lobatae |
| <i>Quercus brevicalyx</i> | DD | CN,LA,TH | 0 | 2.1.1 | Cyclobalanopsis |
| <i>Quercus canariensis</i> | DD | DZ,ES,MA,PT,TN | 83 | 7.1.1,5.3,2,2,2,11,2 | Quercus |
| <i>Quercus carduchorum</i> | DD | IR | 0 | 8.1.1,11,3,11,2 | Cerris |
| <i>Quercus centenaria*</i> | DD | MX | 0 | - | Quercus |
| <i>Quercus chapensis</i> | DD | CN,VN | 3 | - | Cyclobalanopsis |
| <i>Quercus chevalieri</i> | DD | CN,VN | 0 | - | Cyclobalanopsis |
| <i>Quercus chrysocalyx</i> | DD | CN,KH,LA,TH,VN | 1 | 5.3.1 | Cyclobalanopsis |
| <i>Quercus coahuilensis</i> | DD | MX | 0 | - | Lobatae |
| <i>Quercus coffeicolor</i> | DD | MX | 0 | - | Lobatae |
| <i>Quercus conduplicans</i> | DD | CN | 0 | - | Cyclobalanopsis |
| <i>Quercus dalechampii</i> | DD | IT | 21 | - | Quercus |
| <i>Quercus deliquescens</i> | DD | MX | 3 | 2.3,2,1,1,1,2,4,2 | Quercus |
| <i>Quercus dongfangensis</i> | DD | CN | 0 | 2.2.2 | Cyclobalanopsis |
| <i>Quercus edwardsiae</i> | DD | MX | 3 | - | Quercus |
| <i>Quercus elevaticostata</i> | DD | CN | 0 | - | Cyclobalanopsis |
| <i>Quercus eumorpha</i> | DD | MM,TH | 0 | - | Cyclobalanopsis |
| <i>Quercus fuliginosa</i> | DD | CN | 0 | 2.1.4 | Cyclobalanopsis |
| <i>Quercus ghiesbreghtii</i> | DD | MX | 0 | - | Lobatae |
| <i>Quercus gomeziana</i> | DD | BD,CN,MM,VN | 0 | - | Cyclobalanopsis |
| <i>Quercus gracilenta</i> | DD | CN | 0 | - | Cyclobalanopsis |
| <i>Quercus gracilior*</i> | DD | HN | 0 | - | Lobatae |
| <i>Quercus grahamii</i> | DD | MX | 3 | - | Lobatae |
| <i>Quercus hartwissiana</i> | DD | BG,GE,RU,TR | 53 | 7.1.3,5,3,1,1,2 | Quercus |
| <i>Quercus ignaciensis</i> | DD | MX | 0 | - | Lobatae |
| <i>Quercus jinpinensis</i> | DD | CN | 0 | - | Cyclobalanopsis |
| <i>Quercus liaoi</i> | DD | TW | 1 | - | Cyclobalanopsis |
| <i>Quercus melissae*</i> | DD | GT,MX | 0 | - | Quercus |
| <i>Quercus mespilifolia</i> | DD | BD,IN,LA,MM,TH,VN | 1 | - | Cyclobalanopsis |
| <i>Quercus mexiae*</i> | DD | MX | 0 | - | Lobatae |
| <i>Quercus ningangensis</i> | DD | CN | 3 | - | Cyclobalanopsis |
| <i>Quercus ningqiangensis</i> | DD | CN | 0 | - | Quercus |
| <i>Quercus opaca</i> | DD | MX | 1 | - | Quercus |
| <i>Quercus pauciradiata</i> | DD | ES | 0 | 8.3,12,1,1,1 | Quercus |
| <i>Quercus paxtalensis</i> | DD | MX | 0 | 7.1.1,5,3,2,2,3,3 | Lobatae |
| <i>Quercus pentacycla</i> | DD | CN | 2 | - | Cyclobalanopsis |
| <i>Quercus perpallida</i> | DD | MX | 0 | - | Quercus |
| <i>Quercus platycalyx</i> | DD | CN,VN | 0 | 2.2,2,1,1,5,3,4 | Cyclobalanopsis |
| <i>Quercus porphyrogenita*</i> | DD | MX | 0 | - | Quercus |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | <i>Quercus</i> section |
|----------------------------------|------------------------|----------------------------------|--------------------------------------|---|------------------------|
| <i>Quercus protoroburoides</i> * | DD | BG | 0 | - | <i>Quercus</i> |
| <i>Quercus rekonis</i> | DD | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus robusta</i> | DD | MX,US | 2 | 7.1.3,6.1,11.4,11.2 | <i>Lobatae</i> |
| <i>Quercus sarahmariae</i> * | DD | CR | 0 | - | <i>Lobatae</i> |
| <i>Quercus saravanensis</i> | DD | CN,LA,TH | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus shangxiensis</i> | DD | CN | 0 | - | <i>Ilex</i> |
| <i>Quercus shennongii</i> | DD | CN | 0 | - | <i>Quercus</i> |
| <i>Quercus shingjenensis</i> | DD | CN | 0 | - | <i>Quercus</i> |
| <i>Quercus supranitida</i> | DD | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus tardifolia</i> | DD | MX,US | 0 | - | <i>Lobatae</i> |
| <i>Quercus tarokoensis</i> | DD | TW | 6 | - | <i>Ilex</i> |
| <i>Quercus tatakaensis</i> | DD | TW | 5 | - | <i>Ilex</i> |
| <i>Quercus thorelii</i> | DD | CN,LA,TH,VN | 1 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus tinkhamii</i> | DD | MX | 3 | - | <i>Quercus</i> |
| <i>Quercus toumeyi</i> | DD | MX,US | 8 | 8.2.2 | <i>Quercus</i> |
| <i>Quercus toxicodendrifolia</i> | DD | MX | 1 | - | <i>Quercus</i> |
| <i>Quercus trinitatis</i> | DD | MX,SV | 0 | 5.3.2,2.1.3,5.3.4 | <i>Lobatae</i> |
| <i>Quercus tsinglingensis</i> | DD | CN | 0 | - | <i>Quercus</i> |
| <i>Quercus undata</i> | DD | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus ungeri</i> | DD | IR | 0 | - | <i>Cerris</i> |
| <i>Quercus verde</i> | DD | MX | 0 | - | <i>Quercus</i> |
| <i>Quercus vestita</i> | DD | IN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus xanthoclada</i> | DD | LA,MM,VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus yonganensis</i> | DD | CN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus acatenangensis</i> | LC | GT,MX,SV | 0 | - | <i>Lobatae</i> |
| <i>Quercus acrodonta</i> | LC | CN | 3 | - | <i>Ilex</i> |
| <i>Quercus acuta</i> | LC | CN,JP,KR,TW | 46 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus acutissima</i> | LC | BT,CN,IN,JP,KP,KR,LA,MM,NP,TH,VN | 201 | 5.3.2 | <i>Cerris</i> |
| <i>Quercus affinis</i> | LC | MX | 23 | 2.1.2,5.3.3 | <i>Lobatae</i> |
| <i>Quercus agrifolia</i> | LC | MX,US | 94 | 2.3.3,1.1,7.1.3,5.3.2,2.1.3,8.4.2 | <i>Lobatae</i> |
| <i>Quercus alba</i> | LC | CA,US | 234 | 7.1.2,8.2.2,1.1 | <i>Quercus</i> |
| <i>Quercus albocincta</i> | LC | MX | 3 | - | <i>Lobatae</i> |
| <i>Quercus aliena</i> | LC | CN,JP,KP,KR,LA,MM,TH,TW | 101 | 7.1.3,2.2.1 | <i>Quercus</i> |
| <i>Quercus alniifolia</i> | LC | CY | 48 | 11.1,7.1.1 | <i>Ilex</i> |
| <i>Quercus annulata</i> | LC | CN,IN,MM,NP,VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus aquifolioides</i> | LC | BT,CN,MM | 6 | - | <i>Ilex</i> |
| <i>Quercus argentata</i> | LC | ID,MY,SG | 3 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus aristata</i> | LC | MX | 0 | 5.3.4,5.3.1,1.1,2.3.4,2.1.4 | <i>Lobatae</i> |
| <i>Quercus arizonica</i> | LC | MX,US | 31 | - | <i>Quercus</i> |
| <i>Quercus aucheri</i> | LC | GR,TR | 13 | 6.1,5.3.5,11.1,1.3,1.1 | <i>Ilex</i> |
| <i>Quercus augustini</i> | LC | CN,MM,TH,VN | 4 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus auricoma</i> | LC | CN,TH,VN | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus baloot</i> | LC | AF,PK | 7 | - | <i>Ilex</i> |
| <i>Quercus baronii</i> | LC | CN | 16 | - | <i>Ilex</i> |
| <i>Quercus berberidifolia</i> | LC | MX,US | 43 | 8.2.2,8.2.2,8.2.2,8.2.2,8.2.2,8.2.2,8.2.2 | <i>Quercus</i> |
| <i>Quercus bicolor</i> | LC | CA,US | 220 | 7.1.1,5.3.5,8.2.2,8.2.2,11.1 | <i>Quercus</i> |
| <i>Quercus blakei</i> | LC | CN,HK,LA,VN | 1 | 5.3.5 | <i>Cyclobalanopsis</i> |
| <i>Quercus brandisiana</i> | LC | LA,MM,TH | 0 | 2.1.1,5.3.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus brantii</i> | LC | IQ,IR,SY,TR | 23 | 5.3.3,8.4.1 | <i>Cerris</i> |
| <i>Quercus buckleyi</i> | LC | US | 51 | 8.2.2,8.4.2 | <i>Lobatae</i> |
| <i>Quercus bumelioides</i> | LC | CR,GT,HN,MX,NI,PA | 1 | 2.3.4,2.1.4,5.3.5 | <i>Lobatae</i> |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | Quercus section |
|----------------------------------|------------------------|---|--------------------------------------|--|-----------------|
| <i>Quercus calophylla</i> | LC | GT,MX | 16 | 2.1.2,1.1 | Lobatae |
| <i>Quercus canbyi</i> | LC | MX | 39 | 2.1.2,7.1.1,2.3.2 | Lobatae |
| <i>Quercus castanea</i> | LC | GT,MX,SV | 25 | 1.1,2.3,4,2.1.4 | Lobatae |
| <i>Quercus cerris</i> | LC | AL,AT,BA,BG,CH,CZ,ES,FR,GR,HR,HU,IT,LB,ME,MK,PT,RO,RS,SI,SK,SY,TR | 211 | 2.1.1 | Cerris |
| <i>Quercus championii</i> | LC | CN,TW | 6 | - | Cyclobalanopsis |
| <i>Quercus chapmanii</i> | LC | US | 16 | 7.1.2,6.1,1.1 | Quercus |
| <i>Quercus chihuahuensis</i> | LC | MX,US | 5 | 2.3.2,6.1,7.1.3 | Quercus |
| <i>Quercus chrysolepis</i> | LC | MX,US | 82 | 1.1,7.1.2 | Protobalanus |
| <i>Quercus chungii</i> | LC | CN | 1 | - | Cyclobalanopsis |
| <i>Quercus ciliaris</i> | LC | CN | 10 | - | Cyclobalanopsis |
| <i>Quercus coccifera</i> | LC | AL,BA,BG,CY,DZ,ES,FR,GR,HR,IL,IT,JO,LB,LY,MA,ME,MK,PS,PT,RS,SI,SY,TN,TR | 131 | 2.3.4,2.2.3,7.1.1 | Ilex |
| <i>Quercus cocciferoides</i> | LC | CN | 2 | - | Ilex |
| <i>Quercus coccinea</i> | LC | US | 216 | 8.4.2 | Lobatae |
| <i>Quercus confertifolia</i> | LC | MX | 0 | 2.1.2,2.3,2.4,2 | Lobatae |
| <i>Quercus congesta</i> | LC | IT | 0 | 7.1.1,2.3,4,2.1.4,1.1 | Quercus |
| <i>Quercus convallata</i> | LC | MX | 0 | - | Quercus |
| <i>Quercus conzattii</i> | LC | MX | 1 | - | Lobatae |
| <i>Quercus cornelius-mulleri</i> | LC | MX,US | 15 | 6.1 | Quercus |
| <i>Quercus corrugata</i> | LC | BZ,CR,GT,HN,MX,SV | 14 | - | Quercus |
| <i>Quercus crassifolia</i> | LC | GT,MX | 36 | 1.1,2.3,4,11.1 | Lobatae |
| <i>Quercus crassipes</i> | LC | MX | 32 | 5.3.1,2.3.3 | Lobatae |
| <i>Quercus delavayi</i> | LC | CN | 2 | - | Cyclobalanopsis |
| <i>Quercus dentata</i> | LC | CN,JP,KR,MN,RU,TW | 168 | - | Quercus |
| <i>Quercus depressa</i> | LC | MX | 2 | 1.2,2.3,2.4,1.1,1.1,1.1,2.5,3.3 | Lobatae |
| <i>Quercus depressipes</i> | LC | MX,US | 1 | 5.3.5 | Quercus |
| <i>Quercus deserticola</i> | LC | MX | 9 | - | Quercus |
| <i>Quercus dolicholepis</i> | LC | CN | 14 | - | Ilex |
| <i>Quercus douglasii</i> | LC | US | 63 | 2.3.2,11.2,8.1.1,1.1,7.1.2,8.2.2,8.2.2 | Quercus |
| <i>Quercus durata</i> | LC | US | 37 | - | Quercus |
| <i>Quercus eduardi</i> | LC | MX | 7 | 5.3.1,2.3,4,11.1,2.1.4 | Lobatae |
| <i>Quercus ellipsoidalis</i> | LC | CA,US | 115 | 8.4.2,11.1 | Lobatae |
| <i>Quercus elliptica</i> | LC | BZ,GT,HN,MX,NI,SV | 5 | 8.4.2 | Lobatae |
| <i>Quercus emoryi</i> | LC | MX,US | 30 | 5.3.1,8.2.2,2.3,2.6,1.5,2.1,8.2,2.7,1.2,11.1 | Lobatae |
| <i>Quercus engleriana</i> | LC | CN | 15 | - | Ilex |
| <i>Quercus fabrei</i> | LC | CN,HK | 31 | - | Quercus |
| <i>Quercus faginea</i> | LC | ES,MA,PT | 88 | 2.1.4,11.2,8.2,11.3,1.3 | Quercus |
| <i>Quercus falcata</i> | LC | US | 111 | 8.4.2 | Lobatae |
| <i>Quercus floribunda</i> | LC | AF,IN,NP,PK | 3 | - | Ilex |
| <i>Quercus frainetto</i> | LC | AL,BA,BG,CZ,GR,HR,IT,MK,RO,RS,SK,TR | 132 | 2.1.4,8.3,5.3.1 | Quercus |
| <i>Quercus franchetii</i> | LC | CN,TH | 17 | - | Ilex |
| <i>Quercus frutex</i> | LC | MX | 8 | 8.4.1,11.5 | Quercus |
| <i>Quercus fulva</i> | LC | MX | 2 | - | Lobatae |
| <i>Quercus fusiformis</i> | LC | MX,US | 39 | 5.3.3,2.3,4,8.2,8.4.2 | Virentes |
| <i>Quercus gambelii</i> | LC | MX,US | 76 | - | Quercus |
| <i>Quercus gambleana</i> | LC | BD,CN,IN | 0 | - | Cyclobalanopsis |
| <i>Quercus garryana</i> | LC | CA,US | 79 | 2.3.2,8.2.2,8.2.2,8.2.2,8.1.2 | Quercus |
| <i>Quercus gemelliflora</i> | LC | BN,ID,MY | 5 | 2.2.2 | Cyclobalanopsis |
| <i>Quercus geminata</i> | LC | US | 28 | - | Virentes |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | <i>Quercus</i> section |
|-------------------------------|------------------------|---|--------------------------------------|---|------------------------|
| <i>Quercus germana</i> | LC | MX | 27 | 2.3.3,2.3.2,5.3.1 | <i>Quercus</i> |
| <i>Quercus gilliana</i> | LC | CN | 0 | - | <i>Ilex</i> |
| <i>Quercus gilva</i> | LC | CN,JP,KR,TW | 35 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus glabrescens</i> | LC | MX | 16 | 5.3.2,2.3.3 | <i>Quercus</i> |
| <i>Quercus glauca</i> | LC | AF,BT,CN,HK,IN,JP,KP,KR,LA,MM, NP,TW | 111 | 2.1.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus glaucescens</i> | LC | MX | 0 | 7.1.3,5.3.5,2.1.4 | <i>Quercus</i> |
| <i>Quercus glaucooides</i> | LC | MX | 20 | 2.1.1,1.1.8,1.2 | <i>Quercus</i> |
| <i>Quercus gravesii</i> | LC | MX,US | 36 | 7.2.2,2.3.2,11.2 | <i>Lobatae</i> |
| <i>Quercus greggii</i> | LC | MX | 27 | - | <i>Quercus</i> |
| <i>Quercus griffithii</i> | LC | BT,CN,IN,LA,MM,NP,TH,VN | 26 | 2.1.1 | <i>Quercus</i> |
| <i>Quercus grisea</i> | LC | MX,US | 39 | 2.3.2,2.1.2,5.3.1,11.1 | <i>Quercus</i> |
| <i>Quercus guyavifolia</i> | LC | CN | 10 | - | <i>Ilex</i> |
| <i>Quercus helferiana</i> | LC | CN,IN,LA,MM,TH,VN | 0 | 5.3.1 | <i>Cyclobalanopsis</i> |
| <i>Quercus hemisphaerica</i> | LC | US | 48 | 8.2.2 | <i>Lobatae</i> |
| <i>Quercus humboldtii</i> | LC | CO,PA | 7 | 1.1.4,1.5.3.1 | <i>Lobatae</i> |
| <i>Quercus hypoleucooides</i> | LC | MX,US | 27 | - | <i>Lobatae</i> |
| <i>Quercus hypoxantha</i> | LC | MX | 5 | - | <i>Lobatae</i> |
| <i>Quercus ichnusae</i> | LC | IT | 0 | 2.3.4,7.1.1 | <i>Quercus</i> |
| <i>Quercus ilex</i> | LC | AL,BA,CH,DZ,ES,FR,GR,HR,IT,LY,MA, ME,MT,RS,SI,TN,TR | 212 | 1.2,1.1,9.5.4,7.1.3,5.3.1,11.2,2.3.3, 2.1.3,8.2 | <i>Ilex</i> |
| <i>Quercus ilicifolia</i> | LC | CA,US | 101 | 7.1.2,11.1 | <i>Lobatae</i> |
| <i>Quercus imbricaria</i> | LC | US | 190 | 8.4.2,11.1 | <i>Lobatae</i> |
| <i>Quercus incana</i> | LC | US | 43 | 7.1.2,11.1 | <i>Lobatae</i> |
| <i>Quercus infectoria</i> | LC | AZ,CY,GR,IL,IQ,IR,LB,PS,SY,TR | 51 | 5.3.5,2.1.4,2.3.4 | <i>Quercus</i> |
| <i>Quercus inopina</i> | LC | US | 7 | 7.1.2,1.2,1.1,2.1.4 | <i>Lobatae</i> |
| <i>Quercus intricata</i> | LC | MX,US | 5 | 2.3.2,1.2,5.2,2.7,1.2,11.2 | <i>Quercus</i> |
| <i>Quercus invaginata</i> | LC | MX | 9 | - | <i>Quercus</i> |
| <i>Quercus ithaburensis</i> | LC | AL,GR,IL,IT,LB,SY,TR | 84 | 5.3.1,2.3.4,1.3.1.1 | <i>Cerris</i> |
| <i>Quercus john-tuckeri</i> | LC | US | 22 | 1.1,7.1.2,2.3.2 | <i>Quercus</i> |
| <i>Quercus jonesii</i> | LC | MX | 2 | - | <i>Lobatae</i> |
| <i>Quercus kelloggii</i> | LC | MX,US | 68 | 5.3.2,7.1.2,7.1.1,8.2.2,8.2.2 | <i>Lobatae</i> |
| <i>Quercus kerrii</i> | LC | CN,KH,LA,MM,TH,VN | 1 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus laceyi</i> | LC | MX,US | 33 | 11.1 | <i>Quercus</i> |
| <i>Quercus laeta</i> | LC | MX | 25 | 11.1 | <i>Quercus</i> |
| <i>Quercus laevis</i> | LC | US | 29 | 2.2.2,8.4.2,11.1 | <i>Lobatae</i> |
| <i>Quercus lanata</i> | LC | BT,CN,IN,MM,NP,TH,VN | 7 | - | <i>Ilex</i> |
| <i>Quercus lancifolia</i> | LC | BZ,CR,GT,HN,MX,NI,PA,SV | 10 | 1.2,2.3.3 | <i>Quercus</i> |
| <i>Quercus laurifolia</i> | LC | US | 70 | 8.4.1,8.4.2 | <i>Lobatae</i> |
| <i>Quercus laurina</i> | LC | GT,MX,SV | 30 | 7.1.1,5.3.5,2.3.1 | <i>Lobatae</i> |
| <i>Quercus libani</i> | LC | IQ,IR,SY,TR | 88 | 8.4.1 | <i>Cerris</i> |
| <i>Quercus liebmannii</i> | LC | MX | 8 | 2.3.2 | <i>Quercus</i> |
| <i>Quercus lineata</i> | LC | BD,CN,ID,IN,LA,MY,TH,VN | 1 | 2.2.2 | <i>Cyclobalanopsis</i> |
| <i>Quercus longinux</i> | LC | TW | 12 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus longispica</i> | LC | CN | 5 | - | <i>Ilex</i> |
| <i>Quercus lusitanica</i> | LC | ES,MA,PT | 33 | - | <i>Quercus</i> |
| <i>Quercus lyrata</i> | LC | US | 111 | 11.1 | <i>Quercus</i> |
| <i>Quercus macranthera</i> | LC | AM,AZ,GE,IQ,IR,LB,RU,SY,TR | 100 | 11.2,2.3.1,8.1.1,8.2 | <i>Quercus</i> |
| <i>Quercus macrocalyx</i> | LC | CN,LA,VN | 6 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus macrocarpa</i> | LC | CA,US | 261 | 7.1.2,2.3.4 | <i>Quercus</i> |
| <i>Quercus magnoliifolia</i> | LC | MX | 5 | 11.1,7.1.1,5.3.2 | <i>Quercus</i> |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | <i>Quercus</i> section |
|------------------------------|------------------------|--|--------------------------------------|-------------------------------------|------------------------|
| <i>Quercus margarettae</i> | LC | US | 28 | 11.1 | <i>Quercus</i> |
| <i>Quercus marilandica</i> | LC | US | 101 | 8.4.1 | <i>Lobatae</i> |
| <i>Quercus martinezii</i> | LC | MX | 1 | - | <i>Quercus</i> |
| <i>Quercus mexicana</i> | LC | MX | 43 | 1.1,2.3.4,11.1,2.1.4 | <i>Lobatae</i> |
| <i>Quercus michauxii</i> | LC | US | 115 | 8.2.2,8.2.2,8.2.2,8.2.2,8.2.2,8.2.2 | <i>Quercus</i> |
| <i>Quercus microphylla</i> | LC | MX | 11 | 7.1.2 | <i>Quercus</i> |
| <i>Quercus minima</i> | LC | US | 12 | 7.1.2,1.1,2.3.3,2.2.2 | <i>Virentes</i> |
| <i>Quercus miyagii</i> | LC | JP | 0 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus mohriana</i> | LC | MX,US | 18 | - | <i>Quercus</i> |
| <i>Quercus mongolica</i> | LC | CN,JP,KP,KR,MN,RU | 150 | 5.3.2 | <i>Quercus</i> |
| <i>Quercus monimotricha</i> | LC | CN,MM | 10 | - | <i>Ilex</i> |
| <i>Quercus montana</i> | LC | US | 165 | 8.1.2,8.2.2,8.2.2,8.2.2,8.2.2,11.1 | <i>Quercus</i> |
| <i>Quercus morii</i> | LC | TW | 18 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus muehlenbergii</i> | LC | CA,MX,US | 184 | 8.2.2,7.1.1,8.1.2,8.2.2,8.2.2,11.1 | <i>Quercus</i> |
| <i>Quercus myrsinifolia</i> | LC | CN,HK,JP,KR,LA,TH,TW,VN | 108 | 8.2.2 | <i>Cyclobalanopsis</i> |
| <i>Quercus myrtifolia</i> | LC | US | 24 | 7.1.2,1.2,1.1 | <i>Lobatae</i> |
| <i>Quercus nigra</i> | LC | US | 128 | 8.4.1 | <i>Lobatae</i> |
| <i>Quercus oblongifolia</i> | LC | MX,US | 23 | 2.3.2,8.2.2 | <i>Quercus</i> |
| <i>Quercus obtusata</i> | LC | MX | 27 | 5.3.5,2.3.4 | <i>Quercus</i> |
| <i>Quercus oxyodon</i> | LC | BD,BT,CN,IN,MM,NP,TH | 15 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus pachyloma</i> | LC | CN,TW | 6 | - | <i>Cyclobalanopsis</i> |
| <i>Quercus pagoda</i> | LC | US | 60 | 8.4.2,11.1 | <i>Lobatae</i> |
| <i>Quercus palustris</i> | LC | CA,US | 263 | 8.4.1,8.4.2,11.1 | <i>Lobatae</i> |
| <i>Quercus pannosa*</i> | LC | CN | 0 | - | <i>Ilex</i> |
| <i>Quercus peduncularis</i> | LC | BZ,GT,HN,MX,SV | 8 | 11.1 | <i>Quercus</i> |
| <i>Quercus petraea</i> | LC | AL,AM,AT,AZ,BA,BE,BG,BY,CH,CZ,DE,D K,ES,FR,GB,GE,HR,HU,IE,IR,IT,LT,ME,MK ,NL,NO,PL,RO,RS,RU,SI,SK,SY,TR,UA | 178 | 8.1.2,2.2.2,5.3.2,5.3.1,11.1,8.1.2 | <i>Quercus</i> |



Quercus planipocula, LC (Béatrice Chassé)



Quercus microphylla, LC (Béatrice Chassé)

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | Quercus section |
|--------------------------------|------------------------|--|--------------------------------------|---|-----------------|
| <i>Quercus phellos</i> | LC | US | 180 | 8.4.1 | Lobatae |
| <i>Quercus phillyreoides</i> | LC | CN,JP,KP,KR | 105 | - | Ilex |
| <i>Quercus planipocula</i> | LC | MX | 2 | 2.1.3,7.1.1 | Lobatae |
| <i>Quercus poilanei</i> | LC | CN,TH,VN | 0 | - | Cyclobalanopsis |
| <i>Quercus polymorpha</i> | LC | GT,HN,MX,US | 47 | 5.2.1,5.3.1,11.1 | Quercus |
| <i>Quercus potosina</i> | LC | MX | 4 | 5.3.2,2.1.3,8.4.1,2.3.3 | Quercus |
| <i>Quercus praeco</i> | LC | MX | 1 | 5.3.5,2.3.4 | Quercus |
| <i>Quercus pringlei</i> | LC | MX | 8 | 2.3.2,7.1.1,2.1.2 | Quercus |
| <i>Quercus prinoides</i> | LC | CA,US | 70 | 11.1 | Quercus |
| <i>Quercus pubescens</i> | LC | AL,AT,BE,BG,CH,CZ,DE,ES,FR,GR,HR,IT,MD,ME,MK,RO,RS,RU,SI,SK,TR,UA | 136 | 11.3,1.1,8.2,7.1.1 | Quercus |
| <i>Quercus pumila</i> | LC | US | 27 | 7.1.2 | Lobatae |
| <i>Quercus pungens</i> | LC | MX,US | 24 | - | Quercus |
| <i>Quercus pyrenaica</i> | LC | ES,FR,MA,PT | 89 | 2.1.3,8.2.1,8.2.2,1.2,7.1.1,2.3.3,2.3.2,2.2.2,11.5,11.2 | Quercus |
| <i>Quercus rehderiana</i> | LC | CN,TH | 6 | - | Ilex |
| <i>Quercus repanda</i> | LC | MX | 5 | - | Quercus |
| <i>Quercus resinosa</i> | LC | MX | 3 | 11.5 | Quercus |
| <i>Quercus rex</i> | LC | CN,IN,LA,MM,TH,VN | 2 | - | Cyclobalanopsis |
| <i>Quercus robur</i> | LC | AL,AM,AT,AZ,BA,BE,BG,BY,CH,CZ,DE,DK,EE,ES,FI,FR,GB,GE,GR,HR,HU,IE,IR,IT,KZ,LT,LU,LV,MD,ME,MK,NL,NO,PL,PT,RO,RS,RU,SE,SI,SK,TR,UA | 332 | 8.1.2,5.3.2,1.1,2.3.4,2.2.3,11.4,11.3,11.2,11.1,2.1.4,8.3,8.1.2 | Quercus |
| <i>Quercus rotundifolia</i> | LC | DZ,ES,FR,MA,PT | 47 | 2.1.2,2.3.2,11.2,11.3,7.1.1,8.1.2 | Ilex |
| <i>Quercus rubra</i> | LC | CA,US | 334 | 11.2,11.3,8.4.2 | Lobatae |
| <i>Quercus rugosa</i> | LC | GT,HN,MX,US | 70 | 11.1,5.2.1,7.1.1,5.3.1,1.1 | Quercus |
| <i>Quercus salicifolia</i> | LC | CR,GT,HN,MX,NI,PA,SV | 4 | 5.3.2,2.3.2 | Lobatae |
| <i>Quercus salicina</i> | LC | JP,KR | 44 | - | Cyclobalanopsis |
| <i>Quercus sapotifolia</i> | LC | BZ,CR,GT,HN,MX,PA,SV | 2 | - | Lobatae |
| <i>Quercus schottkyana</i> | LC | CN | 19 | - | Cyclobalanopsis |
| <i>Quercus scytophylla</i> | LC | MX | 8 | 5.3.1,2.3.3 | Lobatae |
| <i>Quercus sebifera</i> | LC | MX | 6 | 5.3.2,2.3.3 | Quercus |
| <i>Quercus segoviensis</i> | LC | GT,HN,MX,NI,SV | 0 | 2.3.2 | Quercus |
| <i>Quercus semecarpifolia</i> | LC | AF,CN,IN,NP,PK | 19 | - | Ilex |
| <i>Quercus semiserrata</i> | LC | BD,BT,CN,ID,IN,MM,MY,TH,VN | 0 | - | Cyclobalanopsis |
| <i>Quercus senescens</i> | LC | CN | 5 | - | Ilex |
| <i>Quercus serrata</i> | LC | CN,JP,KP,KR,TW | 127 | 2.1.1,1.1 | Quercus |
| <i>Quercus sessilifolia</i> | LC | CN,JP,TH,TW | 23 | - | Cyclobalanopsis |
| <i>Quercus setulosa</i> | LC | CN,LA,TH,VN | 0 | - | Ilex |
| <i>Quercus shumardii</i> | LC | CA,US | 173 | 8.4.2,11.1 | Lobatae |
| <i>Quercus sideroxylla</i> | LC | MX | 8 | 5.3.2,2.3.2,11.1,2.2.2 | Lobatae |
| <i>Quercus similis</i> | LC | US | 3 | 11.1 | Quercus |
| <i>Quercus sinuata</i> | LC | MX,US | 40 | - | Quercus |
| <i>Quercus sororia</i> | LC | MX | 0 | 1.1,2.3.3 | Quercus |
| <i>Quercus spinosa</i> | LC | CN,MM,TW | 17 | - | Ilex |
| <i>Quercus stellata</i> | LC | US | 107 | 8.4.1,8.2.2 | Quercus |
| <i>Quercus stenophylloides</i> | LC | TW | 30 | - | Cyclobalanopsis |
| <i>Quercus stewardiana</i> | LC | CN | 5 | - | Cyclobalanopsis |
| <i>Quercus striatula</i> | LC | MX | 5 | 1.3,1.2 | Quercus |
| <i>Quercus suber</i> | LC | DZ,ES,FR,IT,MA,PT,TN | 197 | 2.1.4,8.2.1,8.2.7,3.7.1.1,11.2 | Cerris |
| <i>Quercus subspathulata</i> | LC | MX | 7 | 5.3.3,5.3.1 | Quercus |

| Scientific Name | IUCN Red List Category | Country distribution | Number of <i>ex situ</i> collections | Threat codes | <i>Quercus</i> section |
|------------------------------|------------------------|-------------------------------|--------------------------------------|------------------------|------------------------|
| <i>Quercus tarahumara</i> | LC | MX | 6 | 5.3.1,1.1 | <i>Lobatae</i> |
| <i>Quercus texana</i> | LC | US | 104 | 8.4.2,11.1 | <i>Lobatae</i> |
| <i>Quercus trojana</i> | LC | AL,BA,BG,GR,HR,IT,ME,MK,RS,TR | 76 | 5.3.1 | <i>Cerris</i> |
| <i>Quercus tuberculata</i> | LC | MX | 7 | - | <i>Quercus</i> |
| <i>Quercus turbinella</i> | LC | MX,US | 54 | - | <i>Quercus</i> |
| <i>Quercus urbani</i> | LC | MX | 1 | - | <i>Lobatae</i> |
| <i>Quercus uxoris</i> | LC | MX | 7 | 5.3.1,2.1,2.4.1 | <i>Lobatae</i> |
| <i>Quercus vacciniifolia</i> | LC | US | 38 | 5.3.2,11.1,7.1.2 | <i>Protobalanus</i> |
| <i>Quercus variabilis</i> | LC | CN,HK,JP,KP,KR,TW,VN | 137 | 6.3 | <i>Cerris</i> |
| <i>Quercus vaseyana</i> | LC | MX,US | 32 | - | <i>Quercus</i> |
| <i>Quercus velutina</i> | LC | CA,US | 182 | 11.2,8.4.2,8.1.2 | <i>Lobatae</i> |
| <i>Quercus viminea</i> | LC | MX,US | 3 | 5.2.1,2.3.2,5.2.2,11.1 | <i>Lobatae</i> |
| <i>Quercus virginiana</i> | LC | US | 132 | 7.1.1,11.3,8.4.2 | <i>Virentes</i> |
| <i>Quercus vulcanica</i> | LC | SY,TR | 15 | 1.3 | <i>Quercus</i> |
| <i>Quercus wislizeni</i> | LC | MX,US | 64 | 2.3.2,11.1,7.1.2 | <i>Lobatae</i> |
| <i>Quercus wutaishanica</i> | LC | CN | 33 | - | <i>Quercus</i> |
| <i>Quercus xalapensis</i> | LC | GT,HN,MX,NI | 15 | - | <i>Lobatae</i> |

*Assessments to be published in the first IUCN Red List update of 2021

Data sources for Appendices B and C

Country/Territory distribution

Country/territory codes follow the International Organization for Standardization ISO-3166-1. A list of all countries and territories used in IUCN's Red List of Threatened Species can be found online ([iucnredlist.org/resources/country-codes](https://www.iucnredlist.org/resources/country-codes)).

Number of *ex situ* collections

Based on combined results from: 1) 2017 *ex situ* survey conducted by The Morton Arboretum (Beckman *et al.*, 2019); 2) 2019 survey conducted for a project funded through the Institute of Museum and Library Services (award #MA-30-18-0273-18); 3) 2020 survey funded by the USDA Forest Service (cooperative agreement #16-CA-11132546-045) and Fondation Franklinia to support the conservation work of the Global Conservation Consortium for Oak; and 4) records held in BGCI's PlantSearch database of plants in cultivation (tools.bgci.org/plant_search.php; accessed May, 2020).

Threat codes

Threat codes follow IUCN's Threats Classification Scheme (Version 3.2) found online ([iucnredlist.org/resources/threat-classification-scheme](https://www.iucnredlist.org/resources/threat-classification-scheme))

Quercus section

Assessed species were matched to the most recent phylogenetic studies of oaks (Denk *et al.*, 2017; Hipp *et al.*, 2020). Thirty-five species assessed for this report were not included in either of these phylogenetic studies. For these species, a literature review was conducted to determine their section and/or regional oak experts were consulted to assign a section (A. Coombes and J. Strijk, pers. comm.).



Quercus arkansana, VU (Jared Chauncey)



Quercus havardii, EN (Emily Beckman)

APPENDIX D:

IUCN Red List Categories & 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 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.

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.
 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
 - 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 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 Oaks 2020

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