

Conservation Gap Analysis of Select Native Asian Oaks



Species profile: *Quercus xanthotricha*

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CRITICALLY ENDANGERED

<i>Quercus baniensis</i>	<i>Quercus donnaiensis</i>
<i>Quercus baolamensis</i>	<i>Quercus honbaensis</i>
<i>Quercus bidoupensis</i>	<i>Quercus mangdenensis</i>
<i>Quercus blaoensis</i>	<i>Quercus ngochoaensis</i>
<i>Quercus cambodiensis</i>	<i>Quercus pseudoverticillata</i>
<i>Quercus camusiae</i>	<i>Quercus sontraensis</i>
<i>Quercus dankiaensis</i>	<i>Quercus trungkhanhensis</i>
<i>Quercus dilacerata</i>	<i>Quercus xuanlienensis</i>

ENDANGERED

<i>Quercus arbutifolia</i>	<i>Quercus lodicosa</i>
<i>Quercus asymmetrica</i>	<i>Quercus nivea</i>
<i>Quercus bambusifolia</i>	<i>Quercus percoriacea</i>
<i>Quercus chrysotricha</i>	<i>Quercus petelotii</i>
<i>Quercus disciformis</i>	<i>Quercus ramsbottomii</i>
<i>Quercus edithiae</i>	<i>Quercus rupestris</i>
<i>Quercus kinabaluensis</i>	<i>Quercus steenisii</i>
<i>Quercus kingiana</i>	<i>Quercus xanthotricha</i>
<i>Quercus lenticellata</i>	

VULNERABLE

<i>Quercus austrocochinchinensis</i>
<i>Quercus braianensis</i>
<i>Quercus gaharuensis</i>
<i>Quercus hondae</i>
<i>Quercus kerangasensis</i>
<i>Quercus merrillii</i>
<i>Quercus quangtriensis</i>
<i>Quercus treubiana</i>

Quercus xanthotricha A.Camus

IUCN Red List Category and Criteria: Endangered B2ab(iii)

Synonyms: *Cyclobalanopsis xanthotricha* (A.Camus) Y.C.Hsu & H.Wei Jen; *Cyclobalanopsis fuhsingensis* (Y.T.Chang)

Y.T.Chang ex Y.C.Hsu & H.W.Jen **Common Names:** Kor thang, kor nok (Laos), Sồi tày, sồi trụ, sồi biển, xoi cau, xen bien, mai kho (Vietnam) **Classification:** subgenus *Cerris*, section *Cyclobalanopsis*

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DISTRIBUTION AND BIOLOGY

Quercus xanthotricha occurs in northern Laos and China (Yunnan Province; Figure 1). It also reportedly occurs in Viet Nam, but we do not have occurrences points within this country (POWO, 2026). It inhabits primarily subtropical moist forest at 1,400–1,500 m elevation (Figure 2). It is a

tree up to 5 m tall (Strijk et al., 2025). Leaves are up to 6–8 cm long and 2–2.6 cm wide. They are lanceolate, slightly attenuate or rounded at the base, attenuate and obtuse at the top (Strijk et al., 2025). Acorns are ovoid, up to 8–9 mm high and 5 mm in diameter. The cupule covers about one third of the nut.

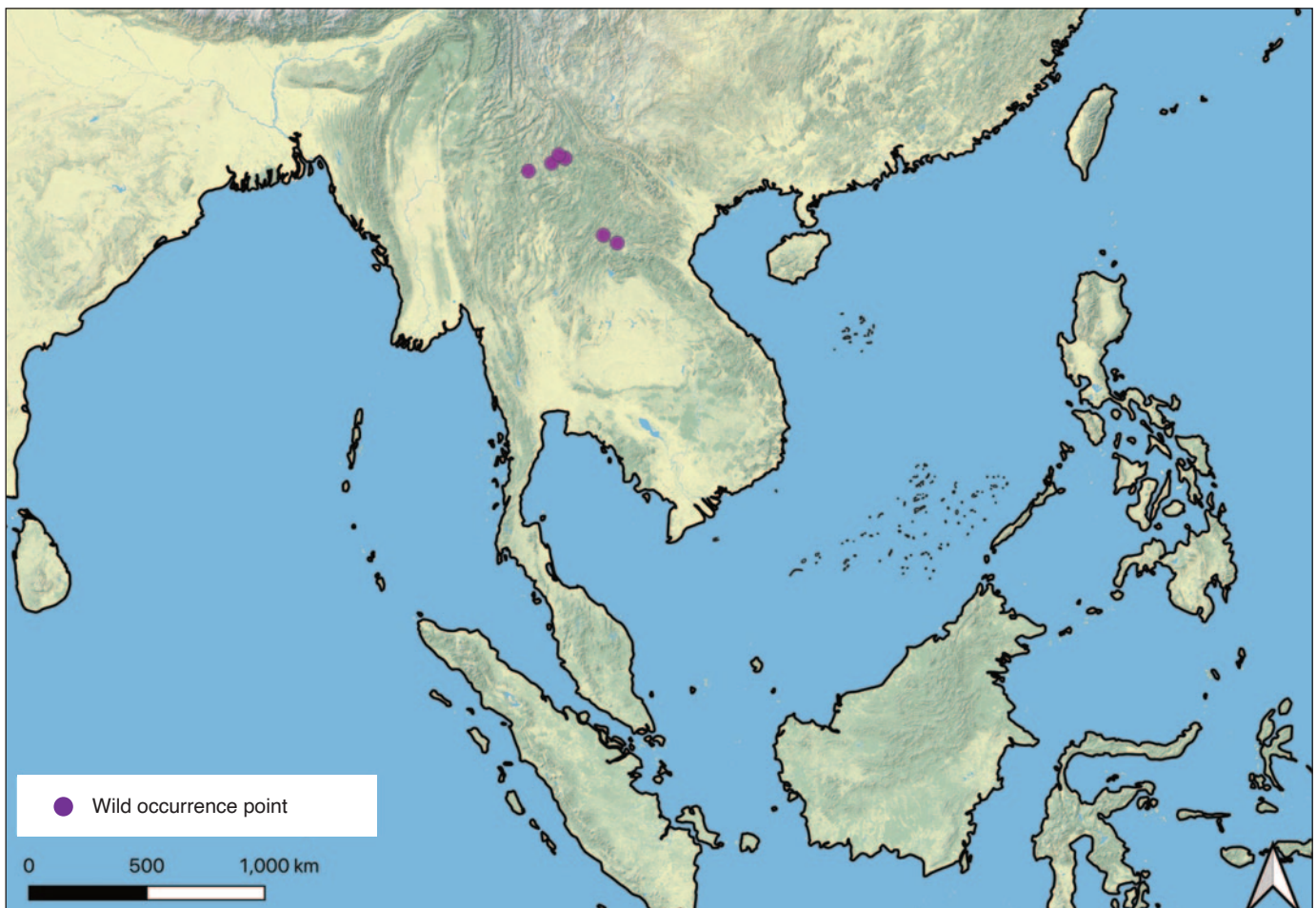


Figure 1. Wild (i.e., in situ) occurrence points for *Quercus xanthotricha*.

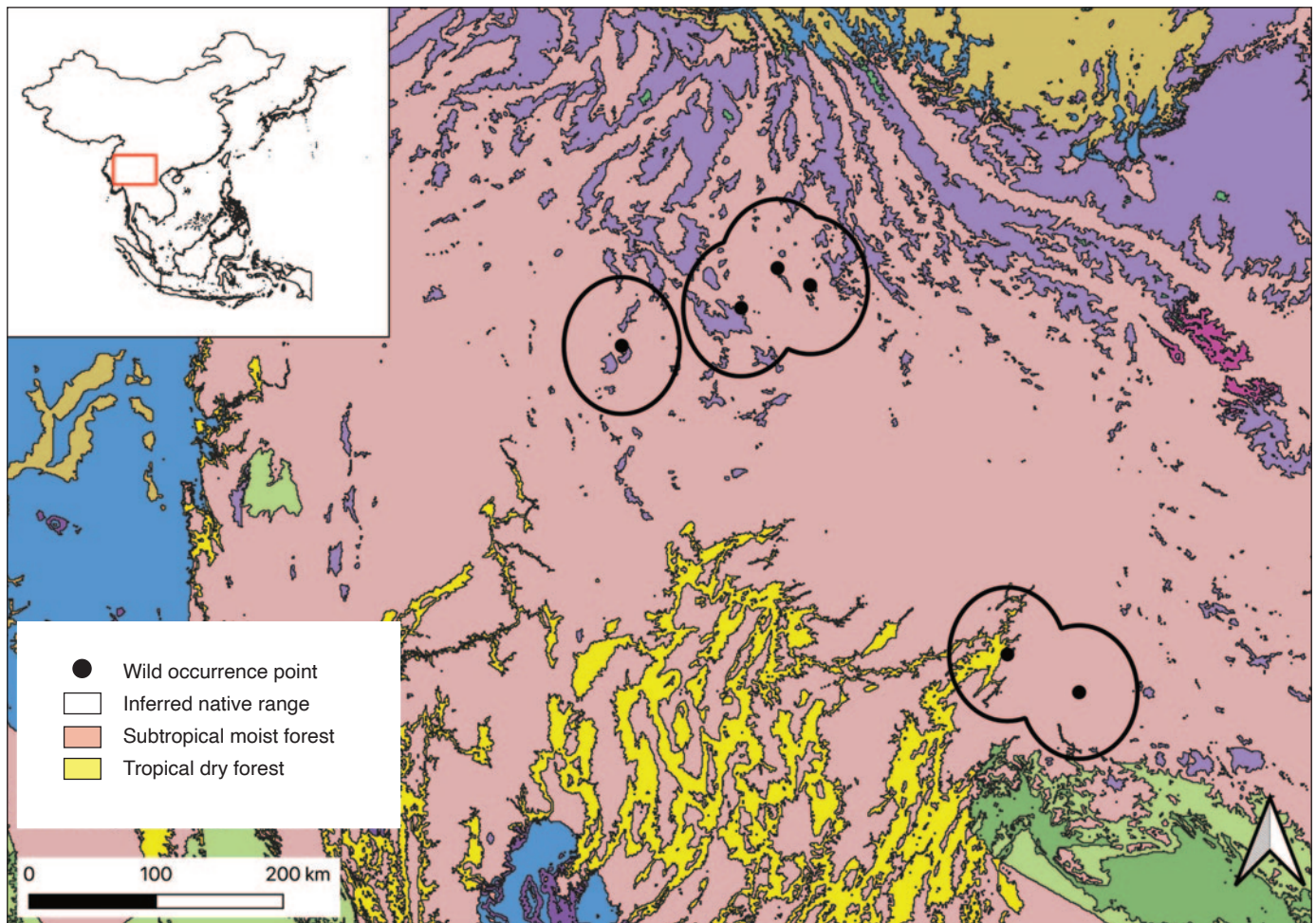


Figure 2. Holdridge life zones within the inferred native range of *Quercus xanthotricha*. Map legend includes the HLZs with at least one occurrence point of *Q. xanthotricha*. For a full map of HLZs within the study region, see Appendix B in Good et al. (2026).



THREATS TO WILD POPULATIONS

Biodiversity loss in Southeast and East Asia is primarily driven by habitat loss from rapid urbanization, industrialization, and agricultural expansion, resulting in some of the highest deforestation rates globally (Austin et al., 2017; Botterill-James et al., 2024; World Resources Institute, 2025). For oaks in Southeast and East Asia, agricultural expansion (including wood and pulp plantations) is the leading threat, followed by logging and wood harvesting (Good et al., 2026). While species-specific data remain limited, a literature review and consultation with species experts indicates that these broader pressures are applicable to *Q. xanthotricha* and other terrestrial plant species.

Logging and wood harvesting: Although no species-specific data are available for *Q. xanthotricha*, logging and selective timber extraction are documented threats to oak species in northern Laos and Yunnan Province, China. In Laos, illegal logging and the harvest of timber for construction materials and fuelwood affect montane forest ecosystems in the subtropical moist zone where this species occurs (Austin et al., 2017). Forest clearance for commercial timber and charcoal production is widespread throughout the subtropical forests of this region.

Agriculture, wood and pulp plantations: Agricultural expansion, including conversion of montane forests to swidden agriculture and plantation crops, is a leading threat to forests in the region where *Q. xanthotricha* occurs. Expansion of rubber, coffee, and cardamom cultivation has been documented in northern Laos and Yunnan, contributing to deforestation at the forest margins of this species' habitat (Austin et al., 2017; World Resources Institute, 2025).

Residential/commercial development, mining, roads: Infrastructure development, including road construction in remote highland areas, facilitates access to previously inaccessible forest habitats and increases logging and agricultural pressure on *Q. xanthotricha* populations. Mining activities in Yunnan Province and northern Laos also contribute to habitat degradation and fragmentation within this species' range.

Tourism and recreation: Unknown for this species. The remote montane habitats where *Q. xanthotricha* occurs are not currently subject to significant tourism pressure.

Fire and fire suppression: Seasonal burning for agricultural land clearance is practiced in the montane forest zone of northern Laos and Yunnan, and may impact regeneration of *Q. xanthotricha*, particularly in edge habitats.

Invasive species competition/disturbance: The impact of invasive species on *Q. xanthotricha* is currently unknown. However, documented invasive plants in Southeast Asia's disturbed montane forests may compete with its seedlings for resources in degraded areas.

Climate change and severe weather: Climate projections for the subtropical moist forest life zone where *Q. xanthotricha* occurs indicate increasing temperatures and changes in precipitation patterns. Species with highly restricted distributions and limited occurrence points are particularly vulnerable to climate-driven habitat shifts. The warm temperate zone in northern Laos and Yunnan is projected to shift upslope over the coming decades.

Genetic material loss: Given the small number of known occurrence points and the potentially isolated nature of populations, inbreeding and reduced genetic diversity are concerns, particularly if populations become further fragmented by habitat loss. No genetic diversity data are currently available for *Q. xanthotricha*.

Pests/pathogens: Unknown for this species. No pest or pathogen data are specifically available for *Q. xanthotricha*.

Extremely small populations: *Q. xanthotricha* is known from only a very small number of localities. The limited occurrence data may partly reflect under-collection in remote highland areas of northern Laos and Yunnan rather than true rarity, but the species' restricted range and small populations make it highly vulnerable to stochastic events. It does not have a confirmed occurrence in Vietnam, though it has been reported there (POWO, 2026).

CONSERVATION ACTIVITIES

Once per year between 2021 and 2025, *Quercus* accessions data were requested from ex situ collections globally. A total of 45 institutions from 12 countries submitted data for Southeast and East Asian (SE-E Asian) oak species, including *Q. xanthotricha*. We also included ex situ collections data in our analysis from the 267 institutions that responded to surveys conducted in 2017–2022 for previous gap analysis of oaks led by The Morton Arboretum, as these often included all *Quercus* level accession data at an institution and could have included one or more of our target species. Past, present, and planned conservation activities for SE-E Asian oak species of concern were also examined through literature review and expert consultation.

There were no institutions that reported ex situ collections of *Q. xanthotricha* (Table 1). As a result, geographic and ecological coverage of ex situ collections for *Q. xanthotricha* could not be calculated.

Using methods adapted from Khoury et al. (2020), we estimated the degree of representation of *Q. xanthotricha* in protected areas in order to identify *in situ* conservation gaps. Wild occurrence points were mapped and overlaid with protected areas from the World Database on Protected Areas (Figure 3; UNEP-WCMC & IUCN, 2025) and the Data Resources of Nature Reserves in China Repository (National Specimen Information Infrastructure, 2020). A fifty-kilometer

Table 1. Results of 2017–2022 ex situ surveys.

Number of ex situ collections reporting this species	0
Number of plants in ex situ collections	0
Average number of plants per institution	0
Percent of ex situ plants of wild origin	NA
Percent of wild origin plants with known locality	NA

Table 2. *In situ* conservation scores for *Quercus xanthotricha* with all scores ranging from 0–100. A final score of 100 indicates comprehensive *in situ* conservation, and a score of 0 represents poor *in situ* conservation.

Geographic coverage <i>in situ</i>	3
Ecological coverage <i>in situ</i>	25
Species representation in <i>in situ</i> collections	0
Final <i>in situ</i> conservation score	9

buffer was placed around each occurrence point to represent the species inferred native range. Geographic coverage *in situ* was estimated by calculating the proportion of a species inferred native range that is covered by protected areas. Ecological coverage *in situ* was estimated by identifying the Holdridge life zones in the inferred native range as well as the Holdridge life zones in protected areas within the inferred native range and calculating the percentage of life zones that are conserved in protected areas. Species representativeness *in situ* was estimated by calculating the percentage of known occurrence points within the species inferred native range that fall inside protected areas. All three scores range from 0–100. A final conservation score *in situ* was calculated by taking an average of the three scores above. Final scores range from 0–100, with scores near 100 indicating comprehensive *in situ* conservation, and scores near 0 indicating poor *in situ* conservation.

The final conservation score *in situ* for *Q. xanthotricha* is 9/100 (Table 2). As a reference, the threatened or Data Deficient SE-E Asian oaks with the highest *in situ* conservation scores are *Q. blaoensis* with a score of 77/100, and *Q. xuanlienensis* with a score of 79/100.

Land protection: The extent to which known occurrence points of *Q. xanthotricha* fall within protected areas has not been fully determined. In China, specimens were collected from Yunnan Province, where a network of nature reserves protects portions of subtropical montane forest habitat. In Laos, the species occurs in Central and Southern Laos, but formal confirmation of whether any occurrences fall within existing protected areas is lacking.

Sustainable management of land: No targeted sustainable land management activities for *Q. xanthotricha* are known at this time.

Population monitoring and/or occurrence surveys: In 2024 and 2025, with project funding from the Franklina Foundation, researchers from Dalat University conducted seven field expeditions across Viet Nam, targeting sites in Hà Tĩnh (Vu Quang NP), Kon Tum (Mang Đen), and Lâm Đồng. These surveys focused on mapping mother trees and collecting seeds and specimens of threatened species. So far, the team has discovered populations of several species of threatened oaks including *Q. xanthotricha*, and successfully gathered mature seeds from five species of threatened oaks for propagation trials.

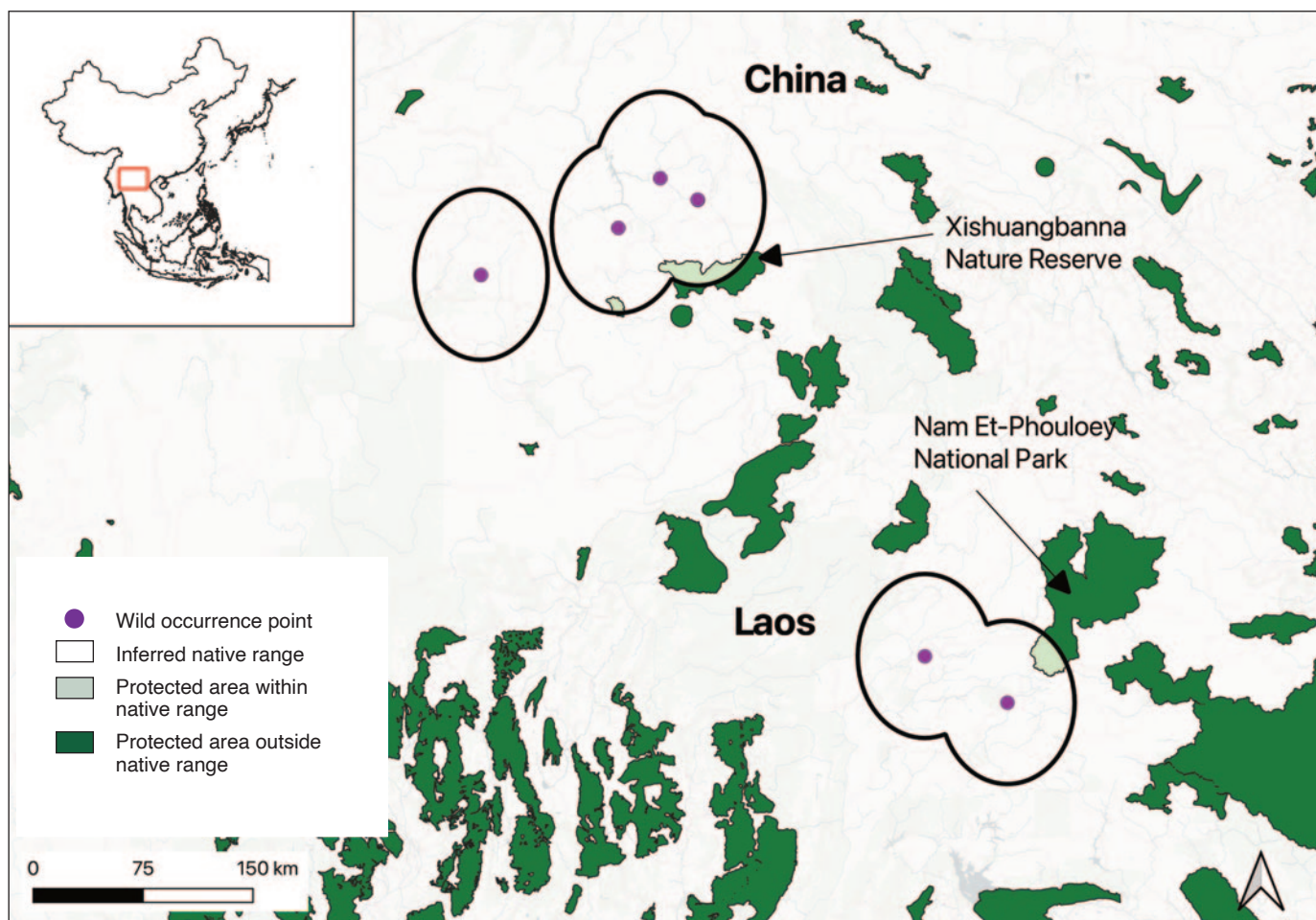


Figure 3. Wild occurrence points and inferred native range of *Quercus xanthotricha* in relation to protected areas. Protected areas are from the World Database on Protected Areas (UNEP-WCMC & IUCN, 2025) and the Data Resources of Nature Reserves in China Repository (National Specimen Information Infrastructure, 2020).

Wild collecting and/or ex situ curation: There were no institutions that reported ex situ collections of *Q. xanthotricha*. This represents a significant conservation gap. Wild collection of seed material for preservation in ex situ collections should be prioritized.

Propagation and/or breeding programs: Propagation of wild collected seeds has been attempted at Dalat University.

Reintroduction, reinforcement, and/or translocation: This is not currently a conservation activity for this species. *Quercus xanthotricha* lacks both ex situ material and sufficient baseline population data to support reintroduction or reinforcement activities at this time.

Research: There is very little published research specifically on *Q. xanthotricha*. Morphological descriptions were recently updated in Fagaceae of Southeast Asia (Strijk et al., 2025). Phylogenetic work on *Quercus* in Southeast Asia has

occasionally included specimens attributable to this species. The Conservation Gap Analysis of Select Native Asian Oaks (Good et al., 2026) identified *Q. xanthotricha* as a target species for conservation attention, and researchers at Dalat University are currently propagating wild collected seeds from this species.

Education, outreach, and/or training: To enhance the capacity building of botanists in Laos, two workshops on taxonomy of Fagaceae and propagation training have been conducted. *Quercus xanthotricha* was one of the focal species of the workshop. A species identification sheet has been created and distributed during the training workshop.

Species protection policies: No specific species protection policies are known for *Q. xanthotricha*. In Laos, the National Biodiversity Strategy and Action Plan (NBSAP) provides general guidelines for biodiversity conservation but does not list specific oak species for protection.

PRIORITY CONSERVATION ACTIONS

To conserve *Q. xanthotricha*, priority must be given to population surveys and occurrence mapping across Laos, China, and Vietnam to refine its IUCN threat assessment and identify the full extent of its range. Additionally, because no living specimens are currently held in botanical institutions, establishing ex situ collections through the rescue of wild seeds and plant material is critical to prevent extinction. Finally, it is essential to verify if existing protected areas cover these populations and, where necessary, collaborate with national governments to expand or establish new land protections.

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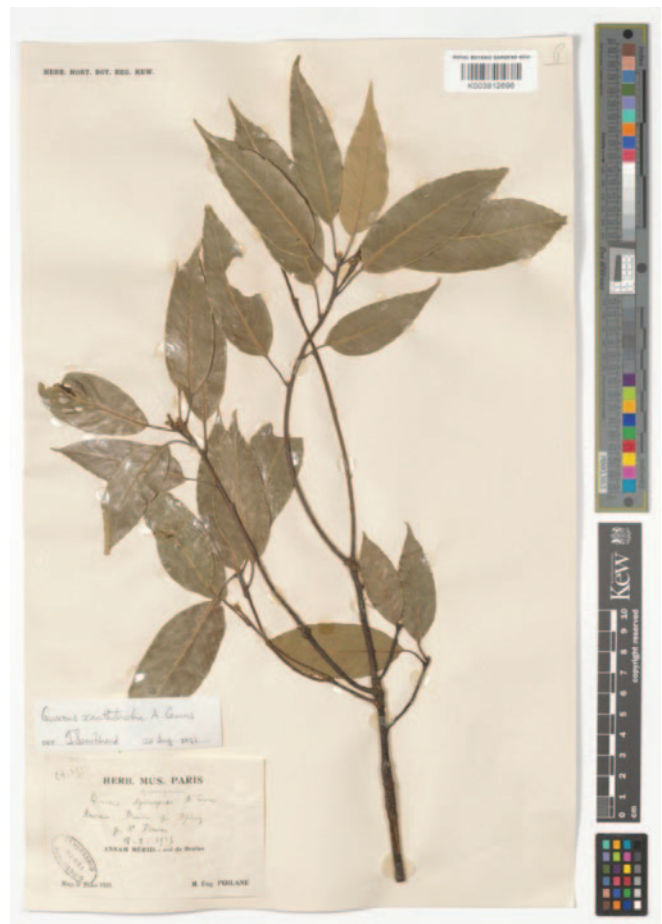
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