Global Conservation Gap Analysis of Magnolia

Species profile: Magnolia zenii

Individual profiles for species where spatial analysis could be performed are listed below.

**Caribbean**
- Magnolia dodecapetala
- Magnolia portoricensis

**East Asia**
- Magnolia amoena
- Magnolia aromatica
- Magnolia cylindrica
- Magnolia dawsoniana
- Magnolia lacei
- Magnolia lucida
- Magnolia odorata
- Magnolia officinalis
- Magnolia sargentiana
- Magnolia sinica
- Magnolia stellata

**Mexico & Central America**
- Magnolia iltisiana
- Magnolia mexicana
- Magnolia oaxacensis
- Magnolia ofeliae
- Magnolia pacifica
- Magnolia pugana
- Magnolia rzedowskiana
- Magnolia sharpii
- Magnolia tamaulipana
- Magnolia vallartensis
- Magnolia vovidesii
- Magnolia yoroconte

**South & Southeast Asia**
- Magnolia rajaniana
- Magnolia sapaensis

This species profile is an appendix of the Global Conservation Gap Analysis of Magnolia. See the full report here: [https://globalconservationconsortia.org/resources/global-conservation-gap-analysis-of-magnolia/](https://globalconservationconsortia.org/resources/global-conservation-gap-analysis-of-magnolia/)
**Magnolia zenii** W.C.Cheng

**Section:** Yulania  **Synonyms:** Magnolia elliptilimba Y.W.Law & Z.Y.Gao, Yulania zenii (W.C.Cheng) D.L.Fu  **Common names:** Baohua Yulan  **IUCN Red List Category and Criteria:** Critically Endangered D

**Co-author:** Xiangying Wen, Botanic Gardens Conservation International, China


**Distribution and Ecology**

*Magnolia zenii* is endemic to Jiangsu in China. It is known from the type locality on the north slopes of Mount Baohua within a national forest park at an altitude of 220 m asl. There are just 18 individuals existing in the wild (China Expert Workshop 2014). It is assessed as Critically Endangered due to its extremely small population size and is a national key protected species.

**Threats to Wild populations**

This species has an extremely small population. Germination rate of seeds is very low and the population is impacted by visitors of the protected area. Germination of seeds is impacted by the dense forest canopy and the high humidity in the forest. So, there are few seedlings found in its wild habitat (Chu 2021). Inbreeding, development, climate change and agriculture, silviculture and/or ranching are all identified as threats to this species.

![Figure 1](image1.png)

*Figure 1.* Documented in situ occurrence points for *Magnolia zenii* (China Expert Workshop 2014). Protected areas are from Protected Planet (UNEP-WCMC 2021).

![Figure 2](image2.png)

*Figure 2.* Responses from the Magnolia conservation action questionnaire for *M. zenii* for ‘Select what you see as the most significant threats to wild populations of each species’. The number of respondents participating in each question is listed in parentheses after the species’ name.
Conservation Activities

In 2019 and 2020, Magnolia taxon and accession level data were gathered from PlantSearch as well as a survey of ex situ collections. A total of 522 institutions from 65 countries submitted data for Magnolia species. Current and needed conservation activities for Magnolia species were also gathered through literature review, expert consultation and a conservation actions questionnaire. A total of 90 respondents from 77 institutions in 25 countries responded to the Magnolia Conservation Actions Questionnaire including 64 respondents from 56 institutions providing information on 145 threatened species and additional species of concern.

Results of ex situ survey

Number of ex situ collections reporting this species: 75
Number of plants in ex situ collections: 132
Average number of plants per institution: 2
Percent of ex situ plants of wild origin: 14%
Percent of wild origin plants with known locality: 53%

Table 1. Scoring matrix identifying the most severe demographic issues affecting Magnolia zenii. Cells are highlighted when the species meets the respective vulnerability threshold for each demographic indicator. Average vulnerability score is calculated using only those demographic indicators with sufficient data (i.e., excluding unknown indicators).

<table>
<thead>
<tr>
<th>Demographic indicators</th>
<th>Level of vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Emergency Score = 40</td>
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<tr>
<td>Population size</td>
<td>&lt; 50</td>
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<tr>
<td>Range/endemism</td>
<td></td>
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<td></td>
<td>Exotic or small</td>
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<td></td>
<td>range or 1 location</td>
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<tr>
<td>Population decline</td>
<td>Extreme</td>
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<tr>
<td>Fragmentation</td>
<td>Severe</td>
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<tr>
<td></td>
<td>fragmentation</td>
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<tr>
<td>Regeneration/recruitment</td>
<td>No regeneration</td>
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<tr>
<td></td>
<td>or recruitment</td>
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<td></td>
<td></td>
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<tr>
<td>Genetic variation/integrity</td>
<td>Extremely low</td>
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</table>

Average vulnerability score 30

Figure 3. Number and origin of Magnolia zenii plants in ex situ collections. Provenance types: W = wild; Z = indirect wild; H = horticultural; U = unknown.
Research: Genetics
Gifu Academy of Forest Science and Culture reports carrying out genetic research on *M. zenii*.

Research: Climate change
One institution reports this activity for *M. zenii*.

Public awareness/education:
Three institutions reported this activity in the questionnaire including Gardens of the Big Bend at University of Florida and Shenzhen Fairy Lake Botanical Garden.

Population reinforcement or introduction
*M. zenii* has been included in reintroduction projects and is a National key protected species in China (Ren H. 2020).

Protect and/or manage habitat
In 2020 and 2021, reinforcement of the slope habitat as well as guardrails have been installed surrounding the individuals (Chu 2021). Studies on population patterns and ecology showed that the species was subdominant in its communities (Jiang et al. 2010). Shenzhen Fairy Lake Botanical Garden reports this activity.

<table>
<thead>
<tr>
<th>Source locality and number of wild provenance individuals in ex situ collections</th>
<th>&lt;5</th>
<th>5-15</th>
<th>15+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species’ estimated native distribution</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Estimated capture of ex situ collections</td>
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</tbody>
</table>

A spatial analysis was conducted to estimate the geographic and ecological coverage of ex situ collections (Figure 4). Twenty, 50 and 100 kilometer buffers were placed around each in situ occurrence point and the source locality of each plant living in ex situ collections. Collectively, the in situ buffer area serves as the inferred native range of the species, or “combined area in situ” (CAI20, CAI50, CAI100 respectively). The ex situ buffer area represents the native range “captured” in ex situ collections, or “combined area ex situ” (CAE20, CAE50, CAE100). Geographic coverage of ex situ collections was estimated by dividing CAE by CAI and is presented here in km² and percentage of area covered. Ecological coverage was estimated by dividing the number of Terrestrial Ecoregions of the World present in the CAE by the number of ecoregions in the CAI. The average percentage of coverage of all three buffer sizes is also presented for the species.

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**Estimated ex situ representation**

<table>
<thead>
<tr>
<th>Buffer size</th>
<th>Geographic coverage</th>
<th>Ecological coverage</th>
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</thead>
<tbody>
<tr>
<td>20km buffer</td>
<td>1,285 / 1,319</td>
<td>1 / 1 (100%)</td>
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<tr>
<td>50km buffer</td>
<td>7,923 / 8,005</td>
<td>1 / 1 (100%)</td>
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<tr>
<td>100km buffer</td>
<td>31,100 / 31,265</td>
<td>1 / 1 (100%)</td>
</tr>
<tr>
<td>Average of all three buffer sizes</td>
<td>99%</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Figure 4.* Magnolia zenii in situ occurrence points and ex situ collection source localities. Terrestrial Ecoregions of the world (Olson 2001) are coloured; the recorded distribution is included in the Changjiang Plain evergreen forests ecoregion.

**Population reinforcement or introduction**
One institution reports this activity for *M. zenii*.

**Pollen and/or seed banking**
Both Shenzhen Fairy Lake Botanical Garden and University of British Columbia Botanical Garden report this activity for *M. zenii*.

**Occurrence surveys or population monitoring**
Shenzhen Fairy Lake Botanical Garden reports this activity.

**Implementation of protection policies or regulations**
Shenzhen Fairy Lake Botanical Garden reports this activity for *M. zenii*.
Habitat restoration
Shenzhen Fairy Lake Botanical Garden reports this activity for *M. zenii*.

Conservation Horticulture
Gardens of the Big Bend at University of Florida, Shenzhen Fairy Lake Botanical Garden and the University of British Columbia Botanical Garden all report conservation horticulture as an activity carried out by their institutions.

Collect and distribute germplasm
Jiangsu Institute of Botany, Nanjing Forestry University, Nanjing Normal University, South China Botanical Garden, and Research Institute of Subtropical Forestry, Chinese Academy of Forestry have all carried out ex situ conservation at a small scale. Shanghai Botanical Garden also holds *M. zenii* ex situ collections (Chu 2021). Shenzhen Fairy Lake Botanical Garden and Zhejiang A&F University report this activity for *M. zenii*. Ex situ collections are reported from the endemic location of this species in the Changjiang Plain evergreen forests ecoregion (Figure 4).

Figure 5. Number of institutions reporting conservation activities for *Magnolia zenii* grouped by organization type. Six of 56 institutions reported activities focused on *M. zenii* (see Appendix F for a list of all responding institutions).
Conservation Actions Needed

Shanghai Botanical Garden, Nanjing Forestry University, Jiangsu Wildlife Conservation Station, and the Baohuashan National Forest Park Management Committee have been participating in the joint project to conserve this species in situ (Chu 2021). On-going propagation, in situ conservation, ex situ conservation, reintroduction, public awareness raising and conservation technique training are supported by a Global Trees Campaign project.

While many activities are recommended for this species, collection and distribution of germplasm, public awareness and population monitoring are most recommended.

References


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Figure 6. Responses from the Magnolia conservation action questionnaire for M. zenii for ‘Select what you see as the most urgent conservation activities for each species’. The number of respondents participating in each question is listed in parentheses after the species’ name.

<table>
<thead>
<tr>
<th>Percentage of respondents</th>
<th>Research: Pests &amp; Pathogens</th>
<th>Public awareness or education</th>
<th>Protect and/or manage habitat</th>
<th>Population reinforcement or introduction</th>
<th>Pollen and/or seed banking</th>
<th>Occurrence surveys or population monitoring</th>
<th>Implement protection policies or regulations</th>
<th>Habitat restoration</th>
<th>Cryopreservation and/or micropropagation</th>
<th>Conservation horticulture</th>
<th>Collect and distribute germplasm</th>
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<td>100%</td>
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