Aquilaria malaccensis (agarwood-producing species): Has the listing in Appendix II come too late?

Aquilaria products and derivatives in trade
List of projects where data has been used

- Reproductive and genetic studies towards the conservation and management of *Aquilaria malaccensis* in Peninsular Malaysia, 2013–2015;

- CTFS-ForestGEO network of forest research plots, 1980–;

- National Forest Inventory 1993–;

- *Kajian pemuliharaan dan pembangunan mikrosatelit DNA ke atas Aquilaria malaccensis* (karas) *di Semenanjung Malaysia, 2011–2012*; and

Preliminary results

- mortality rates have been consistently higher than recruitment rates;
- a declining abundance of trees in various diameter categories;
- high floral abortion rates;
- wild populations suffer from a declining rate of population change; and
- several of its life history traits are thought to be natural evolutionary constraints.
Species biology and life cycle characteristics

- clear nomenclature concept, taxonomic description widely available;
- supra-annual reproductive behaviour;
- infrequent flowering episodes, high floral abortion rate during masting;
- High levels of genetic diversity within populations but low levels among populations; and
- lower rates of recruitment compared to mortality.
Conservation genetics of *A. malaccensis* in P. Malaysia
Species range

Global

Malaysia
Cont.

- It has no habitat preference and is found in a variety of soils from sea level to 1700 m altitude in the primary and logged-over natural forests;

- In a forest, individuals are scattered and nowhere abundant.
Mortality rates are higher than recruitment rates

Mean annualised recruitment and mortality rates of karas in S6

Note: from 1987 onwards
Declining frequency abundance in various diameter categories

Stocking of *Aquilaria malaccensis* and *A. hirta* in 1993, 2004 and 2013 in Permanent Reserved Forests in Peninsular Malaysia based on AOO
Threats

- Unsustainable harvesting;
- Land conversion (very minor).

Conservation status

<table>
<thead>
<tr>
<th>Species</th>
<th>Malaysia Red List</th>
<th>IUCN (2014) Red List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquilaria beccariana</td>
<td>DD</td>
<td>VU A1d</td>
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<tr>
<td>Aquilaria hirta</td>
<td>VU A4cd</td>
<td>NA</td>
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<tr>
<td>Aquilaria malaccensis</td>
<td>VU A4cd</td>
<td>VU A1d</td>
</tr>
<tr>
<td>Aquilaria microcarpa</td>
<td>DD</td>
<td>NA</td>
</tr>
<tr>
<td>Aquilaria rostrata</td>
<td>DD</td>
<td>CR B1ab(v)</td>
</tr>
</tbody>
</table>

NA = Not available

Current management measures

- Larger trees are target leaving the smaller-diameter ones untouched (this threshold may be lowered when the resource dwindles);

- Minor licence is required to harvest from Permanent Reserved Forests (PRFs) and Stateland but rarely enforced where local and indigenous communities are concerned;

- Issuance of a removal pass which records the amount of timber/chip/blocks leaving a concession. This pass is required when applying for other permits, e.g., CITES export permit;

- In national parks, state parks and protection forests in the PRFs, no harvesting is permitted; and

- Frequent patrolling by stakeholders.
Adaptive measures

- Enhanced cooperation and collaboration between primary stakeholders (state authorities) and enforcement agencies (police and army forces, customs, maritime and immigration authorities);

- National Forestry Act (1984, amended 1993; Act 313) is being revised; and

- Severe penalties imposed by the International Trade in Endangered Species Act 2008 (Act 686);

- Harvest is regulated through an export quota system.
Proposed management measures

- review present compliance level; and
- Improve further the adaptive management strategies.

These strategies however must be developed in a holistic manner.
Acknowledgement

- ITTO-CITES Program: Support to ITTO-CITES Implementation for Tree Species;

- Centre for Tropical Forest Science and Forest Global Earth Observatory, Smithsonian Tropical Research Institute;

- Government of Malaysia; and

- CITES.
Thank you