The Efforts and Limitations for Conservation of Plant Species Diversity in Korea

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INTRODUCTION (1)

Natural Environments & People in Korea

✓ Total Area : 223,000㎢ (S. Korea, 100,000㎢)
✓ Populations : 48 millions (487 individuals/㎢)
✓ Land Uses : Forest (65%)/Agriculture Lands(21.5%)/Urban Area(5.9%)
INTRODUCTION (2)

✓ Mountainous Topography
  + River & Stream Corridors + Sea(3sides)
✓ Floristic Diversity & Richness in Korea
  - Vascular Plants → 4,662 species
    (including infraspecific taxa)
  - (842 Monocots, 2,815 Dicots,
    314 Ferns & Gymnos, 691 Moss)
INTRODUCTION (3)

✓ Decrease of Plant Species Diversity by Human Impacts & Natural Disturbance

- Loss of Habitats
- Harvesting & Overexploitation
- Alien Plants & Feral Animals
- Pollution
- Climate Change

Flow diagram of some cause-and-effect relationships in biological communities that are consequences of certain human impacts. The dashed arrow from box A to “Additions” indicates that an increase in the density of a species may behave ecologically like a species addition. (Reproduced by permission from Gilpin and Soule 1986)

BackRok Pond, Mt. Halla (1915m), formed by Volcano Eruption
Climate Change Impacts on Alpine Plants
INTRODUCTION (4)

✓ Decrease of Plant Species Diversity in Korea

- Rapid Urbanization (90%) & Industrialization Since 1970’s
- Harvesting & Overexploitation Problems in Korea
  Traditionally & Recently Uses Of Plant Resources For ;
  Medicinals (Roots/Fruits)
  Edible (Vegetables in Spring Season)
  Ornamentals (Wild Flowers)
- But, Decreasing Trends & Current Status
  Is Not Accurately Surveyed & Analysed

✓ This Papers

- Efforts & Limitations For Conservation
  Of Rare & Endangered Plant Species
  In Korea
THE EFFORTS & LIMITATIONS FOR CONSERVATION OF PLANTS SPECIES DIVERSITY IN KOREA(1)

POLICY PLAN FOR PROTECTION OF WILD PLANTS & ANIMALS IN KOREA

- Long Term Plan for Environment Conservation
- Nat'l Comprensive Plan For Environment
  - Regional Implementation Plan
- Master Plan for Conservation of Natural Environment
  - Regional Implementation Plan
- Master Plan for Protections of Wild Plants & Animals
  - Regional Detail Implementation Plan
- Survey & Analysis
- Management of Endangered Species
- Protected Areas
- Monitoring & Assessment
- Uses of Bio Resources
- International Cooperation
- Administrative Law & Organization
THE EFFORTS & LIMITATIONS FOR CONSERVATION OF PLANTS SPECIES DIVERSITY IN KOREA(2)

<table>
<thead>
<tr>
<th>Field</th>
<th>Higher Priority</th>
<th>Lower Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographic</td>
<td>Small range</td>
<td>Wide range</td>
</tr>
<tr>
<td></td>
<td>Endemic to region</td>
<td>Not endemic to region</td>
</tr>
<tr>
<td>Taxonomy(^1)</td>
<td>High level taxon</td>
<td>Low level taxon</td>
</tr>
<tr>
<td></td>
<td>Small genus/family</td>
<td>Large genus/family</td>
</tr>
<tr>
<td></td>
<td>Probably relict</td>
<td>Not relict</td>
</tr>
<tr>
<td>Habitat</td>
<td>Under threat</td>
<td>Not under threat</td>
</tr>
<tr>
<td></td>
<td>Fragile</td>
<td>Resistant</td>
</tr>
<tr>
<td></td>
<td>Specificity narrow</td>
<td>Wide habitat range</td>
</tr>
<tr>
<td></td>
<td>Successional</td>
<td>Climax</td>
</tr>
<tr>
<td>Life form</td>
<td>Annual or short-lived perennial</td>
<td>Long-lived perennial</td>
</tr>
<tr>
<td>Populations</td>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td></td>
<td>Few</td>
<td>Many</td>
</tr>
<tr>
<td>Biology(^2)</td>
<td>Rarely flowering</td>
<td>Often flowering</td>
</tr>
<tr>
<td></td>
<td>Specific pollinator</td>
<td>Nonspecific pollinator</td>
</tr>
<tr>
<td></td>
<td>Dioecious</td>
<td>Monoecious</td>
</tr>
<tr>
<td></td>
<td>Obligate outcrossing</td>
<td>Selfing readily</td>
</tr>
<tr>
<td></td>
<td>Seed short lived</td>
<td>Seed long lived</td>
</tr>
<tr>
<td></td>
<td>Poor class structure</td>
<td>Good class structure</td>
</tr>
<tr>
<td></td>
<td>Poor vegetative reproduction</td>
<td>Good vegetative reproduction</td>
</tr>
<tr>
<td>Miscella-neous</td>
<td>Harvested</td>
<td>Not harvested</td>
</tr>
<tr>
<td></td>
<td>Region of high endemism</td>
<td>Region of low endemism</td>
</tr>
</tbody>
</table>

\(^1\)High level taxa=family, genus; low level taxa=subspecies, variety.

\(^2\)Poor class structure=disproportionate representation of one age class; good class structure=spread of population through age classes.
THE EFFORTS & LIMITATIONS FOR CONSERVATION OF PLANTS SPECIES DIVERSITY IN KOREA(3)

DESIGNATION OF ENDANGERED & PROTECTED PLANT SPECIES IN KOREA

✓ Legislative Approach by Ministry Of Environment in Korea
  - Environment Conservation Act (1989) : 92 Species as Special Wild Plants & Animals (59 Plants Species)
  - Protection of Wild Plants & Animals Act (2005) :
    221 Species As Endangered Wild Plants & Animals (I·II Class)
    (Total 64 Plant Species Composed of 8 I Class & 56 II Class)

✓ Problems
  - Total No. of Species Designated is Different by Criteria
  - Insufficient Data, Past Experienced Knowledge of Experts (Interview)
  - Commision for Management of Endangered Species (MOE)
THE EFFORTS & LIMITATIONS FOR CONSERVATION OF PLANTS SPECIES DIVERSITY IN KOREA(4)

- Forest Resources Act (2000) : 217 Kinds as Korean Rare Plants
- Korea Red Data Book (2002-2009) by IUCN’s Criteria
  571 Kinds : EW(4) / CR(144) / EN(122) / VU(119) / LC(70) / DD(112)

Categories & Criteria of Red Data Books By IUCN (1994)

- Adequate data
  - Extinct
  - Extinct in the Wild
  - Critically Endangered
  - Endangered
  - Vulnerable

- Evaluated
  - Lower Risk
    - Conservation Dependant
    - Near Threatened
    - Least Concern
  - Data Deficient
  - Not Evaluated
Preservation of plants in their natural habitats is often regarded as the mainstay of Plant species conservation, but protected area system is not easy to maintain and designate newly due to cost problem and confliction with stakeholder in Korea.

### In Situ Conservation and Restoration

<table>
<thead>
<tr>
<th>Section</th>
<th>Area, (\text{km}^2) (Sites)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Parks</td>
<td>6,579 (20)</td>
<td>6.6</td>
</tr>
<tr>
<td>Regional Conservation Areas for Eco &amp; Landscape</td>
<td>248 (24)</td>
<td>0.25</td>
</tr>
<tr>
<td>Special Protected Areas for Wild Plants &amp; Animals</td>
<td>26.2 (1)</td>
<td>0.03</td>
</tr>
<tr>
<td>Protected Areas for Wild Plants &amp; Animals</td>
<td>1,392 (544)</td>
<td>1.40</td>
</tr>
<tr>
<td>Protected Areas for Wetland</td>
<td>186 (15)</td>
<td>0.18</td>
</tr>
<tr>
<td>Specified Islands</td>
<td>10 (153)</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>8,441.2 (758)</strong></td>
<td><strong>8.46%</strong></td>
</tr>
</tbody>
</table>
Ex situ (off-site) conservation is the conservation of plants away from their areas of natural occurrence.

The term does not include conservation by replanting in the Wild – often termed *translocation*. For many people, *ex situ* immediately brings to mind plants growing in botanic gardens or arboretum.

These certainly constitute a major example of *ex situ* conservation, but the concept extends as well to field gene banks, clonal collection, and germ plasm banks where propagating tissues and seed are preserved for growing in the future.

Accordingly botanic gardens have played a significant role in the exploration of the world’s plant resources, introducing many economically important species into cultivation for the first time and disseminating.
THE EFFORTS & LIMITATIONS FOR CONSERVATION OF PLANTS SPECIES DIVERSITY IN KOREA(7)

✓ Institutions for *Ex Situ* Conservation of Plants by MOE in Korea (2008)

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Plant Species</th>
<th>Date</th>
<th>Management Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Halla Arboretum</td>
<td>13</td>
<td>'00.05.25</td>
<td>Public</td>
</tr>
<tr>
<td>3</td>
<td>Hantaek Botanical Garden</td>
<td>10</td>
<td>'01.10.12</td>
<td>Private(F)</td>
</tr>
<tr>
<td>6</td>
<td>Yeomiji Botanical Garden</td>
<td>12</td>
<td>'03.03.10</td>
<td>Private</td>
</tr>
<tr>
<td>8</td>
<td>Gichungsan Botanical Garden</td>
<td>10</td>
<td>'04.03.22</td>
<td>Private</td>
</tr>
<tr>
<td>9</td>
<td>Korea Native Botanical Garden</td>
<td>10</td>
<td>'04.05.03</td>
<td>Private</td>
</tr>
<tr>
<td>12</td>
<td>Chollipo Arboretum</td>
<td>5</td>
<td>'06.09.21</td>
<td>Private(F)</td>
</tr>
<tr>
<td>14</td>
<td>Hampyong Ecological Park</td>
<td>4</td>
<td>'08.11.18</td>
<td>Public</td>
</tr>
</tbody>
</table>

* Korea National Arboretum & 8 Regional Arboretums by KFS
THE EFFORTS & LIMITATIONS FOR CONSERVATION OF PLANTS SPECIES DIVERSITY IN KOREA(8)

✓ Comprehensive Plan for Propagation & Restoration of Endangered Species
by MOE in Korea (2006-2015)

- Selection of Plant Species:
  36 Species Distributed at 17 National Park
- Criteria: Rarity, Adaptation, Endemics,
  Success Possibility,
  Period Required, Flagship Spp.
  (Symbolism, public Awareness),
  Cooperation with Local Community
THE EFFORTS & LIMITATIONS FOR CONSERVATION OF PLANTS SPECIES DIVERSITY IN KOREA(9)
THE EFFORTS & LIMITATIONS FOR CONSERVATION OF PLANTS SPECIES DIVERSITY IN KOREA (10)

Ranunculus kazusensis
Isoetes japonica
Abeliophyllum distichum
Osmanthus insularis

Aconitum koreanum
Vexillabium yakushimense var. nakaianum
Lilium cernum
Aconitum austrokoraiense

Thalictrum coreanum
Milletia japonica
Leontopodium coreanum
Diapensia lapponica var. obovata
THE EFFORTS & LIMITATIONS FOR CONSERVATION OF PLANTS SPECIES DIVERSITY IN KOREA(11)

✓ Restoration of *Bupleurum latissimum* Nakai, Rare Plants by KFS

- First Inventory & Report (1916) in Ullneng Islands by ISHITOYA, Plant Taxonomist (Japan)
- Two Times, Collecting Records in 1936, 1966
- Rediscovery in 2000 by Team for Plants Restroation, Korea Nat'l Arboretum
- Propagation of 100 Individuals and Translocation (2006)
- Creation of Habitats to Induce Flowering & Propagating in Native Conditions (2008)
THE EFFORTS & LIMITATIONS FOR CONSERVATION OF PLANTS SPECIES DIVERSITY IN KOREA(12)

✓ Recovery Plan for Rare & Endangered Species (*Abeliophyllum distichum*)
By Dr. Yong Sik Kim, Chairman of Korean Plants Specialist Group (KPSG), one of official branch in SSC (Species Survival Commission) of IUCN

**Summary**
- Current Species Status
- Habitat Requirements and Limiting Factors
- Recovery Objectives
- Recovery Criteria
- Actions Needed
- Total Estimated Cost of Recovery
- Biodiversity Benefits

**Recovery; proposed research phase**
1. Objective and Criteria
2. Description of Recovery Actions
   1) Monitoring and Searching
      1) Monitoring at All Priority Sites
      2) Searching for New Populations
   3. Research
      1) Objectives and Criteria
      2) Design of Experiment
      3) Further Prerequisite Researches into *Abeliophyllum distichum* Ecology

**Implementation schedule**

**Acknowledgement**

**Biography**
CONCLUSIONS & RECOMMENDATIONS

As the relative high plant diversity of Korea is envisaged from the various kinds of threats from the human activities, the integrated approach to achieve the conservation of plants and their habitats in Korea is major concern to be managed.

One of the most significant tasks to be considered in plant and their habitats conservation of Korea is to establish the integrated systematic approaches, for the proper allocation of the limited plant conservation scientists in the country and fund-raising and so on, among the MOE and KFS.

So the set up of the Korean Plant Conservation Task Force which to support the effective conservation decision-making among the ministries will be one of the effective and powerful capacity building for the conservation of plant and their habitats.
THANKS FOR YOUR ATTENTION