

Effective Methods on the Conservation of Specific Plant Species

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Abstract

효과적인 특정식물종에 보전대책 수립을 위한 정책적 측면에서의 연구결과를 요약하면 아래와 같다.

1) 특정식물종의 분류항목을 보다 더 세분화하고 세분화된 각 항목별 지정기준을 구체적으로 설정하는 것이 필요하다. 2) 조사의 범위를 특정지역에 대한 부분적 조사가 아니라 국토 및 지역차원에서 총체적으로 이루어져야 하고 조사 내용도 특정식물종만이 아닌 타 환경요인들(Biotope, 식물지리적 분포, 토양조건 등)을 함께 조사내용에 포함시킬 필요가 있다. 3) 연구자의 주관적 편견이나 경험에 의한 평가를 지양하고 보다 객관적이고 과학적인 평가체계의 확립이 필요하다. 4) 국가차원에서 특정식물종을 총체적으로 관리할 수 있는 지도제작, 정보시스템의 구축, 현장보전 및 장외보전의 활성화가 필요하다. 본 연구에서 제시된 정책적 차원에서의 개선책은 관계전문가들 사이에 보다 더 구체적인 논의 및 연구를 위한 기초자료 제시로서, 세부적인 연구는 차후 계속 수행되어야 할 것으로 사료된다.

Keywords : specific plants, biotope, habitat fragmentation, geographical distribution

I. Introduction

It has been accelerated for destruction of environment along development of country industrialization mainly started from late 1970. Especially reduction of area of green space and fragmentation of ecosystem got worse habitat environment of specific plant species, which increases numbers of endangered plants every year^{4, 5, 9, 10}. As an expedient of preservation methods for these, preservation methods of endangered wild life is emphasized from Nature Conversation Law(Revision in 1998) § 9, 10, 11 and Enforcement Ordinance § 2, 3, 10 and 19.

And as publishing an illustrated book of endangered and vulnerable wild life in Korea, it inspires consciousness of crisis of gradually decreasing wild life⁶. Recently with Reservation Strategy of Species from IUCN and of Convention on Biological Diversity adopted from Agenda 21, study and discussion for Preservation Strategy of Species is unfolded^{3, 4, 5, 7, 8, 11}). But problem of methods of survey, of establishment of standards of estimation, and of standards of division of national level of endangered plants in Korea are uprising problems which must be rapidly solved. Therefore, this study analysis present conditions and problems of specific

plants species in this country, and which based on, have the aim of submitting basic data of establishment of more effective reservation methods. Especially for analysis of problems owing to huge scale of study range, it is limited to 4 aspects(e.g. problems about standard of classification, about basic investigation methods, about methods of estimation and about administration), and submits substitute methods for these.

II. Method

The method of this study is based on the references abroad, within a country, and whole theories. For investigating present conditions, interview by telephone with experts(september in 1998: 5 university professor and 2 researcher of institute in Kyungpook province) was executed. And in order to know damage and neglect of specific plant species and community was carried out spot survey in two places(September and October in 1998: *Koeleruteria paniculata* association appointed natural monuments in Geojegun, Kyungsangnamdo and Taegun, Chungchongnamdo. Especially, as respects establishing a frame of analysis, it was difficult for the huge range. But, in analysis of interview with experts, spot exploration and references abroad and within a country, this study was carried out-analyses by fixing four items: 1) standard of classification, 2) method of basic investigation, 3) method of estimation, 4) aspect of administration and presented improvement plan based on these four problems.

III. Designation status of specific plant species and problems in preservation countermeasure

1. Designation status of specific plant species

1) Standard of Definition and Division

Theoretically, 4 terms are used to define and divide specific plant species in Korea^{2,10}. (1) Critical to extinct wild plant species, wild species that are still abundant in its natural range but are likely to become endangered because of a decline in numbers without any conservation programs. The decline has come from habitat loss, climate change and pollution of habitat. (2) Vulnerable protect wild plants, the number of these plant species is decreasing rapidly. These are native wild species with high scientific and internationally conservation value. (3) Specific species, these are few individual survivors and could soon become extinct over all or most of its natural range. These plants are located at the high level of plant ecosystem. (4) Rare species are rapidly decreasing in number. They need very special environment to grow. They also have a great scientific value.

All of these 4 categories are only scientifically termed. But in actual these terms are used in combination to categorize the specific plant species. There is no plant data analysis in these categories except data about insect species. Only we can used those terms mixed with.

2) Designation status of specific plant species

According to the very latest (Oct. 1998) designation status of specific plant species, 4 families and 6 species are explained by Nature Conservation Law of Korea. One family and 3 species are threatened and endangered. Among endangered, need to protect plant species are 33 families 52 species^{2,6}.

Table 1. Designation status of specific plants species in Korea ^{2,6)}

	Family	Species	Distribution		
			Korea	World	
Endangered	Orchidaceae	<i>Cymbidium kanran</i>	Chejudo	Japan, China	
		<i>Aerides japonicum</i>	Geojedo, Namhaedo, Jindo	Japan, China	
		<i>Cypripedium japonicum</i>	Kyungkido	Taiwan, Japan, China	
	Ranunculaceae	<i>Ranunculus kazusensis</i>	Seoul, Incheon, Chornnam, Hwanghaedo	USSR, Europe, North America, Japan, China	
	Rosaceae	<i>Cotoneaster wilsonii</i>	Kyungsangbukdo		Endemic
	Diapensiaceae	<i>Diapensia lapponica</i> var. <i>obovata</i>	Chejudo	USSR, North America, Japan	
Threatened	Orchidaceae	<i>Cymbidium kanran</i>	Chejudo	Japan, China	
		<i>Aerides japonicum</i>	Geojedo, Bogildo, Jindo	Japan, China	
		<i>Cypripedium japonicum</i>	Kyungkido	Taiwan, Japan, China	
Vulnerable protect	Psilotaceae	<i>Psilotum nudum</i>	Chejudo	Temperate zone, Taiwan, Japan, China	
	Isoetaceae	<i>Isoetes japonica</i>	Kyungkido, Chejudo	Japan	
	Aspleniaceae	<i>Asplenium antiquum</i>	Chejudo	Taiwan, Japan	
	Saururaceae	<i>Saururus chinensis</i>	Chejudo	Japan, China, Philiphine	
	Chloranthaceae	<i>Chloranthus glaber</i>	Chejudo	Taiwan, India, China	
	Fagaceae	<i>Quercus gilva</i>	Chejudo	Taiwan, Japan, China	
	Nymphaeaceae	<i>Brasenia schreberi</i>	Korea Peninsula	USSR, Europe, India	
	Ranunculaceae	<i>Thalictrum coreanum</i>	Seolaksan, Danyang	China	
		<i>Aconitum austro-koreans</i>	Keumosan, Jirisan		Endemic
		<i>Paeonia obovata</i>	Korea Peninsula	USSR, Japan, China	
	Berberidaceae	<i>Jeffersonia dubia</i>	Korea Peninsula	USSR, China	
		<i>Leontice microrhyncha</i>	Kangweundo	China	
	Cruciferae	<i>Wasabia koreana</i>	Kyungpuk, Uleungdo		Endemic
	Droseraceae	<i>Drosera peltata</i> var. <i>nipponica</i>	Chornnam	Japan, China	
	Crassulaceae	<i>Sedum rotundifolium</i>	Kyungpuk, Juwangsan		Endemic
	Saxifragaceae	<i>Rodgersia tabularis</i>	Kangweundo	China	
		<i>Kirengeshoma koreana</i>	Chornnam, Youngchuisan		Endemic
Hamamelidaceae	<i>Corylopsis coreana</i>	Baekunsan, Chornnam, Jirisan		Endemic	
Leguminosae	<i>Echinosophora koreensis</i>	Yangku, Hamkyungdo		Endemic	
	<i>Euchresta japonica</i>	Chejudo	Japan		
	<i>Milletia japonica</i>	Geojedo	Japan		
	<i>Astragalus membranaceus</i>	Kangweundo, Uleungdo	Russia, China		

3) Preservation program

The history of specific species conservation in Korea is not very old. In 1989, the Ministry of Environment established a protection law for 59 specific wild species and managed them. Government surveyed Korean ecosystem for the

first time in 1991 and the number of specific wild species was increased to 1994 by 1998^{4,6)}. As a result from the 1992 Earth Summit in Rio de Janeiro, an activated program of biodiversity was designed. Moreover Natural Environment Conservation Law, was established in Korea.

Table 1. Continued

	Family	Species	Distribution		
			Korea	World	
Vulnerable protect	Rhamnaceae	<i>Paliurus ramosissimus</i>	Chejudo	Taiwan, China, Japan	
		<i>Berchemia berchemiaefolia</i>	Chungbuk, Kyungbuk	China, Japan	
	Malvaceae	<i>Hibiscus hamabo</i>	Wando, Chejudo	Japan	
	Violaceae	<i>Viola websteri</i>	Kangweundo, Kyungkido, Chungbuk	China	
	Araliaceae	<i>Eleutherococcus senticosus</i>	Kangweundo, Kyungbuk	USSR, China, Japan	
	Umbelliferae	<i>Bupleurum latissimum</i>	Uleungdo		Endemic
	Ericaceae	<i>Rhododendron aureum</i>	Kangweundo	USSR, China, Japan	
		<i>Arctous ruber</i>	Seolaksan	USSR, China	
	Primulaceae	<i>Trientalis europaea</i>	Kangweundo, Gayasan	USSR, Europe, China, Japan	
	Oleaceae	<i>Osmanthus insularis</i>	Chonnam, Bogildo	Japan	
		<i>Abeliophyllum distichum</i>	Bukhansan, Chungbuk, Buan, Jangsusan		Endemic
	Scrophulariaceae	<i>Scrophularia takesimensis</i>	Uleungdo		Endemic
	Rubiaceae	<i>Lasianthus japonicus</i>	Chejudo	Taiwan	
	Compositae	<i>Leontopodium coreanum</i>	Seolaksan		Endemic
	Polypodiaceae	<i>Crypsinus hastatus</i>	below Mid-area	Taiwan, Japan, China	
	Araceae	<i>Arisaema negishii</i>	Chonnam, Chejudo	Japan	
	Liliaceae	<i>Lilium cernuum</i>	Kangweundo, Ilwolsan, Dukjusan	USSR, China	
		<i>Smilacina bicolor</i>	Seolaksan, Jirisan		Endemic
		<i>Trillium tschnoskii</i>	Uleungdo	Japan	
	Amarylidaceae	<i>Lycoris chinensis</i> var. <i>sinuolata</i>	Chonnam, Chonbuk		Endemic
	Iridaceae	<i>Iris odaesanensis</i>	Kangweundo, Kunugbuk		Endemic
		<i>Iris dichotoma</i>	kyungkido, Pungbuk	USSR, China	
	Orchidaceae	<i>Cypripedium guttatum</i> var. <i>koreanum</i>	Kangweundo	USSR, China, Japan	
		<i>Galeola septentrionalis</i>	Chejudo	Japan	
		<i>Vexillabium nakainaum</i>	Kunugbuk, Chonnam	Japan	
		<i>Gastrodia elata</i>	Korea Peninsula	Taiwan, USSR, Japan, China	
<i>Cymbidium nipponicum</i>		Kyungnam, Chonnam	India, China		
<i>Cymbidium lancifolium</i>		Chejudo	Taiwan, India, China, Japan		
<i>Sarcanthus scolopendrifolius</i>		Chonnam	Japan, China		
<i>Neofinetia falcata</i>	Kyungnam, Chejudo	Taiwan, Japan, China			

Officials did not efficiently do their work with various law-system. There is a need for management law that will help in management of special plant species and will also help to do their work efficiently by combining. But the authorization stan-

dard of specific species is less in Korea. It is used to determine by the researchers themselves. The number of endangered species is increasing, because of excessive collection for medicinal and ornamental purposes

- small habitat size
- accelerated habitat loss from heavy recreational act of human

Korean government has decided to preserve endangered species by setting up various programs. For example, surveying habitat of these species standard of specification on the ecological and genetical basis, surveying the environmental causes of decreasing of specific plants, commercial usage, protecting general resources as species recover and preserving habitat and systematized reproduction.

2. Problems in preservation countermeasure

1) Problems in classification and standards of specification

Presently, in Korea the classification of specific plant species (legal standards) divide roughly into four main classes as mentioned above. Among those, division of rare and critical was not clearly presented. Rare is included in critical on ecological point of view, because rare is exterminated easily by human. Therefore, rare is used together with critical.

The critical division in Korea was not subdivided as compared to the critical subdivision in Japan. In Japan critical was subdivided into four categories such as extinct, endangered, rare and local population¹⁸⁾. Although, specific plant species in Korea are decreasing and but they are only scientifically divided and not included in the legal classification. It reflects the insufficient research about specific plant species. With these inconsistencies of classification system, there are contents about standards of specification in specific plants, but the concreteness is really lacks^{2,11)}.

This fact shows that there is clear difference from

Red list classification and standards of specification presented by IUCN(International Union for Conservation of Nature and Nature Resources) in the concreteness^{3,11)}. In conclusion, the imperfection about classification and standards of specification seems one of the biggest reasons why is so difficult to decide the general ranking of preservation priority about the set up of preservation purpose and specific species in establishment of preservation countermeasures.

In Japan¹⁸⁾ the classification of specific plant species divide presently into five main classes: Extinct(Ex), Endangered(En), Critically Endangered(Cr), Nearly threatened(Nt), Vulnerable(VU). Among those, division of rare and critical was clearly presented. In the Red List of Japanese Plants, 1,428 taxa are listed as threatened or extinct. These include 17 taxa which qualify as Ex, 12 as En, 471 as Cr, 410 as Nt and 518 as VU.

2) Problems in the basic investigation methods

(1) Lacks of the whole investigation about specific plant species

The subject of investigation about specific plant species currently in progress, are only habitats or plants. In fact, there are some other specific reasons that bring some plants to an extinction or in critical conditions. There is need to prepare a groundwork that will help to diagnose comprehensively the behaviors of human, plants to plants, plants to animals, plants to environments, habitat factor and plants themselves^{6,7)}. There are also problems related to the investigations carried out by individual experts because their investigations are very local with limited experience, time and budget. Therefore, the informations from such investigation about species

will be not be reliable to that of whole nation.

(2) Lacks of the geographical peculiar investigation of plants

Some preservative countermeasures are set for the specific plants, the plants that are autogenous in Korea and the plants that are widely distributed around Korea. For example, in the case of *Abeliophyllum distichum* among Korean's specific plants, are distributed only in Korea and also the habitat site of this plants is very small. While in case of the *Jeffersonia dubia*, it is inappropriate to set up preservative countermeasures because *Jeffersonia dubia* are widely distributed not only around Korea, but also Japan and China. One of the reasons which is difficult to set up the preservative countermeasure differently for plants because investigation is concentrated on the geographical distribution of plant related on the characteristic of plant⁸⁾.

3) Problems about methods of estimation

The first research about specific plant species in Korea was a publication about "Rare and Critical Animal and Plants in Korea" by the Korean National Council for Conservation of Nature in 1981. At that time, the objective of scientific basis about estimating specific plants was not presented. After that, in 1992 the Ministry of Environment established a single natural environment preservation law and strengthen the existing preservation regulations about specific plants.

The estimation of these specific plants is based on four terms of estimation and standards, which makes it in a more developed form. But, the estimation based on subjective experience of researchers has been considered preferentially because of imperfection of more objective and specific estimation standards about the above mentioned specific plants

^{6, 11)}. That is to say, for the estimation about specific plants until now were the estimations based in subjective experience of researchers. It is imperfection, to say that the estimation the preservation of species resources is more scientific and objective.

4) Problems about administration

(1) An imperfection in the whole data base operation of the national unit

The whole administration operation and the setting up information system is an urgent problem in order to administrate continuously an aspect of changing about specific plants and understand the movement of a group changing as time goes by and administrate efficiently.

(2) An imperfection in the administration of biotope

The administration of gene and biotope are considered together in order to administrate specific plants efficiently. These elements keep close ecological interrelations with one another, they could not be separated by administrating specific plants species^{14, 15)}. That is to say, when a small scale of specific plants species grows in some places, the administration of biotope is an indispensable condition with a gene preservation about each individual object of that species^{13, 16, 17)}.

Among specific plant species under legal protection currently in Korea, most of them are exposed by environment changes of the outside the interference of human because of small size of habitat (Table 2).

But, It is pointed out as big problem about efficient preservation of species that the administration about these specific plant species and biotope around ecological group habitat is except from the object of concern. It can be known to seriously be damaging and neglecting of specific plant species

and community above through results of spot survey(October, September in 1988: Geojegun, Kyungsangnamdo and Taeangun, Chungchong-

namdo) for *Koeleruteria paniculata* association appointed natural monuments(photo 1, 2).

Table 2. Site of specific plants species in Korea

Species	Location	Area (m ²)	
<i>Jeffersonia dubia</i>	Goesan, Chungbuk	2,400	Natural forest
<i>Camellia japonica</i>	Seowon, Chungnam	2,000	Legally protected forest
<i>Ilex cornuta</i>	Puan, Chungbuk	2,700	Natural forest

(3) Problem about the field preservation

Specific plant species in Korea are legally protected only in the preserved areas such as ecological protection area by Nature Environment Conservation Law or natural park by Natural Park Law. Endangered plant species in preserved areas by law is being managed, but endangered plants species don't necessary inhabit only in the area under legal

protection. For example, only 22 species of 39 endangered plant species under national protection set by the Department of Environment have been inhabiting in ecological protection area or national park^{8, 11)}. 17 species are inhabiting outside protection area as stated above is considered as much higher possibility of annihilation crisis⁸⁾. This phenomenon is same as in other countries(Table. 3)¹³⁾.

Table 3. Number of endangered species in/out of reservation area^{8, 11, 13)}

Country	NO. of Endangered species	In (%)	Out (%)
Korea	39	22 (56%)	17 (44%)
Spain	298	120 (40%)	178 (60%)
U.K.	317	70 (22%)	247 (78%)
Germany(NRW)	35	27 (77%)	8 (23%)

Especially as considering that field protection method to preserve various ecosystem, species, gene, presently to make national park or specific protection area objects of concern cannot but point out as a big problem. In case of endangered plant species inhabited in the natural park or specific preservation area under law protection doesn't make special management ways. There are only field organization, protecting specific plant species and all of these organization are located in Seoul. Therefore, the field protection in each local area

does not work efficiently.

(4) Problems about preservation of outside

The best effective method in managing specific plant species as stated above is to protect them in habitat field. But, at the same time field preservation method exposes many problems. The importance of outside preservation is far increasing. The representative method of outside preservation about specific plant species is Seed Banks and Field Gene Banks^{7, 8)}.

a. Seed Banks

Small size of Seed Banks were established in the

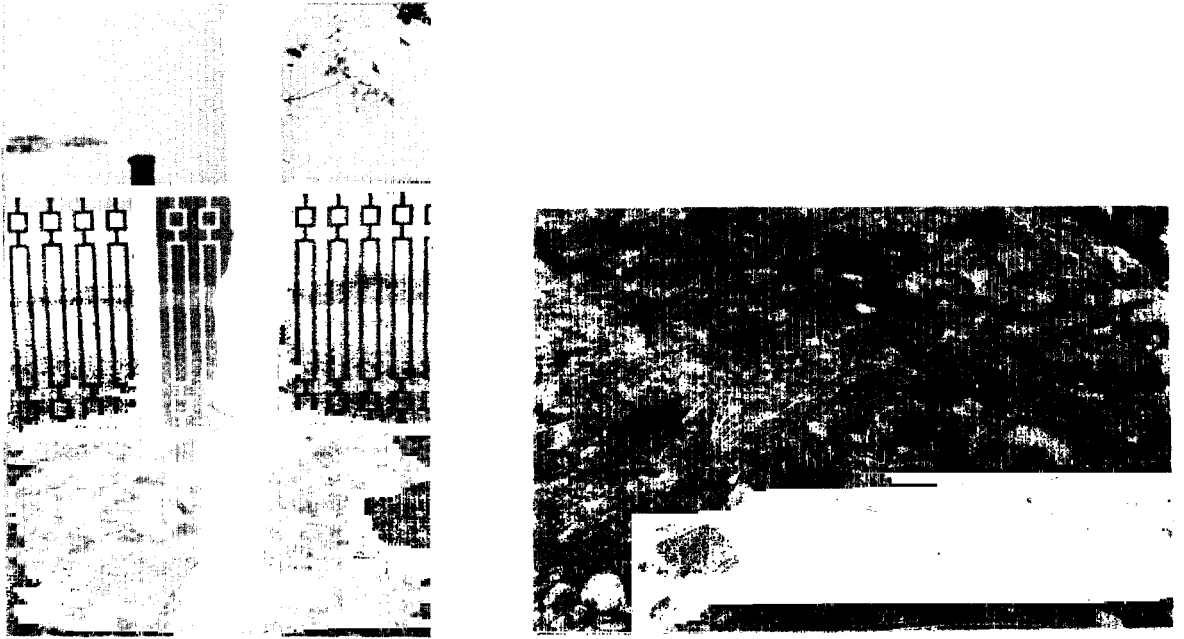


Photo 1. *Koelreuteria paniculata* in, Geojegun Kyungnam Geojedo.

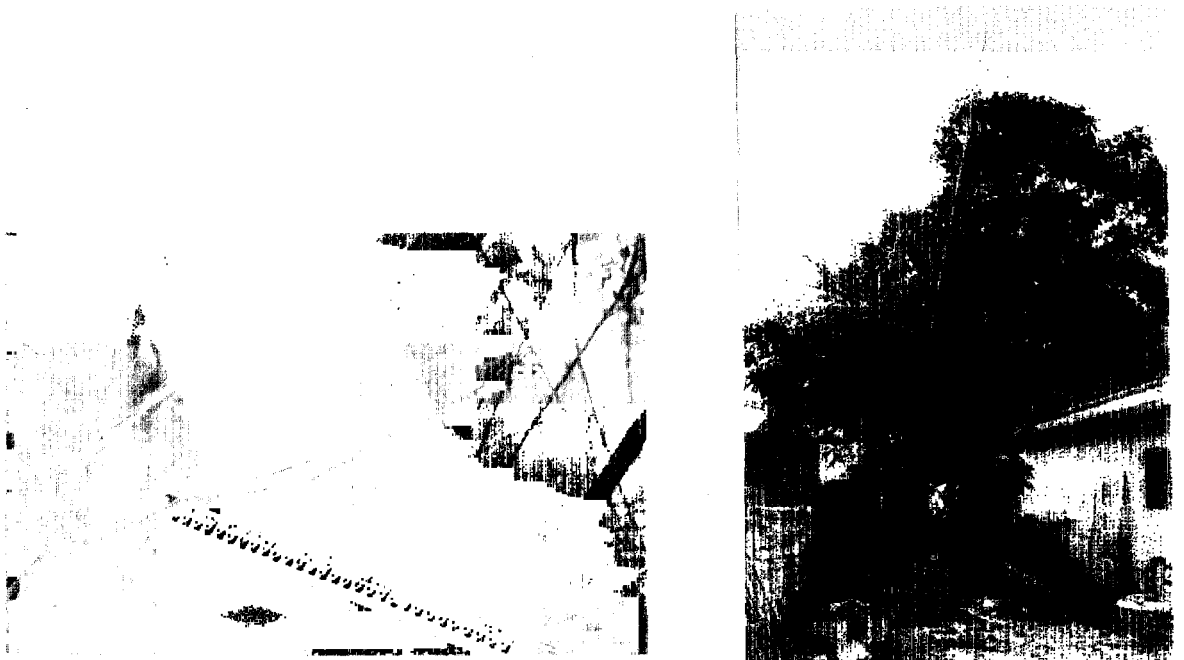


Photo 2. *Koelreuteria paniculata* in, Taeangun Mado Chungnam.

Agricultural Promotion Department till now. That is very less number compared to the number of retained species is Korea are approximately 10.6 thousands. Deutsch Berlin-Darlem Botanic Garden, Seed Bank of America's Plant Preservation center and England's Royal Queen Botanic Garden Seed Bank the number of retained species and size are also lied in bad situation.

b. Field Gene Banks

The representation place which is playing a role of field gene bank can be Botanic Garden, and it can give a place of establishment, reservation, study of specific plant species. Presently, there are many Botanic Gardens and Arboretums but most of them strongly reflect the characterist of scene and leisure space. Only one that is, Kwangnung Arboretum play a role of field gene banks.

IV. Improvement methods

1. Subdivision of classified category and appointed criteria

According to nature conservation law, specific

plant species of korea are classified in endangered, threatened and vulnerable protect. But comparing with overseas developed countries, we need to subdivide classified categories about specific plant species. In other words except for three categories above mentioned, we can add extinct, rare and local population in comparision with reference abroad and within country^{8, 11, 12, 13}. And also it is necessary to clarify and state clearly the appointed criteria (Table 4).

2. Organization of basic research

The subject of investigation about specific plant species currently in progress are only habitats or plants. Therefore, there is need to prepare a ground-work that will help to diagnose comprehensively the behaviors of human, plants to plants, plants to animals, plants to environments, habitat factor and plants themselves. And some preservative countermeasures are set for the specific plants, the plants that are auto-genous in Korea and the plants that are widely distributed around Korea. Investigation need to concentrate on the geographical distribution of specific plant species related on the characteristic of plant.

Table 4. Subdivision of classified category and appointed criteria^{4, 8, 11, 12, 13, 18)}

Division	Standards
Extinct (Ex)	<ol style="list-style-type: none"> 1. Complete disappeared of a species from the earth. 2. Species not definitely located in the wild for 50 years.
Endangered (E)	<ol style="list-style-type: none"> 1. So few individual survivors that the species could soon become extinct in all or most of its natural range. 3. Although there are a few reports for 30 to 50 years, a species which is difficult to decide whether disappeared or not.
Vulnerable (V)	<ol style="list-style-type: none"> 1. Prominently reduce individual number along their group 2. Continuously worsening of habitat's environments 3. Extensive destruction of habitat bring to non-reproductivity, excessive picking
Rare (R)	<ol style="list-style-type: none"> 1. Individual survivors is so few and high scientific value 2. Not at present endangered or vulnerable, but are at risk 3. Usually localised within restricted geographical areas or habitats are thinly scattered over a more extensive range.
Local population (Lp)	<ol style="list-style-type: none"> 1. Habitat is separated from local groups and become endangered 2. There are a Characteristics as local group and important

3. Establishing objective evaluation system

There was not established scientific and objective evaluation system, so evaluation based on each sys-

tematists subjective prejudice or experience. Some of the methods are suggested for the improvement of existing evaluation methods (Table 5).

Table 5. Objective evaluation system of specific plants species^{1, 3, 11, 12, 13, 18)}

No.	Contents
1	continual degree of decreasing
2	scale of individual or groups
3	degree of critical change
4	range of habitat
5	wide of geological distribution
6	degree of fragmentation
7	generation interval
8	degree of maturity degree of individual
9	location

4. Organization and scientification of managing system

1) Enlargement of managing scope

When plant species or habitat scale is relatively small, environmental pressure i.e. isolation of group, close crossing between same species and deterioration of genetic quality, etc. will increase and thereafter ecological isolation will be worse. So in managing specific plant species, not only protecting genes but also preserving biotope around is essential. It is effective to manage through making buffer zones when specific plant species and habitat is exposed to peoples touch.

2) Mapping and computerizing information.

Overall data base operation of national unit is essential in order to manage effectively specific plant species. Mapping operation and computerization will enable to transition each region. It is considered that improvement of species diversity, biotope mapping, constructing biotope information system and

population viability analysis can be used as a substitute of each other. For example, there are some systems in Europe, BM (Biotope Mapping), BIS (Biotope Information System) and PVA (Population Viability Analysis).

3) Activation of spot reservation

Spot reservation is considered. One of the most effective methods to manage specific plant species and genes. We will provide the remedy to the several problems of spot reservation as stated above (Table 6).

4) Activation of outside reservation

Not only activation of spot reservation but activation of outside reservation for the specific plant species is an urgent task in order to act up to the trend of developed countries. There are a number of good points in case of activating setting up of seed bank such as decrease of rotting and necessary size, long keeping time (from tens of years to hundreds of years), mass increase through sowing or tissue cultivation. Therefore it is considered to play a great

Table 6. Activation of spot reservation

No.	Contents
1	Objection and Grade for preservation - specific plant species, genetical and biotope - scientific reason for preservation - benefits in preservation
2	Selection and planning of preservation area - selection and technical planning of preservation area - estimation of location and scale - limitation from outwards
3	Monitoring and sustainable management

role in reserving specific plant species. Accordingly, it is necessary to enlarge steeply the scale of seed bank (currently, set up just in Agricultural Promotion Office), the number of holding seeds, manpower and finance. In local area, they should set up seed bank to reserve local peculiar seed resource. We can also use existing arboretum or botanical gardens as outside gene bank.

Outside reservation other than Kwangneung Arboretum, Hanteak Arboretum etc., we need to set up variety of reservation function of nationwide-scattered arboretum or botanical gardens and assist financially for playing as a center of outside gene bank.

V. Conclusion

The results for establishing effective reservation methods about specific plant species in Korea are like this.

1. Subdivide classified category and establish appointed criteria.

2. Selection standards of specific plant species has to be set up. The scope of research has not to be partial research on specific area but generally nationwide. The research contents also has to include not only specific plant species but also other environ-

mental factors (ecosystem, the geographical distribution of plants and soil condition)

3. More objective and scientific valuation system has to be established to prevent researchers from valuing by subjective prejudice or experience.

4. Management data base work has to be established, which will enable to provide research data of specific plant species to the national unit.

5. The conservation methods of specific plant species in Korea are very primary stage. Discussion among related experts about improvement methods is suggested. These conservation methods need to be conducted in short, medium, long term project priority.

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