

Distribution and Ecological Characteristics of Native *Iris Odesanensis* in Mt. Naeyon

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(Manuscript received 25 August, 2006; accepted 15 December, 2006)

Iris odesanensis Y.N. Lee is one kind of species among 54 endangered plant species designated by the Ministry of Environment in Korea. It is very rare native plant throughout the country. Therefore, this study was conducted to investigate the native *Iris odesanensis* in Mt. Naeyon for their distribution and ecological characteristics. They were mostly distributed mid-slope of the mountain from 443m to 498m altitude. They were located lower part of valley and provided enough humid condition. They had proper light and humidity conditions as they faced south south west, south-south east, and south. They were also located at the places deciduous woody plants were distributed for proper light conditions for spring blooming. *Iris* flowered to use light at the period before the trees thickly covered with foliage. However this unfavorable light condition caused low percentage as 7.04% of blooming individuals in this study. In herbaceous, *Viola chaerophylloides* (Regel) W. Becker, *Carex siderosticta* Hance, *Erythronium japonicum* Decne., *Oxalis obtusangulata* Max., *Hepatica asiatica* Nakai, *Lilium tsingtauense* Gilg et cetera were appeared well. We propose that proper pruning of upper branches of the deciduous trees is needed for suitable light condition of management of native sites.

Key Words : *Iris odesanensis*, Endangered plant, Management, Native site

1. Introduction

Iris odesanensis Y.N. Lee, called as No-Ran-Mu-Ni-Buts-Kot, is very rare plant which is only restricted in Korea. Its height is about 20cm and its rhizomes spread to horizontally.

Leaf is sword-shape and 12-35cm long and 12mm wide. It blooms in April to May and its size is about 3.5cm. Petal is white and yellow stripe is on its middle part¹⁾. It is one kind of species among 54 endangered plant species designated by the Ministry of Environment in Korea²⁾. The Korea Forest Service designated it as a rare and endangered plant and protect it thoroughly³⁾. It is very rare native plant throughout the country. *Iris* species are monocotyledonous and perennial herbaceous plants belonging to Iridaceae⁴⁾. There are about 300 species of upright, rhizomatous or bulbous, sometimes fleshy-rooted

perennials found in a wide range habitats from the temperate zone to the subarctic zone in the Northern hemisphere⁵⁾. Because flowers and leaves of *Iris* species are very beautiful, these plants are generally cultivated as flowering plants in order to sell their flowers, or replant in pots or flower gardens. Roots or rhizomes of *Iris* species are thick and has lots of medicinal ingredients. Its roots or rhizomes are called as Doo-Si-Cho(豆豉草), its medicinal name, and which is known for its effect of anti-inflammation and digestive promoter⁶⁾.

About 10 species including *Iris odesanensis* have been found in Korea. However their definite distribution and ecological characteristics of native site is not known at all. There is no information of native site in Korea, so it is not possible to protect and even restoration of *Iris odesanensis*. It grows natively in Korea and is discovered in lofty mountains in Kangwon-do and Palgong-mountain in Kyung-sangbuk-do. Mt. Naeyon is an eminent mountain and located at Kyung-sangpook-do province¹⁾. Recently native site of

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Iris odesanensis was discovered there. Also there is no knowledge of ecological characteristics of *Iris odesanensis*. Therefore it is not possible to utilize it as a useful plant resource because of impracticability to artificial propagation and culture^{8,9)}.

There are more than 4000 native plant species in Korea. However, there are few precedent that various native plants were developed as plant resources¹⁰⁻¹³⁾. This was due to there is not enough study of native plants in wild situation. There is little scientific report of nation wide distribution of native plants and their native sites¹⁴⁾. A succeeded to culture native *Iris odesanensis* based on the result of ecological research. However there is few results of ecological research which enable to develop native plants to valuable resources. Therefore, this study was conducted to investigate the native *Iris odesanensis* in Mt. Naeyon for their distribution and ecological characteristics. This may be useful to basic data as protect and restoration of native sites and culture it as a plant resource.

2. Material and Methods

This study was carried out in the area of Mt. Naeyon, Pohang city, Kyung-sangpook-do province, native site of *Iris odesanensis*. It was carried out from April to October 2005. Investigation plots were established quadrat on the herb layer including *Iris odesanensis*. Areas of the quadrates were 5x10m ~ 3x8m which represent the ecological characteristics of native sites. dominance, sociability, height of vegetation, and covering percentage of vegetation of emerging plants were investigated¹⁵⁾. Exact location points were decided by GPS(global position system, GPS-V PLUS). Also altitude, degree of slope, compass direction of slope, light condition, soil condition, and so

on was investigated. Especially lighting condition was described as percentage comparing the intensity of illumination of native and other sites. Vegetation of native sites were investigated by phytosociological method of Braun-Blanquet¹⁶⁾. The communities on native sites were classified through phytosociological table work¹⁷⁾.

3. Results and Discussion

Mt. Naeyon is located in southern part of Kyung-sangpook-do province and last part of Taebaek mountain range. Its altitude is 930m. It is reported as it has rich flora. The climate of the native site is typical temperate climate. Area, of native sites of *Iris odesanensis* were ranged from 36m² to 200m² and number of the sites were 8. Locations of the native sites were indicated roughly to protect them indiscretion people. Total 476 individuals were identified. From total 476 individuals, 56 individuals, 7.04% of all, were reproductive as flowering or seeding(Table 1). Detailed site description will not be mentioned for protection of native sites. They were mostly distributed mid-slope of the mountain from 443m to 498m altitude(Fig. 1). They were located lower part of valley and provided enough humid condition. They had proper light and humidity conditions as they faced south south west, south south east, and south(Fig. 2). They were located on the slope of 35 to 43 degrees(Fig. 3). Soil pH of the native sites was slightly acidic as the average 5.03. Soil hardness was the average 0.31kg/cm². About 80.84% of soil was gravel. Soil humidity was slightly dry as average 14.85%. About 18.67% of sun light was reached to the sites and average illuminance was 3.04 Klux. Native sites were semi-shaded because of tree layer such as *Acer mono* Max., *Ulmus davidiana* var. *ja*

Table 1. The habitat area and number of the individual plant *Iris odesanensis*

No. of quadrat	Latitude(N)	Longitude(E)	Area of habitats(cm ²)	% of flowering individuals (No. of flowering individuals / No. of whole individuals)
1	N 36° 14 ' 0 "	E 129° 15 ' 0 "	16	13.16 (5 / 38)
2	N 36° 14 ' 0 "	E 129° 15 ' 0 "	14	4.29 (3 / 70)
3	N 36° 14 ' 0 "	E 129° 15 ' 0 "	16	3.06 (3 / 98)
4	N 36° 14 ' 0 "	E 129° 15 ' 0 "	12	12.5 (2 / 16)
5	N 36° 13 ' 0 "	E 129° 15 ' 0 "	50	2.02 (4 / 198)
6	N 36° 13 ' 0 "	E 129° 15 ' 0 "	14	8.33 (2 / 24)
7	N 36° 13 ' 0 "	E 129° 15 ' 0 "	10	5.26 (1 / 19)
8	N 36° 13 ' 0 "	E 129° 15 ' 0 "	10	7.69 (1 / 13)

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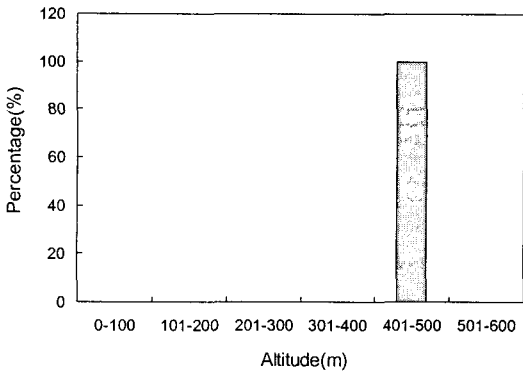


Fig. 1. Altitude of *Iris odesanensis* habitat.

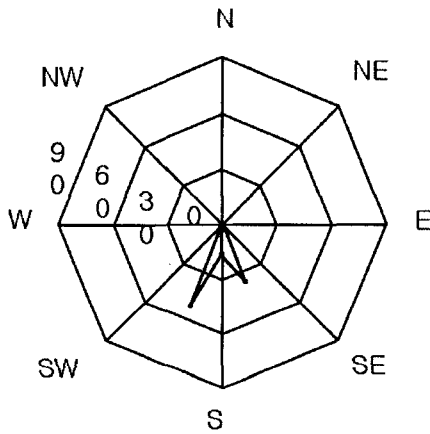


Fig. 2. Direction of *Iris odesanensis* habitat.

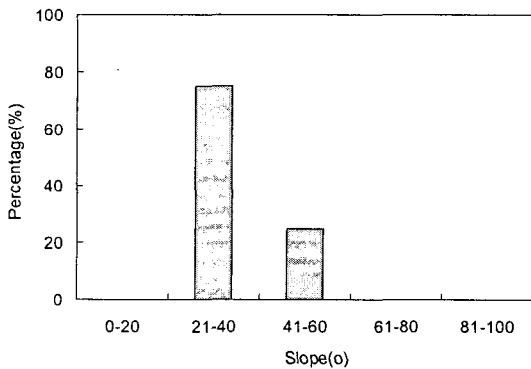


Fig. 3. Slope gradient of *Iris odesanensis* habitat.

ponica Nak., *Quercus serrata* Thunb., *Berchemia berchemiaefolia* (Mak.) Koidz., et cetera and sub-tall tree layer such as *Styrax obassia* S. et Z., *Staphylea bumalda* DC., *Lindera obtusiloba* Bl. and so on were grown near by. Woody plants such as *Styrax obassia* S. et Z., *Staphylea bumalda* DC., *Stephanandra incisa* Zabel., *Lonicera subsessilis* Rehder et cetera were fre-

quently observed. Those were mostly observed at shaded and humid valleys. They were also located at the places deciduous woody plants were distributed for proper light conditions for spring blooming. *Iris* flowered to use light at the period before the trees thickly covered with foliage¹⁴⁾. However this unfavorable light condition caused low percentage as 7.04% of blooming individuals in this study. We propose that proper pruning of upper branches of the deciduous trees is needed for suitable light condition of management of native sites⁸⁾. In herbaceous, *Viola chaerophylloides* (Regel) W. Becker, *Carex siderosticta* Hance, *Erythronium japonicum* Decne., *Oxalis obtriangulata* Max., *Hepatica asiatica* Nakai, *Lilium tsingtauense* Gilg et cetera were appeared well (Fig. 4). Such herbaceous plants prefer aerial humidity and relatively short, therefore *Iris* probably predominant than these plant in the ecological competition¹⁸⁾. Average height of herbaceous plants was 0.3m, the percentage of vegetation cover was 61.25%, and average appearing species was 11. Especially in the native sites, typ-

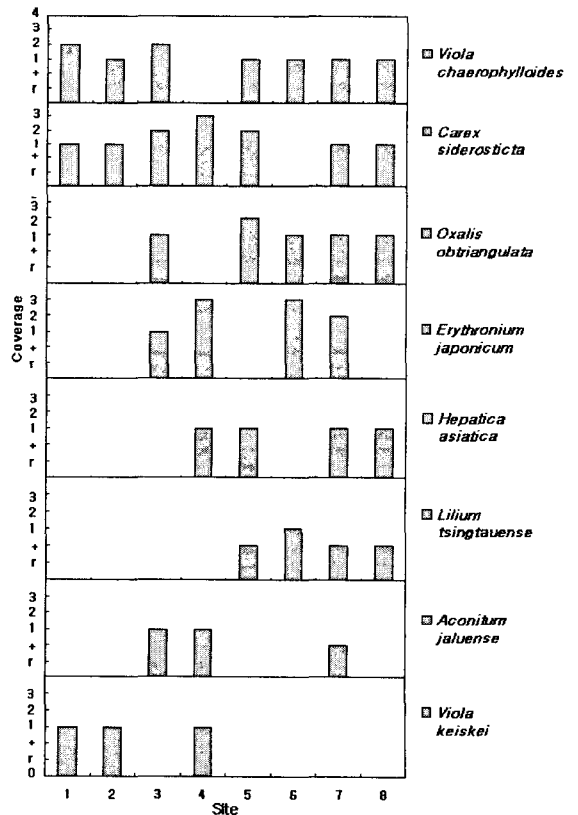


Fig. 4. Coverage of each layer at *Iris odesanensis* habitat.

Table 2. Phytosociological table on the *Iris odesanensis* habitat in Mt. Naeyon

Serial number	1	2	3	4	5	6	7	8	No. of appearance
Releve number	3	1	8	2	6	7	5	4	
Altitude(m)	482	468	498	468	443	485	483	490	
Soil pH	5.08	5.17	5.17	4.7	5.12	4.85	4.53	5.59	
Soil hardness(Kg/cm2)	0.3	0.3	0.26	0.26	0.3	0.26	0.3	0.46	
Soil humidity(%)	15.13	15.04	15.44	14.76	13.06	24.48	13.64	7.24	
intensity percentage of illumination(%)	11	12	24.05	12	34.25	34.25	8.77	13	
Average illuminance(Klux)	4.45	4.8	0.962	4.8	1.375	1.375	2.3	4.25	
Aspect	SSW	SSW	SSW	SSW	SSE	SSE	S	SSE	
Slope(°)	38.5	35	35	35	35	43	35	40	
<i>Iris odesanensis</i>	H 3.3	H 3.3	H 2.2	H 4.4	H 2.2	H 2.2	H 2.2	H 2.2	8
<i>Carex siderosticta</i>	H 2.2	H 1.1	H 1.1	H 1.1	-	H 1.1	H 2.2	H 3.3	7
<i>Viola chaerophylloides</i>	H 2.2	H 2.2	H 1.1	H 1.1	H 1.1	H 1.1	H 1.1	-	7
<i>Erythronium japonicum</i>	H 1.1	-	H 1.1	-	H 1.1	H 1.1	H 2.2	-	5
<i>Oxalis obtriangulata</i>	H 1.1	-	-	-	H 3.3	H 2.2	-	H 3.3	4
<i>Hepatica asiatica</i>	-	-	H 1.1	-	-	H 1.1	H 1.1	H 1.1	4
<i>Styrax obassia</i>	ST 1.1	-	ST 1.1	-	ST 1.1	-	ST +	-	4
<i>Stephanandra incisa</i>	S 2.2	S 1.1	-	S 1.1	-	-	S +	-	4
<i>Lilium tsingtauense</i>	-	-	H +	-	H 1.1	H +	H +	-	4
<i>Staphylea bumalda</i>	-	-	S 1.1	-	-	S 1.2	-	S 1.1	3
<i>Viola keiskei</i>	-	H 1.1	-	H 1.1	-	-	-	H 1.1	3
<i>Aconitum jaluense</i>	H 1.1	-	-	-	-	H +	-	H 1.1	3
<i>staphylea bumalda</i>	ST 1.1	ST 1.1	-	ST +	-	-	-	-	3
<i>Weigela subsessilis</i>	S 2.2	S 1.1	-	-	-	-	-	-	2
<i>Lindera obtusiloba</i>	ST +	-	-	-	-	-	ST 1.1	-	2
<i>Lindera obtusiloba</i>	-	-	-	-	-	-	S 1.1	S +	2
<i>Lonicera subsessilis</i>	-	-	-	-	S 1.1	-	-	S 1.1	2
<i>Isodon inflexus</i>	H +	-	-	-	H 1.1	-	-	-	2
<i>Polygonatum humile</i>	H 1.1	-	-	-	H 1.1	-	-	-	2
<i>Aster ageratoides</i>	H 2.2	-	-	-	-	-	H 1.1	-	2
<i>Polygonatum odoratum</i> var. <i>pluriflorum</i>	-	-	-	-	-	H 1.1	-	H +	2
<i>Tulipa edulis</i>	-	-	-	-	-	H +	-	H +	2
<i>Viola rossii</i>	-	H 1.1	-	-	-	-	H 1.1	-	2
<i>Pseudostellaria heterophylla</i>	-	H 1.1	-	-	-	-	-	H 1.1	2
어어수수리리	-	-	-	-	-	-	-	+	1
<i>Vicia unijuga</i>	H 1.1	-	-	H +	-	-	-	-	2
<i>Potentilla fragarioides</i> var. <i>major</i>	H 1.1	H 1.1	-	-	-	-	-	-	2
<i>Astilbe chinensis</i> var. <i>davidii</i>	H 1.1	H 2.2	-	-	-	-	-	-	2
<i>Acer ginnala</i>	ST +	-	-	-	-	-	-	-	1
<i>Euonymus alatus</i>	ST +	-	-	-	-	-	-	-	1
<i>Deutzia parviflora</i>	S +	-	-	-	-	-	-	-	1
<i>Lespedeza maximowiczii</i>	S +	-	-	-	-	-	-	-	1
<i>Trigonotis nakaii</i>	H 2.2	-	-	-	-	-	-	-	1
<i>Rubus oldhamii</i>	H 1.1	-	-	-	-	-	-	-	1
<i>Sanicula chinensis</i>	H 1.1	-	-	-	-	-	-	-	1
<i>Artemisia princeps</i> var. <i>orientalis</i>	H 1.1	-	-	-	-	-	-	-	1
<i>Xanthium strumarium</i>	H 1.1	-	-	-	-	-	-	-	1
<i>Clematis apiifolia</i>	H +	-	-	-	-	-	-	-	1
<i>Callicarpa japonica</i>	-	-	S 1.1	-	-	-	-	-	1
<i>Asarum sieboldii</i>	-	-	H 1.1	-	-	-	-	-	1
<i>Quercus serrata</i>	-	-	T 1.+	-	-	-	-	-	1
<i>Picrasma quassioides</i>	-	-	ST +	-	-	-	-	-	1
<i>Equisetum arvense</i>	-	H 1.1	-	-	-	-	-	-	1
<i>Angelica polymorpha</i>	-	H +	-	-	-	-	-	-	1
<i>Actinidia arguta</i>	-	-	-	ST +	-	-	-	-	1
<i>Smilax sieboldii</i>	-	-	-	-	-	-	-	S +	1
<i>Rubus oldhamii</i>	-	-	-	-	-	-	-	S 1.1	1
<i>Boehmeria spicata</i>	-	-	-	-	-	-	-	S +	1
<i>Celastrus flagellaris</i>	-	-	-	-	-	-	-	S +	1
<i>Acer mono</i>	-	-	-	-	-	-	-	T 3.1	1
<i>Ulmus davidiana</i> var. <i>japonica</i>	-	-	-	-	-	T 2.1	-	-	1
<i>Actinidiaarguta</i>	-	-	-	-	-	T 1.+	-	-	1
<i>Acer mono</i>	-	-	-	-	-	-	S +	-	1

ical short plants such as *Viola chaerophylloides* (Regel) W. Becker, *Viola keiskei* Miq., *Viola rossii* Hemsl., *Viola grypoceras* A. Gray in genera *Viola* were appeared. In south south west faced native site, proper light and enough humid conditioned place, *Stephanandra incisa* Zabel., *Deutzia parviflora* Bunge., *Lespedeza maximowiczii* Schneid., *Astilbe chinensis* var. *davidii* Fr., *Vicia unijuga* A. Br., *Trigonotis nakaii* Hara et cetera were appeared. However in south south east or south faced sites, relatively more light condition places, *Smilax sieboldii* Miq., *Rubus oldhamii* Miq., *Polygonatum odoratum* var. *pluriflorum* Ohwi., *Tulipa edulis* Bak. et cetera were appeared. Especially vines such as *Actinidia arguta* Planch., *Rubus oldhamii* Miq., *Clematis apiifolia* A. P. DC. et cetera and strong Leguminosae or *Chrysanthemum*s should be removed (Table 2). These plants could make worse of light condition of native sites and take advantages in ecological competition to *Iris*⁹⁾. For conservation of *Iris* native sites and continue of individual number, environment should be maintained properly and reasonable removal of competitors may be needed¹⁹⁾.

Reference

- 1) Lee, Y. N., 2002, Flora of Korea, Kyohaksa publishing Co, Seoul, 953pp.
- 2) Ministry of Environment in Korea, 2005, <http://www.me.go.kr/>.
- 3) Korea forest service, 2005, <http://www.me.go.kr/>.
- 4) Ahn, Y. H., 2005, Analysis of genetic relationship of native *Iris* species plants using RAPD, Jour. of the Environmental Science, 14(3), 265-269.
- 5) Shibata, K., 1998, A cyclopedia of useful plants and plant products, Hokuryukan Co., Tokyo, pp. 514-519.
- 6) Chung, B. S. and M. K. Shin, 2002, Encyclopedia of Pharmacognosy. Youngrimsa, Seoul, pp.194-197.
- 7) Ahn, Y. H. and K. Y. Choi, 2002, Ecological characteristics and distribution of Korean native *Rhapontica uniflora* at habitats, Kor. J. Hort. Sci. & Technol., 20, 126-133.
- 8) Ahn, Y. H., K. H. Chung, K. Y. Choi and D. S. Park, 2001, Ecological characteristics and distribution of plant resources of *Pyrus* and *Malus* sp. in Jindong vally, Gwangwon province, Plant Res, 4(3), 130-139.
- 9) Ahn, Y. H., K. H. Chung and H. S. Park, 2003, Vegetation and flora of Hibiscus hamabo inhabited naturally in Soan Island, Jour. of the Environmental Science, 12(11), 1181-1187.
- 10) Ahn, Y. H., J. H. Sul and K. H. Cho, 1998, Effect of preservation period, light, temperature, and priming on the seed germination of *Lysimachia mauritiana*, Kor. J. Env. Eco., 12(1), 9-13.
- 11) Ahn, Y. H., S. H. Kim, C. H. Lee and S. T. Lee, 1999, Palynotaxonomic study of the genus *Hemerocallis* in Korea, J. Kor. Soc. Hort. Sci., 40(4), 505-510.
- 12) Ahn, Y. H., S. H. Yeau, N. S. Lee and S. T. Lee, 1999, Studies on characteristics of *Adonis amurensis* native to South Korea, Kor. J. Env. Eco., 13(3), 203-208.
- 13) Cho, K. H. and Y. H. Ahn, 2000, Effect of sucrose and supplementary substances on the germination ecology and the seedling growth of native *Bletilla striata*, Kor. J. Env. Eco., 14(3), 205-211.
- 14) Ahn, Y. H., 2005, Ecological characteristics and distribution of native *Scrophularia takesimensis* in Ulleung-do Island, Jour. of the Environmental Science, 14(12), 1087-1092.
- 15) Ecology research group, 1967, Manual of ecological research, Asakura publishing Co., Tokyo, pp.238-246.
- 16) Braun-Blanquet, J., 1964, Pflanzsoziologie, Grundzude der Vegetationskunde, 3rd ed. Springer, New York, 85pp.
- 17) Ishitsuka, K. O., 1982, Distribution of plant community and environment, Asakura publishing Co., Tokyo, pp.329-340.
- 18) Wilson, J. B. and G. W. Lee, 1989, Infiltration invasion, Functionnal Ecology, pp.379-382.
- 19) Matsuo T. N., 1989, Collected data of plant genetic resources, Kodansha Scientific Co., Tokyo, pp.4-27.