

Vascular plant diversity of the Gogunsan Archipelago in the Korean Peninsula

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This study was carried out to investigate the flora of six islands belonging to the Gogunsan Archipelago (i.e., Sinsi-do, Seonyu-do, Munyeo-do, Yami-do, Bian-do, and Duri-do) in the Korean Peninsula. As results of five field surveys from March to October of 2016, we have identified 575 total taxa, representing 527 species, five subspecies, 42 varieties, and one hybrid, placed in 358 genera and 118 families. Of these 575 taxa, four are endemic to Korea, six taxa are listed on the Korean Red List of threatened species, 67 are floristic regional indicator plants, and 74 are invasive alien species. In this study, we compared species richness among the islands, and find that the larger the islands, the higher the species richness. In the case of habitat affinity types, forest species were most common, followed by farmland, seacoast, bare ground and wetland species. From similarity analyses based on the composition of vascular plants, each island did not exhibit either local specificity or unique diversity. On the contrary, the proportion of invasive alien and ruderal species may increase by human activities. Investigations and analyses of island flora such as this are important to assess the current status of the flora, predict future vegetation patterns and the spread of the alien species, and establish management plans of plant diversity.

Keywords: endemic plants, invasive alien plants, similarity index

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INTRODUCTION

The Korean Peninsula, located in the eastern portion of the Eurasian continent, is connected to the continent to the north and surrounded by seawater on three sides (Kim *et al.*, 2015). Since Korea is located at the intersection of vascular plants with southern and northern distribution limits, plant diversity is relatively high per unit area and distributions are very complex. These features of Korean flora are thought to be results of correlations between ecological characters of plants and abiotic elements of climate, geographical features, and geographical location (Lee and Yim, 2002). The southwestern coast of the Korean Peninsula is a typical Rias coast with irregular, complex coastlines formed by erosion, fault activities, and sea elevation, and thus many inhabited and uninhabited islands are scattered nearby. A lot of islands are scattered along western and southern coasts of the peninsula (Cho,

2002), and the present flora of these islands follow the peninsula effect being impoverished in species composition from the mainland to the adjacent islands or outer edge of the peninsula (Lee and Yim, 2002). In the last glacial maximum (some 12,000-18,000 years ago), the current western and southern coasts were land associated with continents, but after the ice age was over, some areas with high elevation became islands caused by the rising sea level. Scholars estimate that the current coastline formed some 8,000 to 10,000 years ago so that plants remaining on the southwestern coastal islands could be isolated from the population of the continent for more than 8,000 years (National Institute of Biological Resources, 2015). There is a possibility of genetic interaction between peninsular and inland populations depending on pollination and seed dispersal capabilities, but islands located far from shore show unique ecosystem because of geographical barriers and isolation. It is also known

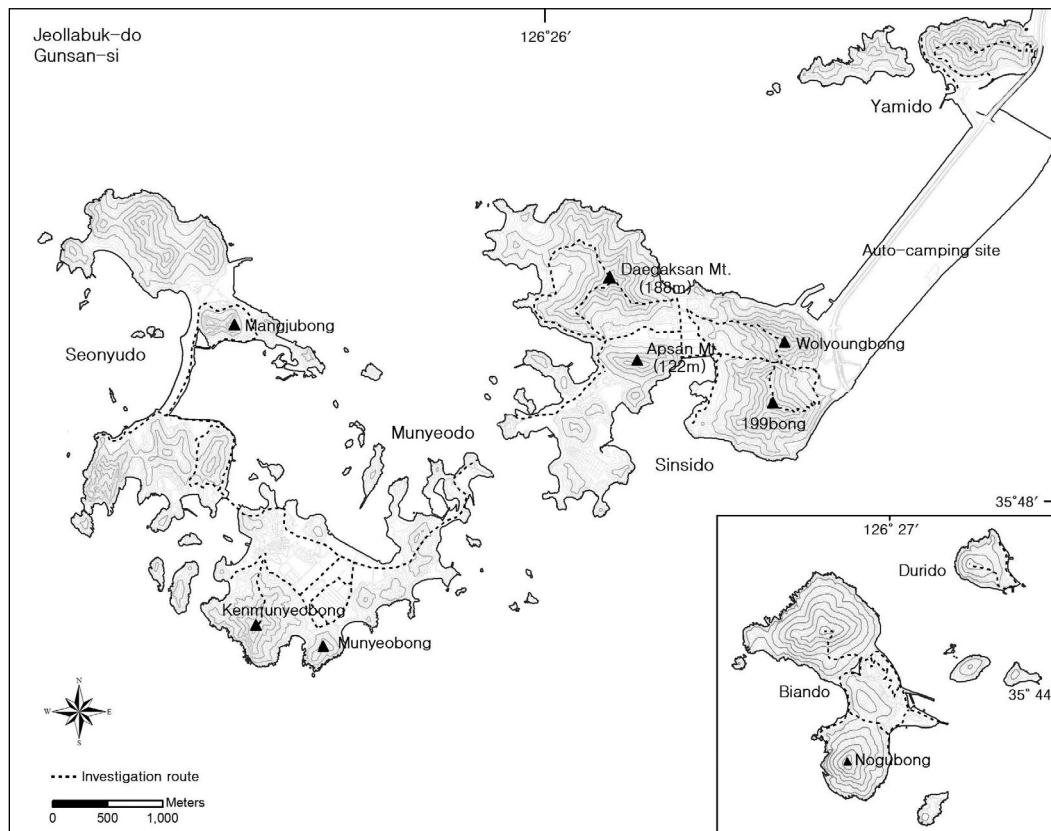


Fig. 1. A map of investigated area in the Gogunsan Archipelago.

that the island forms an independent ecological landscape and is biologically localized where the introduction, settlement, and extinction of species is more variable than that of mainland (Kim *et al.*, 2016). It is a common that the closer the island is to the mainland and the larger its area, the higher species richness (Kong, 2007). Currently, about 4,000 inhabited and uninhabited islands are scattered around the southwestern coast of Korea (Kim *et al.*, 2016). Although the islands, which forms their own ecosystem based on interactions between terrestrial and marine ecosystems, are highly valued area in terms of ecological, biological, and genetic conditions, not much progress has been made in domestic research on these issues (Kim *et al.*, 2016). Recent research into island biogeography has been performed on the basis of a variety of fauna and flora, including vascular plants, marine invertebrates, birds, and spiders (Kim *et al.*, 2016). Through these floristic studies, new species such as *Melampyrum koreanum* K.-J. Kim & S.-M. Yun, *Paraphlomis koreana* S. C. Ko & G. Y. Chung, and *Potentilla gageodoensis* M. Kim were discovered and several species including *Ajuga nipponensis* Makino, *Fimbristylis hookeriana* Boeck., *Carex tsushimensis* (Ohwi) Ohwi, and *Rhododendron keiskei* var. *hypoglauca* Suto & Suzuki were recorded for the

first time in Korea (Kim and Yun, 2012; Kim and Kim, 2013; Kim *et al.*, 2013; Ko *et al.*, 2014; Nam *et al.*, 2014; So *et al.*, 2014; Yang *et al.*, 2015). These findings are presumed to be due to the fact that the islands on the southwestern coast acts as a shelter or new frontier for some species due to geographical, climatic, and geographical conditions different from those in inland areas (National Institute of Biological Resources, 2015). Southwestern coastal islands of the Korean Peninsula, on the other hand, are the most favorable sites for ecological studies of distribution shift of evergreen trees because they are located at the northern limits of the species. Without surveys of exact floral diversity, numerous inhabited and uninhabited islands of west coast show symptoms of unnatural degradation or disappearance of rare species due to human disturbance and damage. Of islands of the Gogunsan Archipelago, the current study is focused on flora of Sinsi-do and Yami-do that were connected to the land by the Saemangeum Seawall, and flora of their adjacent islands such as Seonyu-do, Munyeo-do, Bian-do, and Duri-do (Fig. 1).

The first study on the Gogunsan Archipelago was conducted by Lee *et al.* (1980), and they reported that the islands comprise 364 taxa in 85 families and 246 genera:

Table 1. The dates and site of vascular plants surveyed in the Gogunsan Archipelago.

Islands	Dates
Sinsi-do	31 Mar. 2016; 24 May 2016; 29 Jun. 2016; 7 Sep. 2016; 9 Sep. 2016; 25 Oct. 2016
Seonyu-do	23 May 2016; 8 Sep. 2016
Munyeo-do	24 May 2016; 7 Sep. 2016
Yami-do	1 Apr. 2016; 30 Jun. 2016; 8 Sep. 2016; 25 Oct. 2016
Bian-do	25 May 2016; 28 Jun. 2016; 8 Sep. 2016
Duri-do	25 May 2016

355 species, five varieties, and five hybrids. Since then, studies have been carried out by Lee and Kim (1980), Kim (2008), Jang *et al.* (2013). The previous research has been carried out in limited areas, so a comprehensive survey of vascular plants in the region is needed. Accordingly, this study was conducted to secure voucher specimens through field surveys, create a detailed plant diversity list, and conservation strategies to ensure biodiversity and effective management are discussed in detail.

MATERIALS AND METHODS

Survey site

The Gogunsan Archipelago is about 50 km from Gunsan-si, consisting of Sinsi-do, Seonyu-do, Munyeo-do, Yami-do, Bian-do, Duri-do, Daejang-do, Jangja-do, and many other uninhabited islands. The Gogunsan Archipelago is considered part of Okdo-myeon, Gunsan-si, Jeollabuk-do Province (126°15'-126°30' East longitude, 35°45'-35°55' North latitude), in Korea.

The geology of the Gogunsan Archipelago consists of the Jurassic sedimentary rocks of Daedong system, Cretaceous sedimentary rocks of the Gyeongsang system, Late Cretaceous to early tertiary acidic volcanic rocks, and Quaternary sediments (Won and Song, 1980).

This study investigated six islands of the Gogunsan Archipelago: Sinsi-do, Seonyu-do, Munyeo-do, Yami-do, Bian-do, and Duri-do. These islands, are affected by northwestern winds in the winter and are hot and rainy in the summer. Mean annual rainfall recorded at the weather station in the Gogunsan Archipelago is 1,284.5 mm and the mean annual temperature over last five years (2011-2015) is 12.6°C with maximum temperature of 35°C and minimum of -11.3°C (Gunsan-si, 2017).

Survey method and analysis

The six islands were surveyed five times between March and October of 2016 for the investigation of the flora of vascular plants (Fig. 1, Table 1). The collected plants were made into the immersion and dried specimens. All the voucher specimens are deposited at the herbarium (KB) of the National Institute of Biological Resources in

Korea. Various ecological habitats include mountain, flatland, wetland, valley, reclaimed land, sandy coast, mud flat, rocky coast, and abandoned salt field. Specimens were identified with the use of illustrations, photographs, and published descriptions (Lee, 1980; 2003; Lee, 1996; Lee, 2006; Park, 2009; Kim and Kim, 2011; Lee and Lee, 2015; Cho *et al.*, 2016). The voucher specimens were listed according to the Cronquist classification system of vascular plants (Cronquist, 1981). Under each family, genera and species are listed in an alphabetical order. Korean and scientific names of vascular plants followed Lee *et al.* (2011) and a cultivated plant was indicated by (C) after the Korean name. The survey plants were also categorized based on endemic plants of the Korean Peninsula (Chung *et al.*, 2017), red list plants (National Institute of Biological Resources, 2012), floristic regional indicator plants (National Institute of Environmental Research, 2012), and invasive alien plants (Jung *et al.*, 2016). The habitat affinity types of species were categorized according to preference of habitat: forest, farmland, wetland, seacoast, and bare ground. We used cluster analysis to similarity of species composition among the six islands. The index of similarity was analyzed using UPGMA (Unweighted Pair Group Method using Arithmetic algorithm) of MVSP (Multi Variate Statistical Package 3.1-Kovaok Computing Services), depicted as a dendrogram.

RESULTS AND DISCUSSION

Flora of vascular plants

From the five trips to the Gogunsan Archipelago, we identified 575 total taxa (527 species, five subspecies, 42 varieties, and one hybrid) categorized into included 118 families and 358 genera (Table 2, Appendix 1). The total number of voucher specimens was 2,847, which included some planted or cultivated plants. Of the 575 taxa investigated, pteridophyta included 17 taxa (16 species and one variety) belonging to 11 families and 14 genera, while gymnospermae included four taxa (4 species) belonging to two families and two genera, and angiospermae included 554 taxa, with 383 taxa (353 species, two subspecies, 27 varieties, and one hybrid) belonging to

Table 2. The number of vascular plants surveyed in the Gogunsan Archipelago.

Islands	Family	Genus	Species	Subspecies	Variety	Hybrid	Total
Sinsi-do	89	234	312	3	26	1	342
Seonyu-do	72	190	233	2	17	–	252
Munyeo-do	76	167	185	2	14	1	201
Yami-do	72	151	166	3	15	–	184
Bian-do	91	211	243	2	18	–	263
Duri-do	39	61	65	3	–	–	68
Total	118	358	527	5	42	1	575

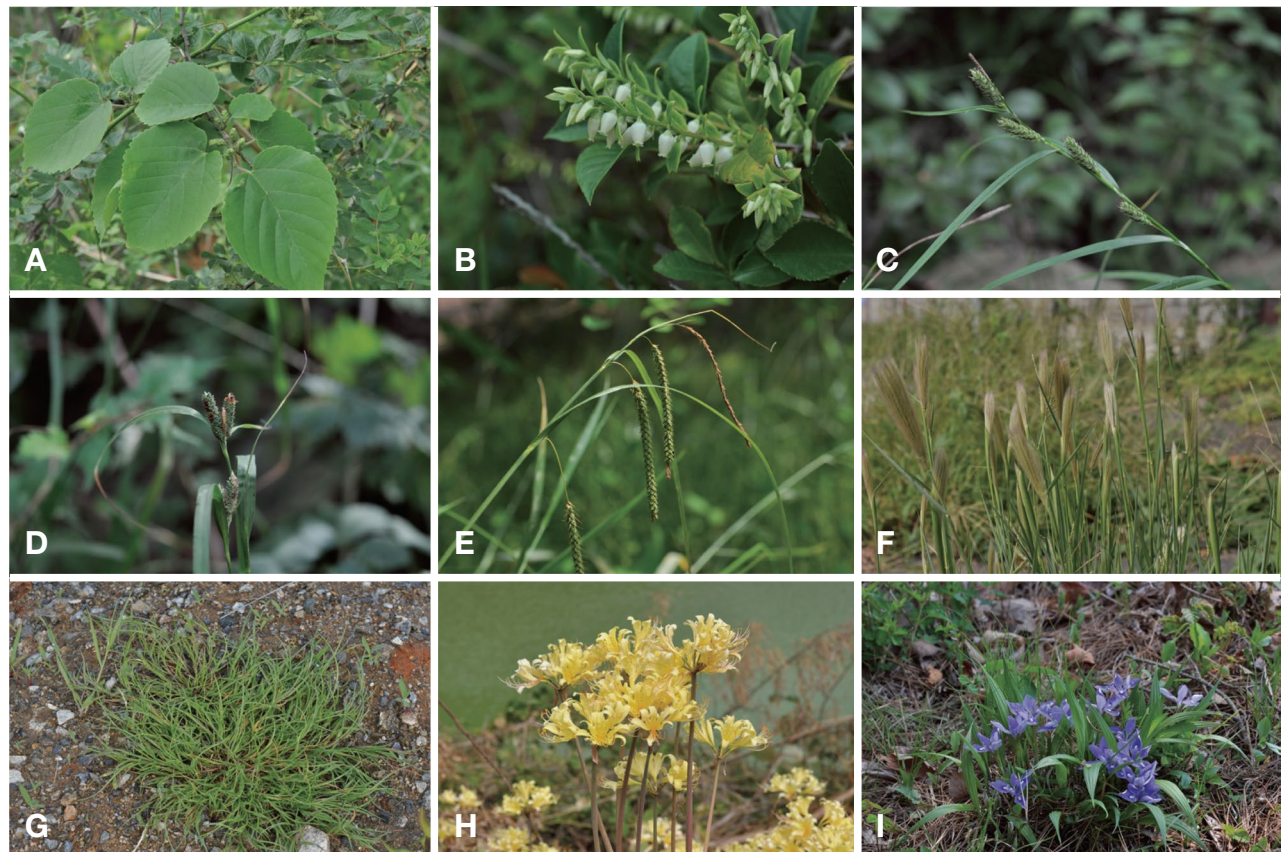


Fig. 2. Some remarkable taxa in the Gogunsan Archipelago. A. *Morus tiliaefolia* Makino.; B. *Vaccinium bracteatum* Thunb.; C. *Carex ligulata* var. *austrokoreensis* Ohwi; D. *Carex maculata* Boott; E. *Carex phacota* Spreng.; F. *Chloris virgata* Sw.; G. *Parapholis incurve* (L.) C. E. Hubb.; H. *Lycoris flavescens* M. Y. Kim & S. T. Lee; I. *Iris rossii* var. *latifolia* J. K. Sim & Y. S. Kim.

dicotyledoneae (88 families, 247 genera), and 14 taxa (154 species, three subspecies, and 14 varieties) belonging to monocotyledoneae (17 families, 95 genera). The 575 taxa of vascular plants in the flora of the Gogunsan Archipelago represented 13.2% of the total flora of Korea, 4,338 taxa (Lee *et al.*, 2011).

Several species reported in previous studies could not be found in these surveys. Some of the major taxa missing are *Selaginella involvens* (Sw.) Spring, *Pyrrosia hastata* (Thunb. ex Houtt.) Ching, *Corylus sieboldiana* var. *mandshurica* (Maxim. & Rupr.) C. K. Schneid. *Corispermum*

chinganicum Iljin, *Machilus thunbergii* Siebold & Zucc., *Vicia bungei* Ohwi, *Cayratia japonica* (Thunb.) Gagnep., *Syringa reticulata* var. *mandshurica* (Maxim.) H. Hara, *Swertia japonica* (Schult.) Griseb., *Adenophora strica* Miq., *Taraxacum platycarpum* Dahlst., *Carex lenta* D. Don, and *Dioscorea japonica* Thunb.. However, this study newly identified 162 taxa, such as *Ophioglossum petiolatum* Hook., *Ceratophyllum demersum* L., *Morus tiliaefolia* Makino (Fig. 2A), *Rumex nipponicus* Franch. & Sav., *Rhodotypos scandens* (Thunb.) Makino, *Caesalpinia decapetala* (Roth) Alston, *Vigna minima* (Roxb.)

Table 3. The list of endemic plants surveyed in the Gogunsan Archipelago.

Family	Taxa
Ranunculaceae	<i>Clematis brachyura</i> Maxim.
Liliaceae	<i>Hemerocallis hakuunensis</i> Nakai
Amaryllidaceae	<i>Lycoris flavescens</i> M. Y. Kim & S. T. Lee
Iridaceae	<i>Iris rossii</i> var. <i>latifolia</i> J. K. Sim & Y. S. Kim

Table 4. The list of red list plants surveyed in the Gogunsan Archipelago.

Family	Taxa	Grade ^a
Orchidaceae	<i>Pogonia minor</i> (Makino) Makino	NT
Poaceae	<i>Phacelurus latifolius</i> (Steud.) Ohwi	LC
Orchidaceae	<i>Cymbidium goeringii</i> (Rchb. f.) Rchb. f.	
Boraginaceae	<i>Lithospermum arvense</i> L.	NE
Cyperaceae	<i>Carex ligulata</i> var. <i>austrokoreensis</i> Ohwi	

^aGrade: NT. Threatened species; LC. Least Concern species; NE. Not Evaluate species.

Ohwi & H. Ohashi, *Zanthoxylum planispinum* Siebold & Zucc., *Oxalis dillenii* Jacq., *Adenophora polyantha* Nakai, *Carex maculata* Boott (Fig. 2D), *Rhynchospora faberi* C. B. Clarke, and *Phaenosperma globosa* Munro & Benth.. It is assumed that the differences in the species lists are due to the difference of the survey sites and the investigation periods between the current and previous studies.

Korean endemic plants

According to a checklist of endemic plants on the Korean Peninsula (Chung *et al.*, 2017), four endemic taxa were found in survey sites (Table 3): *Clematis brachyura* Maxim., *Hemerocallis hakuunensis* Nakai, *Lycoris flavescens* M. Y. Kim & S. T. Lee (Fig. 2H), and *Iris rossii* var. *latifolia* J. K. Sim & Y. S. Kim (Fig. 2I). The distribution patterns of these plants are different in that *C. brachyura* Maxim., *H. hakuunensis* Nakai, and *I. rossii* var. *latifolia* J. K. Sim & Y. S. Kim were discontinuously distributed in the ridges, while *L. flavescens* M. Y. Kim & S. T. Lee was found in lowland and sunny sides of a reservoir. Meanwhile, *Rubus parvifolius* var. *taquetii* (H. Lévl.) Lauener & D. K. Ferguson is known synonym of *R. parvifolius* L. (Iwatsuki *et al.*, 2001; Chung *et al.*, 2017).

Red List plants

Of the Red List plants according to International Union for Conservation of Nature (IUCN), six of the species discovered in our surveys were evaluated. One species was categorized as Near Threatened (NT) [*Pogonia minor* (Makino) Makino], two species [*Phacelurus latifolius*

(Steud.) Ohwi and *Cymbidium goeringii* (Rchb. f.) Rchb. f.] as Least Concern (LC), and three species as Not Evaluated (NE) (*Polygonum polyneuron* Franch. & Sav., *Lithospermum arvense* L. and *Carex ligulata* var. *austrokoreensis* Ohwi) (Table 4). Of these species, the small number of *P. minor* (Makino) Makino and *C. ligulata* var. *austrokoreensis* Ohwi were observed on the sunny forest edge in Munyeo-do and west valley in Sinsi-do, respectively.

Floristic regional indicator plants

The floristic regional indicator plants found were 67 taxa comprising four taxa of the fourth grade included *P. polyneuron* Franch. & Sav., *Ligustrum quihoui* var. *latifolium* Nakai, *C. ligulata* var. *austrokoreensis* Ohwi, and *L. flavescens* M. Y. Kim & S. T. Lee. Fourteen taxa of the third grade included *Vaccinium bracteatum* Thunb. (Fig. 2B), *Carex phacota* Spreng. (Fig. 2E), *Aletris spicata* (Thunb.) Franch.. Lastly, 10 taxa of second grade included *Stauntonia hexaphylla* Decne., *Caesalpinia decapetala* (Roth) Alston, and *Ainsliaea apiculata* Sch. Bip. ex Zoll., and 39 taxa of first grade included *Dicranopteris linearis* (Burm. f.) Underw., *Kadsura japonica* (L.) Dunal, and *Ruppia maritima* L.. The complete list is found in Table 5. These species account for 11.6% of vascular plants in the Gogunsan Archipelago. Of them, 18 taxa are floristic regional indicator plants over third grade, which indicates their relative importance in biogeography (Table 5).

Based on the flora of the Korean Peninsula, the Gogunsan Archipelago floristic division belongs to the southern province (Lee and Yim, 2002). The plants that are assumed to be at their northern limits on the Korean Peninsula are as follows: *D. linearis* (Burm. f.) Underw., *Sinomenium acutum* (Thunb.) Rehder & E. H. Wilson, *V. bracteatum* Thunb., *L. quihoui* var. *latifolium* Nakai, and *C. ligulata* var. *austrokoreensis* Ohwi (Lee and Lee, 2015; Korea National Arboretum, 2016).

Invasive alien plants

The 74 invasive alien plants (19 families, and 52 genera), based on Jung *et al.* (2016), include *Oxalis dillenii* Jacq., *Aegilops cylindrica* Host, *Chloris virgata* Sw. (Fig. 2F), and *Parapholis incurve* (L.) C. E. Hubb. (Fig. 2G), and *Sorghum halepense* (L.) Pers. (Table 6). The percent of naturalized index (NI) was 12.8% of the total 575 taxa vascular plants. Six taxa are considered ecosystem disturbance plants: *Rumex acetosella* L., *Ambrosia artemisiifolia* L., *Aster pilosus* Willd., *Hypochaeris radicata* (Thunb.) Franch. & Sav., *Lactuca scariola* L., and *Solidago altissima* (Aiton) McNeill. Meanwhile, seven taxa are archaeophyte [*Amaranthus lividus* L., *Fagopyrum esculentum* Moench, *Abutilon theophrasti* Medik., *Brassica juncea* (L.) Czern., *Thlaspi arvense* L., *Lycium chin-*

Table 5. The list of floristic regional indicator plants surveyed in the Gogunsan Archipelago.

Family	Taxa	Grade	
Polygonaceae	<i>Polygonum polyneuron</i> Franch. & Sav.	IV	
Oleaceae	<i>Ligustrum quihoui</i> var. <i>latifolium</i> Nakai		
Cyperaceae	<i>Carex ligulata</i> var. <i>austrokoreensis</i> Ohwi		
Amaryllidaceae	<i>Lycoris flavescens</i> M. Y. Kim & S. T. Lee		
Moraceae	<i>Ficus oxyphylla</i> Miq. ex Zoll.	III	
Ericaceae	<i>Vaccinium bracteatum</i> Thunb.		
Crassulaceae	<i>Hylotelephium spectabile</i> (Boreau) H. Ohba		
Rosaceae	<i>Rhodotypos scandens</i> (Thunb.) Makino		
Aquifoliaceae	<i>Ilex integra</i> Thunb.		
Sapindaceae	<i>Koelreuteria paniculata</i> Laxm.		
Convolvulaceae	<i>Calystegia dahurica</i> (Herb.) Choisy		
Rubiaceae	<i>Mitchella undulata</i> Siebold & Zucc.		
Cyperaceae	<i>Carex maculata</i> Boott		
	<i>Carex phacota</i> Spreng.		
Poaceae	<i>Phaenosperma globosa</i> Munro & Benth.		
	<i>Polypogon monspeliensis</i> (L.) Desf.		
Liliaceae	<i>Aletris spicata</i> (Thunb.) Franch.		
	<i>Asparagus cochinchinensis</i> (Lour.) Merr.		
Lardizabalaceae	<i>Stauntonia hexaphylla</i> Decne.	II	
Menispermaceae	<i>Sinomenium acutum</i> (Thunb.) Rehder & E. H. Wilson		
Moraceae	<i>Morus tiliaefolia</i> Makino		
Fabaceae	<i>Caesalpinia decapetala</i> (Roth) Alston		
Rutaceae	<i>Zanthoxylum planispinum</i> Siebold & Zucc.		
Verbenaceae	<i>Caryopteris incana</i> (Thunb. ex Houtt.) Miq.		
Asteraceae	<i>Ainsliaea apiculata</i> Sch. Bip. ex Zoll.		
Araceae	<i>Arisaema heterophyllum</i> Blume		
Liliaceae	<i>Polygonatum falcatum</i> A. Gray		
Orchidaceae	<i>Epipactis thunbergii</i> A. Gray		
Gleicheniaceae	<i>Dicranopteris linearis</i> (Burm. f.) Underw.		I
Thelypteridaceae	<i>Thelypteris glanduligera</i> (Kunze) Ching		
Dryopteridaceae	<i>Cyrtomium fortunei</i> J. Sm.		
Schisandraceae	<i>Kadsura japonica</i> (L.) Dunal		
Ranunculaceae	<i>Semiaquilegia adoxoides</i> (DC.) Makino		
Celtidaceae	<i>Celtis biondii</i> var. <i>heterophylla</i> (H. Lév.) C. K. Schneid.		
Aizoaceae	<i>Tetragonia tetragonoides</i> (Pall.) Kuntze		
Caryophyllaceae	<i>Silene aprica</i> var. <i>oldhamiana</i> (Miq.) C. Y. Wu		
Theaceae	<i>Camellia japonica</i> L.		
	<i>Eurya japonica</i> Thunb.		
Tiliaceae	<i>Grewia parviflora</i> Bunge		
Brassicaceae	<i>Sisymbrium luteum</i> (Maxim) O. E. Schulz		
Ericaceae	<i>Vaccinium oldhamii</i> Miq.		
Myrsinaceae	<i>Ardisia japonica</i> (Thunb.) Blume		
Primulaceae	<i>Lysimachia mauritiana</i> Lam.		
Pittosporaceae	<i>Pittosporum tobira</i> (Thunb.) W. T. Aiton		
Rosaceae	<i>Malus baccata</i> (L.) Borkh.		
	<i>Rubus hirsutus</i> Thunb.		
Elaeagnaceae	<i>Elaeagnus macrophylla</i> Thunb.		
Celastraceae	<i>Euonymus japonicus</i> Thunb.		
Aquifoliaceae	<i>Ilex macropoda</i> Miq.		
Euphorbiaceae	<i>Euphorbia pekinensis</i> Boiss.		
	<i>Mallotus japonicus</i> (L. f.) Müll. Arg.		
Staphyleaceae	<i>Euscaphis japonica</i> (Thunb.) Kanitz		
Rutaceae	<i>Orixa japonica</i> Thunb.		
Araliaceae	<i>Hedera rhombea</i> (Miq.) Bean		
Convolvulaceae	<i>Calystegia soldanella</i> (L.) Roem. & Schult.		
Boraginaceae	<i>Argusia sibirica</i> (L.) Dandy		
Verbenaceae	<i>Vitex rotundifolia</i> L. f.		
Lamiaceae	<i>Scutellaria strigillosa</i> Hemsl.		
Oleaceae	<i>Ligustrum japonicum</i> Thunb.		

Table 5. Continued.

Family	Taxa	Grade
Ruppiaceae	<i>Ruppia maritima</i> L.	
Araceae	<i>Arisaema ringens</i> (Thunb.) Schott	
Cyperaceae	<i>Carex kobomugi</i> Ohwi <i>Carex tristachya</i> Thunb.	
Poaceae	<i>Cynodon dactylon</i> (L.) Pers. <i>Ischaemum antephoroides</i> (Steud.) Miq. <i>Phacelurus latifolius</i> (Steud.) Ohwi	
Liliaceae	<i>Allium tuberosum</i> Rottler ex Spreng.	

Table 6. The list of invasive alien plants surveyed in the Gogunsan Archipelago.

Family	Taxa
Papaveraceae	<i>Papaver rhoeas</i> L.
Phytolaccaceae	<i>Phytolacca americana</i> L.
Chenopodiaceae	<i>Atriplex prostrata</i> Boucher ex DC. <i>Chenopodium album</i> L. <i>Chenopodium ficifolium</i> Sm. <i>Chenopodium glaucum</i> L.
Amaranthaceae	<i>Amaranthus hybridus</i> L. <i>Amaranthus viridis</i> L.
Caryophyllaceae	<i>Cerastium glomeratum</i> Thuill.
Polygonaceae	<i>Rumex acetosella</i> L. <i>Rumex crispus</i> L. <i>Rumex nipponicus</i> Franch. & Sav. <i>Rumex obtusifolius</i> L. <i>Rumex patientia</i> L.
Brassicaceae	<i>Lepidium virginicum</i> L.
Crassulaceae	<i>Sedum mexicanum</i> Britton.
Rosaceae	<i>Potentilla supina</i> L.
Fabaceae	<i>Amorpha fruticosa</i> L. <i>Medicago lupulina</i> L. <i>Medicago polymorpha</i> L. <i>Medicago sativa</i> L. <i>Melilotus suaveolens</i> Ledeb. <i>Robinia pseudoacacia</i> L. <i>Trifolium repens</i> L.
Onagraceae	<i>Oenothera biennis</i> L. <i>Oenothera laciniata</i> Hill
Euphorbiaceae	<i>Euphorbia supina</i> Raf.
Oxalidaceae	<i>Oxalis dillenii</i> Jacq.
Solanaceae	<i>Physalis angulata</i> L.
Convolvulaceae	<i>Cuscuta campestris</i> Yunck. <i>Ipomoea hederacea</i> var. <i>integriscula</i> A. Gray <i>Ipomoea purpurea</i> (L.) Roth
Scrophulariaceae	<i>Veronica arvensis</i> L. <i>Veronica persica</i> Poir.
Rubiaceae	<i>Diodia teres</i> Walter
Asteraceae	<i>Ambrosia artemisiifolia</i> L. <i>Aster pilosus</i> Willd. <i>Aster subulatus</i> var. <i>sandwicensis</i> (A. Gray) A. G. Jones <i>Bidens frondosa</i> L. <i>Bidens pilosa</i> L. <i>Conyza bonariensis</i> (L.) Cronquist <i>Conyza canadensis</i> (L.) Cronquist <i>Coreopsis lanceolata</i> L. <i>Coreopsis tinctoria</i> Nutt. <i>Cosmos sulphureus</i> Cav. <i>Erechtites hieracifolia</i> (L.) Raf. ex DC. <i>Erigeron annuus</i> (L.) Pers. <i>Helianthus tuberosus</i> L.

Table 6. Continued.

Family	Taxa
Poaceae	<i>Hypochaeris radicata</i> (Thunb.) Franch. & Sav.
	<i>Lactuca scariola</i> L.
	<i>Rudbeckia hirta</i> var. <i>pulcherrima</i> Farw.
	<i>Senecio vulgaris</i> (Iljin) Kitam.
	<i>Solidago altissima</i> (Aiton) McNeill
	<i>Sonchus asper</i> (L.) Hill
	<i>Sonchus oleraceus</i> L.
	<i>Tagetes minuta</i> L.
	<i>Xanthium canadense</i> Mill.
	<i>Aegilops cylindrica</i> Host
	<i>Avena fatua</i> L.
	<i>Bromus catharticus</i> Vuhl
	<i>Bromus rigidus</i> Roth
	<i>Bromus tectorum</i> L.
	<i>Chloris virgata</i> Sw.
	<i>Dactylis glomerata</i> L.
	<i>Eragrostis curvula</i> (Schrud.) Nees
	<i>Festuca arundinacea</i> Schreb.
	<i>Festuca myuros</i> L.
	<i>Leptochloa malabarica</i> (L.) Veldkamp
<i>Lolium multiflorum</i> Lam.	
<i>Lolium perenne</i> L.	
<i>Lolium rigidum</i> Gaudin	
<i>Panicum dichotomiflorum</i> Michx.	
<i>Parapholis incurve</i> (L.) C. E. Hubb.	
<i>Sorghum halepense</i> (L.) Pers.	

ense Mill., and *Eclipta prostrata* (L.) L.], while two species are considered alien species that were introduced intentionally and but are highly likely to spread in the natural ecosystem (*Ainus firma* Siebold & Zucc., and *Indigofera bungeana* Walp.). The invasive alien plants in the Gogunsan Archipelago were frequently observed around marine landing places of Seonyu-do, Bian-do, and Duri-do. Some species were also found around rest areas, road cracks, beaches, and farmlands on Sinsi-do and Yami-do island. Due to their location near human-modified habitats, we hypothesize that this inflow of alien species is caused by constant interference in plant diversity on the island by human activities. In the past these islands (Sinyu-do, Munyeo-do, Bian-do, and Duri-do) were only accessible by crossing the sea, but the number of visitors is expected to increase due to the opening of a bridge in December 2017. Accordingly, it is necessary to set up an effective plan to minimize the introducing invasive alien plants, including monitoring the distribution of alien species and rooting out regularly.

Species richness and classification of habitat affinity types

Species richness was highest in Sinsi-do (342 taxa, 89 families and 234 genera), followed by Bian-do (263 taxa, 91 families and 211 genera), Seonyu-do (252 taxa, 72 families and 190 genera), Munyeo-do (201 taxa, 76 fam-

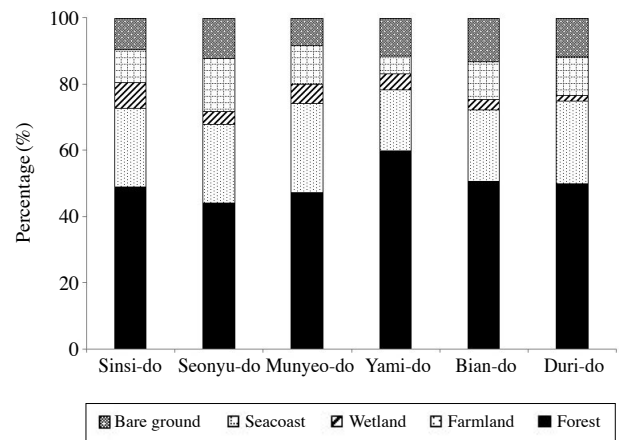


Fig. 3. Variations of percentage of habitat affinity types in the Gogunsan Archipelago.

ilies and 167 genera), Yami-do (184 taxa, 72 families and 151 genera), and Duri-do (68 taxa, 39 families and 61 genera) (Table 2). According to the theory of island biogeography, larger islands and closer islands to the mainland should have more species (MacArthur and Wilson, 1967), and this phenomenon is supported in the current flora study. Ranking of species richness shows close relationships with the size of the island. The area of each island is as follows: Sinsi-do (4.25 km²), Seonyu-do (2.13

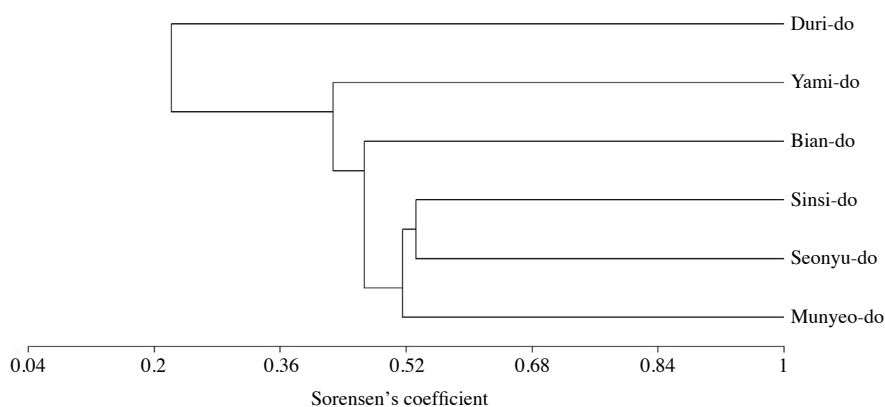


Fig. 4. Dendrograms showing the degree of Sørensen similarity based on vascular flora data of the Gogunsan Archipelago.

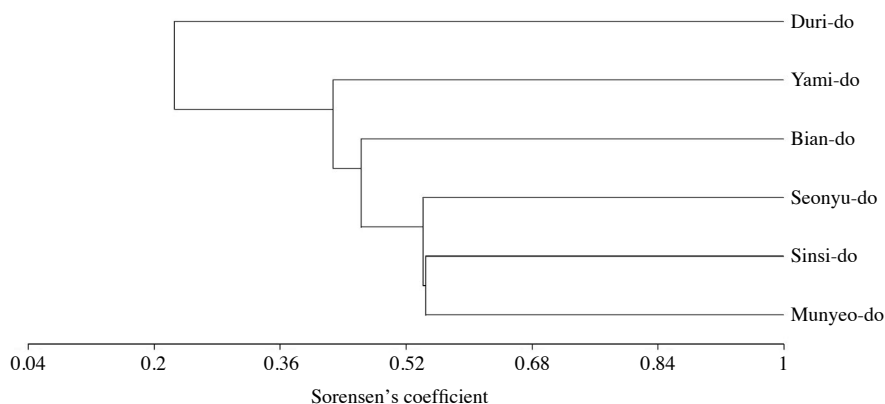


Fig. 5. Dendrograms showing the degree of Sørensen similarity based on native flora data (except invasive alien plants, ruderal plants) of the Gogunsan Archipelago.

km²), Munyeo-do (1.74 km²), Bian-do (1.63 km²), Yami-do (0.41 km²), and Duri-do (0.14 km²) (Gunsan-si, 2017).

For the result of analyzing habitat affinity types for total vascular plants (Fig. 3), the proportion of forest species was the highest on all islands. Following forest habitats, the most common types on most of the islands were farmland, seacoast, bare ground. This result is likely caused by the size of each land mosaic (types of ecosystem). In other words, it is that species richness is higher as the size of land mosaic is larger. The spatial elements, heterogeneity, and diversity of a landscape reflect a natural system, including disturbances and human influences on some areas (Turner and Bratton, 1987; Hong, 1998). The animals and plants survive by using habitat of spatially heterogeneous landscape. Therefore, structural diversity and size of land mosaic within the landscape is closely related with species richness and ecosystem quality (Peterken *et al.*, 1992; Forman and Collinge, 1996; Hong *et al.*, 2000; Kurki *et al.*, 2000). If the islands are exposed to rapid environmental changes, it is more likely that existing flora will be replaced sooner than anywhere else by

new species because the islands are small and isolated. Therefore, it is important to investigate and analyze flora of the islands in order to protect existing flora. Also, these results can be used as a baseline data to conserve and establish management plan of the islands (Kim *et al.*, 2016).

Similarity analysis

As the result of a similarity analysis based on total vascular plants, the similarity between Seonyu-do and Sinsi-do (node 1) was the highest at 53.2%. The index was lower in the following order: Munyeo-do and node 1 51.6% (node 2), node 2 and Bian-do 46.7% (node 3), node 3 and Yami-do 42.7% (node 4), and node 4 and Duri-do 22.2% (Fig. 4). Meanwhile, as the result of a similarity analysis excluding invasive alien and ruderal plants, the similarity between Sinsi-do and Munyeo-do (node 1) was the highest at 54.5%. The index was lower in the following order: Seonyu-do and node 1 54.2% (node 2), node 2 and Bian-do 46.3% (node 3), node 3 and Yami-do 42.8% (node 4), and node 4 and Duri-do 22.6% (Fig. 5). The index of

similarity based on the analysis excluding invasive alien and ruderal plants was higher than when all species were included. The index of similarity between the adjacent islands also was higher. This means that the proportion of invasive alien plants and ruderal plants increase with increasing disturbance by human activity. As the proportion of these species increase by human activity, each island does not have unique, local diversity. Artificial disturbance also is closely related with invasive alien species richness and composition of the islands (Chung and Hong, 2006). If the natural vegetation is temporarily destroyed by invasion and spread of invasive alien plants, the natural ecosystem will be disrupted and the rare or endemic plants will become extinct. Therefore these data can be used to conserve ecosystem of the islands and control invasive alien plants. Furthermore, it is essential to do continuous, long-term surveys monitoring environmental and flora changes (Chung and Hong, 2006; Kim *et al.*, 2016).

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Appendix 1. The list of vascular plants surveyed in the Gogunsan archipelago.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
Selaginellaceae 부처손과 <i>Selaginella tamariscina</i> (P. Beauv.) Spring 부처손; GGS161090, 161238	○			○		
Equisetaceae 속새과 <i>Equisetum arvense</i> L. 쇠뜨기; GGS161028	○					
Ophioglossaceae 고사리삼과 <i>Botrychium ternatum</i> (Thunb.) Sw. 고사리삼; GGS160732					○	
<i>Ophioglossum petiolatum</i> Hook. 자루나도고사리삼; GGS160712					○	
Osmundaceae 고비과 <i>Osmunda japonica</i> Thunb. 고비; GGS160444, 160590	○		○			
Gleicheniaceae 풀고사리과 <i>Dicranopteris linearis</i> (Burm. f.) Underw. 발풀고사리; GGS160096				○		
Dennstaedtiaceae 잔고사리과 <i>Pteridium aquilinum</i> var. <i>latiusculum</i> (Desv.) Underw. ex A. Heller 고사리; GGS160337, 160873, 161377, 161544	○	○	○		○	
Aspleniaceae 꼬리고사리과 <i>Asplenium incisum</i> Thunb. 꼬리고사리; GGS160236, 160807, 161249		○		○	○	
Athyriaceae 개고사리과 <i>Athyrium niponicum</i> (Mett.) Hance 개고사리; GGS160724					○	
<i>Deparia japonica</i> (Thunb.) M. Kato 진고사리; GGS160725					○	
Thelypteridaceae 처녀고사리과 <i>Thelypteris glanduligera</i> (Kunze) Ching 사다리고사리; GGS161023, 161689, 161941	○		○	○		
<i>Thelypteris palustris</i> (A. Gray) Schott 처녀고사리; GGS160698					○	
Dryopteridaceae 관중과 <i>Cyrtomium falcatum</i> (L. f.) C. Presl 도깨비고비; GGS160061, 160603, 160702				○	○	○
<i>Cyrtomium fortunei</i> J. Sm. 쇠고비; GGS160056	○					
<i>Dryopteris chinensis</i> (Baker) Koidz. 가는잎족제비고사리; GGS161295, 162334	○		○			
<i>Dryopteris uniformis</i> (Makino) Makino 폼비늘고사리; GGS161735, 161906			○		○	
Davalliaceae 넉줄고사리과 <i>Davallia mariesii</i> T. Moore ex Baker 넉줄고사리; GGS161009, 161237	○			○		
Pinaceae 소나무과 <i>Pinus densiflora</i> Siebold & Zucc. 소나무; GGS160360, 160571, 161375	○	○	○			
<i>Pinus rigida</i> Mill. 리기다소나무 (C); GGS162346	○					
<i>Pinus thunbergii</i> Parl. 곰솔; GGS160439, 160620, 160927, 161230, 161458	○		○	○	○	○
Cupressaceae 측백나무과 <i>Juniperus rigida</i> Siebold & Zucc. 노간주나무; GGS160095, 161374, 161820, 162382	○		○	○	○	
Lauraceae 녹나무과 <i>Lindera glauca</i> (Siebold & Zucc.) Blume 감태나무; GGS160744, 161271, 161506	○			○	○	
<i>Lindera obtusiloba</i> Blume 생강나무; GGS160044, 160066	○			○		
Aristolochiaceae 쥐방울덩굴과 <i>Aristolochia contorta</i> Bunge 쥐방울덩굴; GGS160951					○	
Schisandraceae 오미자과 <i>Kadsura japonica</i> (L.) Dunal 남오미자; GGS161878					○	
<i>Schisandra chinensis</i> (Turcz.) Baill. 오미자; GGS160723					○	
Ceratophyllaceae 붕어마름과 <i>Ceratophyllum demersum</i> L. 붕어마름; GGS160411			○			
Ranunculaceae 미나리아재비과 <i>Clematis apiifolia</i> DC. 사위질췌; GGS161594, 161667	○		○			
<i>Clematis brachyura</i> Maxim. 외대으아리; GGS161253				○		
<i>Clematis terniflora</i> DC. 참으아리; GGS161367, 161595, 161844, 162198	○	○	○		○	
<i>Ranunculus cantoniensis</i> DC. 털개구리미나리; GGS161207, 161985	○			○		
<i>Ranunculus chinensis</i> Bunge 첫가락나물; GGS161115, 161360	○			○		
<i>Ranunculus sceleratus</i> L. 개구리자리; GGS160146, 160428, 160473	○	○	○			
<i>Ranunculus tachiroei</i> Franch. & Sav. 개구리미나리; GGS160356, 160494	○	○				
<i>Semiaquilegia adoxoides</i> (DC.) Makino 개구리발톱; GGS160054, 160067, 160229, 160374, 160615, 160740	○	○	○	○	○	○
Lardizabalaceae 으름덩굴과 <i>Akebia quinata</i> (Houtt.) Decne. 으름덩굴; GGS160607, 160707, 162070		○			○	○
<i>Stauntonia hexaphylla</i> Decne. 멸꿀; GGS160029	○					

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
Menispermaceae 새모래덩굴과						
<i>Cocculus trilobus</i> (Thunb.) DC. 맹맹이덩굴; GGS160606, 160987, 161173, 161336, 161668, 162062	○	○	○	○	○	○
<i>Sinomenium acutum</i> (Thunb.) Rehder & E. H. Wilson 방기; GGS160803					○	
Papaveraceae 양귀비과						
<i>Papaver rhoeas</i> L. 개양귀비; GGS160433			○			
<i>Papaver somniferum</i> L. 양귀비; GGS160656						○
Fumariaceae 현호색과						
<i>Corydalis heterocarpa</i> Siebold & Zucc. 염주괴불주머니; GGS160622, 160780					○	○
<i>Corydalis incisa</i> (Thunb.) Pers. 자주괴불주머니; GGS160730					○	
<i>Corydalis turtschaninovii</i> Besser 조선현호색; GGS160049, 160090, 160226	○	○		○		
Ulmaceae 느릅나무과						
<i>Zelkova serrata</i> (Thunb.) Makino 느티나무; GGS160645, 160743					○	○
Celtidaceae 팽나무과						
<i>Celtis biondii</i> var. <i>heterophylla</i> (H. Lévl.) C. K. Schneid. 폭나무; GGS160788, 161264, 162257, 162440	○	○		○	○	
<i>Celtis sinensis</i> Pers. 팽나무; GGS160237, 160610, 160719, 161656, 162082	○	○	○		○	○
Cannabaceae 삼과						
<i>Humulus japonicus</i> Siebold & Zucc. 환삼덩굴; GGS161430, 161497, 161771, 161979, 162043	○	○	○	○	○	
Moraceae 뽕나무과						
<i>Broussonetia papyrifera</i> (L.) L'Hér. ex Vent 꾸지나무; GGS160292, 160601, 161673		○	○			○
<i>Cudrania tricuspidata</i> (Carrère) Bureau ex Lavallée 꾸지뽕나무; GGS160577, 160648, 160748, 161647, 162294	○	○	○		○	○
<i>Ficus oxyphylla</i> Miq. ex Zoll. 모람; GGS160731					○	
<i>Morus alba</i> L. 뽕나무 (C); GGS160416			○			
<i>Morus tiliaefolia</i> Makino 돌뽕나무; GGS160771					○	
Urticaceae 켜기풀과						
<i>Boehmeria longispica</i> Steud. 왜모시풀; GGS161100, 161827, 162034	○	○			○	
Juglandaceae 가래나무과						
<i>Platycarya strobilacea</i> Siebold & Zucc. 굴피나무; GGS160130, 160386, 161165, 161950, 162405	○	○	○	○		
Fagaceae 참나무과						
<i>Quercus acutissima</i> Carruth. 상수리나무; GGS160773, 161036, 161232	○			○	○	
<i>Quercus aliena</i> Blume 갈참나무; GGS160804					○	
<i>Quercus aliena</i> var. <i>acuteserrata</i> Maxim. ex Wenz. 졸갈참나무; GGS162432	○					
<i>Quercus dentata</i> Thunb. 떡갈나무; GGS161061	○					
<i>Quercus mongolica</i> Fisch. ex Ledeb. 신갈나무; GGS161006	○					
<i>Quercus serrata</i> Murray 졸참나무; GGS160397, 160487, 160848, 161233, 162279	○	○	○	○	○	
<i>Quercus variabilis</i> Blume 굴참나무; GGS161378, 161455, 162262	○	○	○			
Betulaceae 자작나무과						
<i>Alnus firma</i> Siebold & Zucc. 사방오리 (C); GGS160045, 160675, 160710	○				○	○
<i>Alnus hirsuta</i> (Spach) Fisch. ex Rupr. 물오리나무; GGS160456			○			
<i>Carpinus turczaninowii</i> Hance 소사나무; GGS160108, 160390, 160576, 160616, 161274	○	○	○	○		○
Phytolaccaceae 자리공과						
<i>Phytolacca americana</i> L. 미국자리공; GGS160949, 161229, 161650, 162021		○	○	○	○	
Aizoaceae 변행초과						
<i>Tetragonia tetragonoides</i> (Pall.) Kuntze 변행초; GGS160990					○	
Chenopodiaceae 명아주과						
<i>Atriplex gmelinii</i> C. A. Mey. ex Bong. 가는갯능쟁이; GGS161130, 161725	○		○			
<i>Atriplex prostrata</i> Boucher ex DC. 창갯능쟁이; GGS161707			○			
<i>Chenopodium album</i> L. 흰명아주; GGS160930					○	
<i>Chenopodium album</i> var. <i>centrorubrum</i> Makino 명아주; GGS160827, 161525, 161955, 162249	○	○		○	○	
<i>Chenopodium ficifolium</i> Sm. 줄명아주; GGS160274, 160652, 160747, 161318		○		○	○	○
<i>Chenopodium glaucum</i> L. 취명아주; GGS160857, 161589, 161602	○		○		○	
<i>Salicornia europaea</i> L. 통통마디; GGS160403, 162220		○	○			
<i>Salsola komarovii</i> Iljin 수송나물; GGS162104, 162207	○	○				
<i>Salsola tragus</i> L. 나래수송나물; GGS162130	○					
<i>Suaeda glauca</i> (Bunge) Bunge 나문재; GGS161132, 162107, 162212	○	○			○	
<i>Suaeda maritima</i> (L.) Dumort. 해홍나물; GGS161651, 162250		○			○	

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
Amaranthaceae 비름과						
<i>Achyranthes japonica</i> (Miq.) Nakai 쇠무릎; GGS161369, 161579, 161781, 162058	○	○	○		○	
<i>Amaranthus hybridus</i> L. 긴털비름; GGS161520, 161790	○				○	
<i>Amaranthus lividus</i> L. 개비름; GGS161112	○					
<i>Amaranthus viridis</i> L. 청비름; GGS160948, 161514	○				○	
Portulacaceae 쇠비름과						
<i>Portulaca oleracea</i> L. 쇠비름; GGS161468, 161636, 161774	○		○		○	
Molluginaceae 석류풀과						
<i>Mollugo pentaphylla</i> L. 석류풀; GGS161567, 161870	○				○	
Caryophyllaceae 석죽과						
<i>Arenaria serpyllifolia</i> L. 벼룩이자리; GGS160261		○				
<i>Cerastium glomeratum</i> Thuill. 양점나도나물; GGS160986, 161201	○				○	
<i>Cerastium holosteoides</i> var. <i>hallaisanense</i> M. Mizush. 점나도나물; GGS160024, 160062	○			○		
<i>Pseudostellaria heterophylla</i> (Miq.) Pax 개별꽃; GGS160728					○	
<i>Sagina maxima</i> A. Gray 큰개미자리; GGS160191, 160375, 160649, 160811, 161331		○	○	○	○	○
<i>Silene aprica</i> var. <i>oldhamiana</i> (Miq.) C. Y. Wu 갯장구채; GGS160131, 160377, 160528, 160614, 160768, 161292	○	○	○	○	○	○
<i>Spergularia marina</i> (L.) Griseb 갯개미자리; GGS160250, 160420, 160517, 160812	○	○	○		○	
<i>Stellaria aquatica</i> (L.) Scop. 쇠별꽃; GGS160650, 161312				○		○
<i>Stellaria media</i> (L.) Vill. 별꽃; GGS160033, 160079, 160945	○	○			○	
<i>Stellaria neglecta</i> Weihe ex Bluff & Fingerh. 초록별꽃; GGS160352				○		
Polygonaceae 마디풀과						
<i>Fagopyrum esculentum</i> Moench 메밀; GGS161358				○		
<i>Fallopia dumetorum</i> (L.) Holub 닭의덩굴; GGS160659, 161157, 161279	○			○		○
<i>Polygonum aviculare</i> L. 마디풀; GGS160964, 162000, 162118, 162213	○	○		○	○	
<i>Polygonum filiforme</i> Thunb. 이삭여뀌; GGS161900					○	
<i>Polygonum hydropiper</i> L. 여뀌; GGS162481	○					
<i>Polygonum japonicum</i> Meisn. 흰꽃여뀌; GGS161527, 161776, 162278	○	○			○	
<i>Polygonum lapathifolium</i> L. 흰여뀌; GGS161043, 161344, 161621, 161782, 162008	○	○	○	○	○	
<i>Polygonum longisetum</i> Bruijn 개여뀌; GGS161851					○	
<i>Polygonum persicaria</i> L. 봄여뀌; GGS160519	○					
<i>Polygonum polyneuron</i> Franch. & Sav. 이삭마디풀; GGS161730			○			
<i>Polygonum sagittatum</i> L. 미꾸리남시; GGS162393	○					
<i>Polygonum senticosum</i> (Meisn.) Franch. & Sav. 머느리밑씻개; GGS160653, 160900, 161183, 162059	○	○			○	○
<i>Rumex acetosa</i> L. 수영; GGS160148, 160667, 160755		○			○	○
<i>Rumex acetosella</i> L. 애기수영; GGS161137	○					
<i>Rumex crispus</i> L. 소리쟁이; GGS160241, 160398, 160643, 160856, 161178, 161221	○	○	○	○	○	○
<i>Rumex japonicus</i> Houtt. 참소리쟁이; GGS160932					○	
<i>Rumex nipponicus</i> Franch. & Sav. 줄소리쟁이; GGS160539	○					
<i>Rumex obtusifolius</i> L. 돌소리쟁이; GGS160847					○	
<i>Rumex patientia</i> L. 부령소리쟁이; GGS160349		○				
Plumbaginaceae 갯길경과						
<i>Limonium tetragonum</i> (Thunb.) Bullock 갯길경; GGS161134, 161713, 162210	○	○	○			
Theaceae 차나무과						
<i>Camellia japonica</i> L. 동백나무; GGS160014, 160091, 160704	○			○	○	
<i>Eurya japonica</i> Thunb. 사스레피나무; GGS160006, 160064, 160831, 161438, 162027	○	○	○	○	○	
Clusiaceae 물레나물과						
<i>Hypericum erectum</i> Thunb. 고추나물; GGS162010, 161387		○	○			
Tiliaceae 피나무과						
<i>Corchoropsis tomentosa</i> (Thunb.) Makino 수까치개; GGS162197, 162415	○	○				
<i>Grewia parviflora</i> Bunge 장구밥나무; GGS160957, 161101, 161248, 161663, 162014	○	○	○	○	○	
Malvaceae 아욱과						
<i>Abutilon theophrasti</i> Medik. 어저귀; GGS161585, 161765	○				○	
Violaceae 제비꽃과						
<i>Viola albida</i> var. <i>chaerophylloides</i> F. Maek. 남산제비꽃; GGS160008	○					
<i>Viola aponica</i> Langsd. ex Ging. 왜제비꽃; GGS160132, 160618, 160764	○				○	○
<i>Viola grypoceras</i> A. Gray 뉘시제비꽃; GGS160027, 160232, 160734	○	○			○	

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
<i>Viola mandshurica</i> W. Becker 제비꽃; GGS160443			○			
<i>Viola rossii</i> Hemsl. 고깔제비꽃; GGS160013	○					
Cucurbitaceae 박과						
<i>Trichosanthes kirilowii</i> Maxim. 하늘타리; GGS160924, 161197, 161674, 162035	○	○	○		○	
Salicaceae 버드나무과						
<i>Salix koreensis</i> Andersson 버드나무; GGS161098	○					
Brassicaceae 십자화과						
<i>Arabis glabra</i> (L.) Bernh. 장대나물; GGS160332		○				
<i>Brassica juncea</i> (L.) Czern. 갓; GGS160060, 160185, 160407, 160668		○	○	○		○
<i>Capsella bursa-pastoris</i> (L.) Medik. 냉이; GGS160070, 160646				○		○
<i>Cardamine fallax</i> (O. E. Schulz) Nakai 좁쌀냉이; GGS160022	○					
<i>Lepidium virginicum</i> L. 콩다닥냉이; GGS160164, 160543, 160761, 161346	○	○		○	○	
<i>Rorippa indica</i> (L.) Hiern 개갓냉이; GGS160155, 162111	○	○				
<i>Rorippa palustris</i> (L.) Besser 속속이풀; GGS160499, 161631	○		○			
<i>Sisymbrium luteum</i> (Maxim) O. E. Schulz 노란장대; GGS160774						○
<i>Thlaspi arvense</i> L. 말냉이; GGS160078, 160833				○	○	
Ericaceae 진달래과						
<i>Rhododendron mucronulatum</i> Turcz. 진달래; GGS160011, 160077, 161395	○		○	○		
<i>Vaccinium bracteatum</i> (Nakai) Kitam. 모새나무; GGS160001, 161953, 162269	○	○		○		
<i>Vaccinium oldhamii</i> Miq. 정금나무; GGS160491, 161406	○		○			
Pyrolaceae 노루발과						
<i>Chimaphila japonica</i> Miq. 매화노루발; GGS161240				○		
<i>Pyrola japonica</i> Klenze ex Alef. 노루발; GGS160819					○	
Ebenaceae 감나무과						
<i>Diospyros kaki</i> Thunb. 감나무 (C); GGS161280				○		
<i>Diospyros lotus</i> L. 고욤나무; GGS160778					○	
Styracaceae 때죽나무과						
<i>Styrax japonicus</i> Siebold & Zucc. 때죽나무; GGS160115, 160396, 160484, 160795, 161263	○	○	○	○	○	
Symplocaceae 노린재나무과						
<i>Symplocos sawafutagi</i> Nagam. 노린재나무; GGS160173		○				
<i>Symplocos tanakana</i> Nakai 검노린재; GGS160107, 160368, 160477, 160608, 160706, 161231	○	○	○	○	○	○
Myrsinaceae 자금우과						
<i>Ardisia japonica</i> (Thunb.) Blume 자금우; GGS160051, 160230, 161255, 161690, 161881	○	○	○	○	○	
Primulaceae 앵초과						
<i>Lysimachia clethroides</i> Duby 큰까치수염; GGS160887, 161052, 161267, 161407, 162170	○	○	○	○	○	
<i>Lysimachia japonica</i> Thunb. 쯤가지풀; GGS160503	○					
<i>Lysimachia mauritiana</i> Lam. 갯까치수염; GGS160457, 160492, 160612, 160904	○		○		○	○
Pittosporaceae 돈나무과						
<i>Pittosporum tobira</i> (Thunb.) W. T. Aiton 돈나무; GGS160126, 160440, 160908		○	○		○	
Grossulariaceae 까치밥나무과						
<i>Ribes fasciculatum</i> var. <i>chinense</i> Maxim. 까마귀밥나무; GGS160081				○		
Crassulaceae 돌나물과						
<i>Hylotelephium spectabile</i> (Boreau) H. Ohba 큰평의비름; GGS162086	○					
<i>Orostachys japonica</i> (Maxim.) A. Berger 바위솔; GGS161446	○					
<i>Sedum bulbiferum</i> Makino 말뚱비름; GGS160561	○					
<i>Sedum kamtschaticum</i> Fisch. & C. A. Mey. 기린초; GGS162087	○					
<i>Sedum mexicanum</i> Britton. 멕시코돌나물; GGS160468			○			
<i>Sedum oryzifolium</i> Makino 땅채송화; GGS160295, 160898, 161305		○		○	○	
<i>Sedum polytrichoides</i> Hemsl. 바위채송화; GGS161069, 161306	○			○		
<i>Sedum sarmentosum</i> Bunge 돌나물; GGS160364, 160658		○				○
Rosaceae 장미과						
<i>Agrimonia pilosa</i> Ledeb. 짚신나물; GGS161747, 161848			○		○	
<i>Aria alnifolia</i> (Siebold & Zucc.) Decne. 팔배나무; GGS160121, 160369, 160597, 160809, 161277	○	○	○	○	○	
<i>Chaenomeles speciosa</i> (Sw.) Nakai 산당화 (C); GGS160028	○					
<i>Duchesnea indica</i> (Andr.) Focke 민뺨딸기; GGS160621, 160830					○	○
<i>Geum aleppicum</i> Jacq. 큰뺨무; GGS160931					○	
<i>Malus baccata</i> (L.) Borkh. 야광나무; GGS161016	○					
<i>Potentilla chinensis</i> Ser. 딱지꽃; GGS162193		○				

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
<i>Potentilla fragarioides</i> L. 양지꽃; GGS160071, 160565	○			○		
<i>Potentilla freyniana</i> Bornm. 세잎양지꽃; GGS160058	○					
<i>Potentilla supina</i> L. 개소시랑개비; GGS161004, 161347	○			○		
<i>Pourthiaea villosa</i> (Thunb.) Decne. 윤노리나무; GGS160117, 161007, 161261	○	○		○		
<i>Prunus japonica</i> var. <i>nakaii</i> (H. Lévl.) Rehder 이스라지나무; GGS160128, 160596	○	○				
<i>Prunus serrulata</i> var. <i>pubescens</i> (Makino) Nakai 잔털벚나무; GGS160127, 160572, 160775	○	○				○
<i>Prunus tomentosa</i> Kom. 앵도나무; GGS160021, 160806	○					○
<i>Pyrus calleryana</i> var. <i>fauriei</i> (C. K. Schneid.) Rehder 풍배나무; GGS160573	○					
<i>Rhodotypos scandens</i> (Thunb.) Makino 병아리꽃나무; GGS160720						○
<i>Rosa luciaeae</i> Franch. & Rochebr. ex Crép. 돌가시나무; GGS160915, 161213, 161246	○			○	○	
<i>Rosa multiflora</i> Thunb. 꿩레나무; GGS160114, 160569, 160631	○	○				○
<i>Rosa rugosa</i> (Regel) Bijn. 해당화; GGS160177, 162122	○	○				
<i>Rubus corchorifolius</i> L. f. 수리딸기; GGS160727, 161936, 162333	○			○	○	
<i>Rubus crataegifolius</i> Bunge 산딸기; GGS161242				○		
<i>Rubus hirsutus</i> Thunb. 장딸기; GGS160688						○
<i>Rubus parvifolius</i> L. 멧석딸기; GGS160113, 160625, 160736, 161184, 161335	○	○		○	○	○
<i>Rubus parvifolius</i> var. <i>taquetii</i> (H. Lévl.) Lauener & D. K. Ferguson 사슴딸기; GGS160129, 160849		○			○	
<i>Sanguisorba officinalis</i> L. 오이풀; GGS161376, 161483, 161944, 162037	○	○	○	○		
<i>Stephanandra incisa</i> (Thunb.) Zabel 국수나무; GGS160228, 160488	○	○				
Fabaceae 콩과						
<i>Aeschynomene indica</i> L. 자귀풀; GGS161620, 161801, 161976, 162386	○			○	○	○
<i>Albizia julibrissin</i> Durazz. 자귀나무 (C); GGS160891, 161037, 161276, 161366, 162028	○	○		○	○	○
<i>Amorpha fruticosa</i> L. 족제비싸리; GGS160143, 160486	○	○				
<i>Caesalpinia decapetala</i> (Roth) Alston 실거리나무; GGS162258		○				
<i>Chamaecrista nomame</i> (Siebold) H. Ohashi 차풀; GGS161539, 161856, 162073	○	○				○
<i>Desmodium podocarpum</i> DC. 개도독눔의갈고리; GGS161740				○		
<i>Dunbaria villosa</i> (Thunb.) Makino 여우팔; GGS161736, 161753, 162044		○	○			○
<i>Glycine soja</i> Siebold & Zucc. 돌콩; GGS161397, 161597, 161987	○			○	○	
<i>Indigofera bungeana</i> Walp. 큰낭아초; GGS160995, 162292	○	○				
<i>Indigofera kirilowii</i> Maxim. ex Palib. 땅비싸리; GGS160110, 160430, 160489	○	○		○		
<i>Kummerowia striata</i> (Thunb.) Schindl. 매듭풀; GGS161368, 161513, 161980	○			○	○	
<i>Lathyrus japonicus</i> Willd. 갯완두; GGS160111, 160902		○				○
<i>Lespedeza bicolor</i> Turcz. 싸리; GGS160994, 161265, 162069	○	○		○		
<i>Lespedeza cuneata</i> (Dum. Cours.) G. Don. 비수리; GGS161380, 161750, 161984, 162047, 162308	○	○		○	○	
<i>Lespedeza cyrtobotrya</i> Miq. 참싸리; GGS161362, 161518, 162149	○	○		○		
<i>Lespedeza maximowiczii</i> C. K. Schneid. 조록싸리; GGS161022, 161269	○			○		
<i>Lespedeza pilosa</i> (Thunb.) Siebold & Zucc. 팽이싸리; GGS161760, 162194		○				○
<i>Lespedeza tomentosa</i> (Thunb.) Siebold ex Maxim. 개싸리; GGS161999, 162015		○		○		
<i>Lespedeza virgata</i> (Thunb.) DC. 줄싸리; GGS162284		○				
<i>Maackia amurensis</i> Rupr. & Maxim. 다릅나무; GGS161126	○					
<i>Medicago lupulina</i> L. 잔개자리; GGS160214, 160969		○				○
<i>Medicago polymorpha</i> L. 개자리; GGS160371, 160966				○		○
<i>Medicago sativa</i> L. 자주개자리; GGS160997	○					
<i>Melilotus suaveolens</i> Ledeb. 전동싸리; GGS161967				○		
<i>Pueraria lobata</i> (Willd.) Ohwi 칩; GGS161432, 161470, 161812, 161918, 162071	○	○	○	○	○	
<i>Robinia pseudoacacia</i> L. 아까시나무 (C); GGS160176, 160678, 160792		○				○
<i>Sophora flavescens</i> Aiton 고삼; GGS160859, 161217, 161330, 162049	○	○				○
<i>Trifolium repens</i> L. 토끼풀; GGS160304		○				
<i>Vicia angustifolia</i> L. ex Reichard 가는살갈퀴; GGS160118, 160611, 160841		○				○
<i>Vicia tetrasperma</i> (L.) Schreb. 열치기완두; GGS160154, 160441, 160474	○	○	○			
<i>Vigna minima</i> (Roxb.) Ohwi & H. Ohashi 좁돌팔; GGS161573, 161766	○					○
<i>Vigna umbellata</i> (Thunb.) Ohwi & H. Ohashi 덩굴팔; GGS161702, 162046		○	○			
Elaeagnaceae 보리수나무과						
<i>Elaeagnus macrophylla</i> Thunb. 보리밥나무; GGS160059, 160599, 161858				○	○	○
<i>Elaeagnus umbellata</i> Thunb. 보리수나무; GGS160544, 160796, 161225, 161684	○		○	○	○	
Haloragaceae 개미탑과						
<i>Haloragis micrantha</i> (Thunb.) R. Br. 개미탑; GGS160578, 161236, 161402	○		○	○		

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
Lythraceae 부처꽃과						
<i>Ammannia multiflora</i> (W. A. Nicholson) Rehder 좀부처꽃; GGS162395	○					
Onagraceae 바늘꽃과						
<i>Ludwigia epilobioides</i> Maxim. 여뀌바늘; GGS161575, 161634, 161961	○		○	○		
<i>Oenothera biennis</i> L. 달맞이꽃; GGS160980, 161032, 161381, 161989	○		○	○	○	
<i>Oenothera laciniata</i> Hill 애기달맞이꽃; GGS160267, 161988		○		○		
Cornaceae 층층나무과						
<i>Cornus kousa</i> F. Buerger ex Miq. 산딸나무; GGS161053	○					
Santalaceae 단향과						
<i>Thesium chinense</i> Turcz. 제비꽃; GGS160324, 160767		○			○	
Celastraceae 노박덩굴과						
<i>Celastrus orbiculatus</i> Thunb. 노박덩굴; GGS160294, 160385, 160574, 160965, 161328	○	○	○	○	○	
<i>Euonymus alatus</i> (Thunb.) Siebold 화살나무; GGS160786, 160828, 161294				○	○	○
<i>Euonymus hamiltonianus</i> Wall. 참빛살나무; GGS160207, 160432, 160776		○	○		○	
<i>Euonymus japonicus</i> Thunb. 사철나무; GGS160175, 160394, 160570, 160647, 160892, 161286	○	○	○	○	○	○
<i>Euonymus oxyphyllus</i> Miq. 참회나무; GGS160234, 161017, 161275	○	○		○		
Aquifoliaceae 감탕나무과						
<i>Ilex integra</i> Thunb. 감탕나무; GGS160018	○					
<i>Ilex macropoda</i> Miq. 대팻집나무; GGS161121	○					
Euphorbiaceae 대극과						
<i>Acalypha australis</i> L. 깨풀; GGS160941, 161391, 161519, 162060	○	○	○		○	
<i>Euphorbia helioscopia</i> L. 등대풀; GGS160350		○				
<i>Euphorbia humifusa</i> Willd. ex Schtdl. 땅빈대; GGS161609, 162096	○		○			
<i>Euphorbia pekinensis</i> Boiss. 대극; GGS161062, 161247, 162288	○	○		○		
<i>Euphorbia supina</i> Raf. 애기땅빈대; GGS161763, 161995				○	○	
<i>Mallotus japonicus</i> (L. f.) Müll. Arg. 예덕나무; GGS161018, 161228, 161396, 162031	○	○	○	○		
<i>Securinega suffruticosa</i> (Pall.) Rehder 광대싸리; GGS160910					○	
Rhamnaceae 갈매나무과						
<i>Rhamnella franguloides</i> (Maxim.) Weberb. 까마귀베개; GGS160777					○	
<i>Rhamnus yoshinoi</i> Makino 짝자래나무; GGS161060	○					
Vitaceae 포도과						
<i>Ampelopsis brevipedunculata</i> (Maxim.) Trautv. 개머루; GGS160674, 160906, 161099, 161341, 161678, 162016	○	○	○	○	○	○
<i>Parthenocissus tricuspidata</i> (Siebold & Zucc.) Planch. 담쟁이덩굴; GGS160613, 160893, 161297				○	○	○
<i>Vitis amurensis</i> Rupr. 왕머루; GGS160729					○	
<i>Vitis ficifolia</i> var. <i>sinuata</i> (Regel) H. Hara 까마귀머루; GGS160293, 161308, 161433, 161850, 162128	○	○	○	○	○	
<i>Vitis flexuosa</i> Thunb. 새머루; GGS161117, 161266, 161675	○	○	○			
Polygalaceae 원지과						
<i>Polygala japonica</i> Houtt. 애기풀; GGS160330, 160765	○				○	
Staphyleaceae 고추나무과						
<i>Euscaphis japonica</i> (Thunb.) Kanitz 말오줌때; GGS160460, 160799, 161015, 161243, 162261	○	○	○	○	○	
Sapindaceae 무환자나무과						
<i>Koelreuteria paniculata</i> Laxm. 모감주나무; GGS161672			○			
Aceraceae 단풍나무과						
<i>Acer pictum</i> var. <i>mono</i> (Maxim.) Franch. 고로쇠나무; GGS161909			○			
Anacardiaceae 율나무과						
<i>Rhus javanica</i> L. 붉나무; GGS160632, 161174, 161949, 162032	○	○		○		○
<i>Toxicodendron sylvestri</i> (Siebold & Zucc.) Kuntze 산검양율나무; GGS160791, 161270				○	○	
<i>Toxicodendron trichocarpum</i> (Miq.) Kuntze 개율나무; GGS161070	○					
Simaroubaceae 소태나무과						
<i>Picrasma quassioides</i> (D. Don) Benn. 소태나무; GGS160104, 160389, 160711, 161273		○	○	○	○	
Rutaceae 운향과						
<i>Evodia daniellii</i> Hemsl. 쉬나무; GGS161342				○		
<i>Orixa japonica</i> Thunb. 상산; GGS160703					○	
<i>Zanthoxylum planispinum</i> Siebold & Zucc. 개산초; GGS160709					○	
<i>Zanthoxylum schinifolium</i> Siebold & Zucc. 산초나무; GGS160619, 161140, 161259, 161400, 162018	○	○	○	○		○

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
Oxalidaceae 썩이밥과						
<i>Oxalis corniculata</i> L. 썩이밥; GGS160180, 160662, 160800, 161202	○	○			○	○
<i>Oxalis dillenii</i> Jacq. 들썩이밥; GGS160960, 161364, 162054, 162498	○	○	○		○	
Geraniaceae 쥐손이풀과						
<i>Geranium sibiricum</i> L. 쥐손이풀; GGS161652, 161841, 162116	○		○		○	
<i>Geranium thunbergii</i> Siebold ex Lindl. & Paxton 이질풀; GGS161195, 161320	○			○		
Araliaceae 두릅나무과						
<i>Aralia elata</i> (Miq.) Seem. 두릅나무; GGS160636						○
<i>Hedera rhombea</i> (Miq.) Bean 송악; GGS160068, 160633, 160832				○	○	○
Apiaceae 미나리과						
<i>Anthriscus sylvestris</i> (L.) Hoffm. 전호; GGS160291, 160677, 160726		○			○	○
<i>Bupleurum falcatum</i> L. 시호; GGS161424, 161940, 162079, 162183	○	○	○	○		
<i>Cnidium japonicum</i> Miq. 갯사상자; GGS161710, 162225		○	○			
<i>Daucus carota</i> L. 산당근; GGS160934					○	
<i>Hydrocotyle maritima</i> Honda 선피막이; GGS161107	○					
<i>Oenanthe javanica</i> (Blume) DC. 미나리; GGS161603			○			
<i>Osmorhiza aristata</i> (Thunb.) Rydb. 긴사상자; GGS160758					○	
<i>Ostericum grosseserratum</i> (Maxim.) Kitag. 신감채; GGS161847					○	
<i>Peucedanum terebinthaceum</i> (Fisch. ex Trevir.) Fisch. ex Turcz. 기름나물; GGS162431	○					
<i>Sanicula chinensis</i> Bunge 참반디; GGS161887					○	
<i>Torilis japonica</i> (Houtt.) DC. 사상자; GGS160851, 161182, 161359	○			○	○	
Apocynaceae 협죽도과						
<i>Trachelospermum asiaticum</i> (Siebold & Zucc.) Nakai 마삭줄; GGS160640, 161125, 161278	○			○		○
Asclepiadaceae 박주가리과						
<i>Cynanchum paniculatum</i> (Bunge) Kitag. 산해박; GGS161005, 161257, 162286	○	○		○		
<i>Metaplexis japonica</i> (Thunb.) Makino 박주가리; GGS161706, 161814			○		○	
Solanaceae 가지과						
<i>Lycium chinense</i> Mill. 구기자나무 (C); GGS161778					○	
<i>Physalis angulata</i> L. 땅파리; GGS161694			○			
<i>Solanum lyratum</i> Thunb. 배풍등; GGS161928, 162026		○		○		
<i>Solanum nigrum</i> L. 까마중; GGS160959, 161311, 161524, 161681	○		○	○	○	
Convolvulaceae 메꽃과						
<i>Calystegia dahurica</i> (Herb.) Choisy 선메꽃; GGS160202, 160871, 161116	○	○			○	
<i>Calystegia hederacea</i> (Thunb.) Makino 애기메꽃; GGS160929					○	
<i>Calystegia soldanella</i> (L.) Roem. & Schult. 갯메꽃; GGS160198, 160427, 160532, 160639, 160909	○	○	○		○	○
<i>Cuscuta campestris</i> Yunck. 미국실새삼; GGS161194, 161751	○				○	
<i>Ipomoea hederacea</i> var. <i>integriuscula</i> A. Gray 둥근잎미국나팔꽃; GGS161628, 161799			○		○	
<i>Ipomoea purpurea</i> (L.) Roth 둥근잎나팔꽃; GGS161777						○
Boraginaceae 지치과						
<i>Argusia sibirica</i> (L.) Dandy 모래지치; GGS160205, 160536	○	○				
<i>Bothriospermum tenellum</i> (Hornem.) Fisch. & C. A. Mey. 꽃밭이; GGS160790					○	
<i>Lithospermum arvense</i> L. 개지치; GGS160400, 160510	○		○			
<i>Trigonotis peduncularis</i> (Trev.) Benth. ex Baker & S. Moore 꽃마리; GGS160050, 160190	○	○				
Verbenaceae 마편초과						
<i>Callicarpa japonica</i> Thunb. 작살나무; GGS160705, 161010, 161296	○			○	○	
<i>Caryopteris incana</i> (Thunb. ex Houtt.) Miq. 층꽃나무; GGS162088	○					
<i>Clerodendrum trichotomum</i> Thunb. 누리장나무; GGS162066		○		○		
<i>Vitex rotundifolia</i> L. f. 순비기나무; GGS162471	○					
Phrymaceae 파리풀과						
<i>Phryma leptostachya</i> var. <i>oblongifolia</i> (Koidz.) Honda 파리풀; GGS161871					○	
Lamiaceae 꿀풀과						
<i>Clinopodium chinense</i> var. <i>shibetchense</i> (H. Lévl.) Koidz. 산층층이; GGS161568, 161666	○		○			
<i>Isodon inflexus</i> (Thunb.) Kudô 산박하; GGS161008, 161245, 161403, 161830, 162007	○	○	○	○	○	
<i>Lamium amplexicaule</i> L. 광대나물; GGS160076, 160355		○		○		
<i>Leonurus japonicus</i> Houtt. 익모초; GGS16137, 161813			○		○	
<i>Leonurus macranthus</i> Maxim. 송장풀; GGS161892					○	
<i>Lycopus lucidus</i> Turcz. ex Benth. 썩싸리; GGS162255		○				

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
<i>Mosla punctulata</i> (J. F. Gmel.) Nakai 들깨풀; GGS161388, 161541, 161755	○		○		○	
<i>Prunella asiatica</i> Nakai 꿀풀; GGS160339, 160466, 160818		○	○		○	
<i>Salvia plebeia</i> R. Br. 배암차즈기; GGS160392, 160894, 161114	○		○		○	
<i>Scutellaria indica</i> L. 골무꽃; GGS160133, 160372, 160530, 160817	○	○	○		○	
<i>Scutellaria pekinsis</i> var. <i>transitra</i> (Makino) H. Hara ex H. W. Li 산골무꽃; GGS160741					○	
<i>Scutellaria strigillosa</i> Hemsl. 참골무꽃; GGS162230		○				
Callitrichaceae 별이끼과						
<i>Callitriche palustris</i> L. 물별이끼; GGS160026, 160216	○	○				
Plantaginaceae 질경이과						
<i>Plantago asiatica</i> L. 질경이; GGS160347, 161021, 161326	○	○		○		
Oleaceae 물푸레나무과						
<i>Fraxinus rhynchophylla</i> Hance 물푸레나무; GGS161055	○					
<i>Fraxinus sieboldiana</i> Blume 쇠물푸레; GGS161254				○		
<i>Ligustrum japonicum</i> Thunb. 광나무; GGS162078	○					
<i>Ligustrum obtusifolium</i> Siebold & Zucc. 쥐똥나무; GGS160231, 160630, 160770		○			○	○
<i>Ligustrum quihoui</i> var. <i>latifolium</i> Nakai 상동잎쥐똥나무; GGS161054, 161676	○		○			
Scrophulariaceae 현삼과						
<i>Lindernia procumbens</i> (Krock.) Borbás 발독외풀; GGS161604			○			
<i>Mazus pumilus</i> (Burm. f.) Steenis 주름잎; GGS162478	○					
<i>Melampyrum roseum</i> Maxim. 꽃머느리밭풀; GGS161422, 161477, 161822, 162185	○	○	○		○	
<i>Veronica arvensis</i> L. 선개불알풀; GGS160166, 160671		○				○
<i>Veronica persica</i> Poir. 큰개불알풀; GGS160023, 160168, 160954	○	○			○	
<i>Veronica polita</i> ssp. <i>lilacina</i> (H. Hara ex T. Yamaz.) T. Yamaz. 개불알풀; GGS160098				○		
Acanthaceae 쥐꼬리망초과						
<i>Justicia procumbens</i> L. 쥐꼬리망초; GGS161831					○	
Campanulaceae 초롱꽃과						
<i>Adenophora polyantha</i> Nakai 수원잔대; GGS162163		○				
<i>Adenophora verticillata</i> (Pall.) Fisch. 층층잔대; GGS161762, 162061		○			○	
<i>Adenophora verticillata</i> var. <i>hirsuta</i> F. Schmidt 털잔대; GGS161884					○	
<i>Codonopsis lanceolata</i> (Siebold & Zucc.) Trautv. 더덕; GGS160860					○	
<i>Platycodon grandiflorum</i> (Jacq.) A. DC. 도라지; GGS161408, 161495, 162283	○	○	○			
Rubiaceae 꼭두선이과						
<i>Diodia teres</i> Walter 백령풀; GGS162121, 162199	○	○				
<i>Galium pogonanthum</i> (Wallr.) Hayek 산갈퀴; GGS160721, 161044	○				○	
<i>Galium verum</i> var. <i>asiaticum</i> Nakai 솔나물; GGS161113, 161329	○			○		
<i>Mitchella undulata</i> Siebold & Zucc. 호자덩굴; GGS160041, 161394	○		○			
<i>Paederia scandens</i> (Lour.) Merr. 계요동; GGS161365, 161526, 161775, 162009	○	○	○		○	
<i>Rubia cordifolia</i> var. <i>pratensis</i> Maxim. 갈퀴꼭두선이; GGS161445, 161930, 162115, 162166	○	○	○	○		
Linnaeaceae 린데풀과						
<i>Abelia ×grandiflora</i> (Rovelli ex André) Rehder 꽃명강나무 (C); GGS161581	○					
Caprifoliaceae 인동과						
<i>Lonicera harai</i> Makino 길마가지나무; GGS160793					○	
<i>Lonicera japonica</i> Thunb. 인동; GGS160157, 160405, 160476, 161337	○	○	○	○		
Viburnaceae 산분꽃나무과						
<i>Viburnum carlesii</i> Hemsl. 분꽃나무; GGS160391, 161180, 161291	○		○	○		
<i>Viburnum dilatatum</i> Thunb. 가막살나무; GGS160781					○	
<i>Viburnum erosum</i> Thunb. 털팽나무; GGS160116, 161120, 161244, 161658	○	○	○	○		
Valerianaceae 마타리과						
<i>Patrinia scabiosifolia</i> Fisch. ex Trevir. 마타리; GGS161373, 161457, 162033	○	○	○			
<i>Patrinia villosa</i> (Thunb.) Juss. 푼갈; GGS161436, 161487, 161818, 161943, 162012	○	○	○	○	○	
Asteraceae 국화과						
<i>Ainsliaea apiculata</i> Sch. Bip. ex Zoll. 좁막취; GGS161691			○			
<i>Ambrosia artemisiifolia</i> L. 돼지풀; GGS161807, 161963				○	○	
<i>Artemisia annua</i> L. 개똥쑥; GGS161869					○	
<i>Artemisia argyi</i> H. Lév. & Vaniot 황해쑥; GGS161699, 162311	○		○			
<i>Artemisia capillaris</i> Thunb. 사철쑥; GGS161729, 161840, 162093, 162223	○	○	○		○	
<i>Artemisia indica</i> Willd. 쑥; GGS161383, 161511, 161791, 161959	○		○	○	○	
<i>Artemisia japonica</i> Thunb. 제비쑥; GGS161571, 161821	○				○	

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
<i>Artemisia keiskeana</i> Miq. 맑은대쭉; GGS161467	○					
<i>Artemisia lancea</i> Vaniot 뽕쭉; GGS161932				○		
<i>Aster hispidus</i> Thunb. 갯쭉부쟁이; GGS161024, 161664, 162048	○	○	○			
<i>Aster pilosus</i> Willd. 미국쭉부쟁이; GGS162017		○				
<i>Aster scaber</i> Thunb. 참취; GGS161404, 161496, 161826, 162189	○	○	○		○	
<i>Aster subulatus</i> var. <i>sandwicensis</i> (A. Gray) A. G. Jones 큰비짜루국화; GGS161564, 161635, 161773, 161978	○		○	○	○	
<i>Attractylodes ovata</i> (Thunb.) DC. 삽주; GGS161076, 161439, 162173	○	○	○			
<i>Bidens biternata</i> (Lour.) Merr. & Sherff 털도깨비바늘; GGS161300, 161685, 161793, 162053		○	○	○	○	
<i>Bidens frondosa</i> L. 미국가막사리; GGS161614, 162051		○	○			
<i>Bidens pilosa</i> L. 울산도깨비바늘; GGS161605, 161954			○	○		
<i>Breea segeta</i> (Bunge) Kitam. 조뱅이; GGS160150, 160434, 160935, 161193	○	○	○		○	
<i>Carpesium cernuum</i> L. 좀담배풀; GGS161934, 162318	○			○		
<i>Centipeda minima</i> (L.) A. Braun & Aschers. 중대가리풀; GGS161570, 161617	○		○			
<i>Cirsium japonicum</i> var. <i>maackii</i> (Maxim.) Matsum. 영경귀; GGS160869						○
<i>Conyza bonariensis</i> (L.) Cronquist 실망초; GGS161382, 161465, 161780, 161997, 162164	○	○	○	○	○	
<i>Conyza canadensis</i> (L.) Cronquist 망초; GGS161515, 161728, 161796, 162004	○	○	○		○	
<i>Coreopsis lanceolata</i> L. 큰금계국 (C); GGS160299, 161001	○	○				
<i>Coreopsis tinctoria</i> Nutt. 기생초 (C); GGS160999, 161991	○			○		
<i>Cosmos sulphureus</i> Cav. 노랑코스모스 (C); GGS161385			○			
<i>Crepidiastrum denticulatum</i> (Houtt.) J. H. Pak & Kawano 이고들빼기; GGS161845, 161952				○	○	
<i>Crepidiastrum sonchifolium</i> (Bunge) J. H. Pak & Kawano 고들빼기; GGS160413, 160598	○		○			
<i>Dendranthema boreale</i> (Makino) Ling 산국; GGS162406	○					
<i>Eclipta prostrata</i> (L.) L. 한련초; GGS161464, 161632, 161792, 161977			○	○	○	
<i>Erechtites hieracifolia</i> (L.) Raf. ex DC. 붉은서나물; GGS161677, 162038		○	○			
<i>Erigeron annuus</i> (L.) Pers. 개망초; GGS160358, 160880, 161000, 161354	○	○		○	○	
<i>Eupatorium japonicum</i> Thunb. 등골나물; GGS161440, 161449, 161825, 162273	○	○	○		○	
<i>Eupatorium makinoi</i> var. <i>oppositifolium</i> (Koidz.) Kawah. & Yahara 벌등골나물; GGS161260				○		
<i>Helianthus tuberosus</i> L. 풍판지 (C); GGS161370			○			
<i>Hemistepta lyrata</i> Bunge 지칭개; GGS160431, 160509, 160918	○		○		○	
<i>Hypochaeris radicata</i> (Thunb.) Franch. & Sav. 서양금혼초; GGS160538, 161222	○			○		
<i>Inula salicina</i> var. <i>asiatica</i> Kitam. 벼들금불초; GGS161759					○	
<i>Ixeridium dentatum</i> (Thunb.) Tzvelev 씬바귀; GGS160317, 160454			○			
<i>Ixeris debilis</i> (Thunb.) A. Gray 범음 씬바귀; GGS160106			○			
<i>Ixeris repens</i> (L.) A. Gray 갯씀바귀; GGS160201			○			
<i>Lactuca indica</i> var. <i>laciniata</i> (Houtt.) H. Hara 왕고들빼기; GGS161361, 161806, 162005, 162361	○	○	○		○	
<i>Lactuca scariola</i> L. 가시상추; GGS161810					○	
<i>Leibnitzia anandria</i> (L.) Turcz. 솜나물; GGS160082, 160867				○	○	
<i>Petasites japonicus</i> (Siebold & Zucc.) Maxim. 머위; GGS160221, 160657		○				○
<i>Pseudognaphalium affine</i> (D. Don) Anderb. 뚝쭉; GGS160506	○					
<i>Rudbeckia hirta</i> var. <i>pulcherrima</i> Farw. 원추천인국 (C); GGS161200	○					
<i>Senecio vulgaris</i> (Iljin) Kitam. 개쭉갓; GGS160950					○	
<i>Sigesbeckia glabrescens</i> Makino 진득찰; GGS161838					○	
<i>Solidago altissima</i> (Aiton) McNeill 양미역취; GGS162146		○				
<i>Solidago virgaurea</i> ssp. <i>asiatica</i> Kitam. ex H. Hara 미역취; GGS162411	○					
<i>Sonchus asper</i> (L.) Hill 큰방가지뚥; GGS160259, 160406, 160518, 160637, 161307, 161770	○	○	○	○	○	○
<i>Sonchus brachyotus</i> DC. 사데풀; GGS161516, 161719, 161809, 162506	○		○	○	○	
<i>Sonchus oleraceus</i> L. 방가지뚥; GGS160301, 160669, 160750		○			○	○
<i>Tagetes minuta</i> L. 만수국야채비; GGS162495	○					
<i>Taraxacum mongolicum</i> Hand.-Mazz. 털민들레; GGS160074				○		
<i>Taraxacum officinale</i> F. H. Wigg. 서양민들레; GGS160052, 161322	○			○		
<i>Tephrosia kirilowii</i> (Turcz. ex DC.) Holub 솜방망이; GGS160348, 160579	○	○				
<i>Xanthium canadense</i> Mill. 큰도꼬마리; GGS162075		○				
<i>Youngia japonica</i> (L.) DC. 뿌리뱅이; GGS160467, 160708, 160343		○	○		○	
Juncaginaceae 지채과						
<i>Triglochin maritimum</i> L. 지채; GGS160575, 162217	○	○				
Potamogetonaceae 가래과						
<i>Potamogeton crispus</i> L. 말즘; GGS160917					○	

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
Ruppiaceae 줄말과						
<i>Ruppia maritima</i> L. 줄말; GGS160408, 162484	○		○			
Zosteraceae 거머리말과						
<i>Zostera marina</i> L. 거머리말; GGS160916					○	
Araceae 천남성과						
<i>Arisaema heterophyllum</i> Blume 두루미천남성; GGS160629, 160680					○	○
<i>Arisaema ringens</i> (Thunb.) Schott 큰천남성; GGS160624, 160683, 161241				○	○	○
<i>Pinellia ternata</i> (Thunb.) Ten. ex Breitenb. 반하; GGS160696					○	
Lemnaceae 개구리밥과						
<i>Spirodela polyrhiza</i> (L.) Schleid. 개구리밥; GGS161615			○			
Commelinaceae 닭의장풀과						
<i>Commelina communis</i> L. 닭의장풀; GGS161083, 161251, 161386, 161853, 162064	○	○	○	○	○	
Juncaceae 골풀과						
<i>Juncus alatus</i> Franch. & Sav. 날개골풀; GGS160203	○					
<i>Juncus diastrophanthus</i> Buchenau 별날개골풀; GGS161029		○				
<i>Juncus effusus</i> var. <i>decipiens</i> Buchenau 골풀; GGS160156, 160498, 160858, 161348	○	○		○	○	
<i>Juncus gracillimus</i> (Buchenau) V. I. Krecz. & Gontsch. 물골풀; GGS160435, 160527, 160627, 160766, 161299	○		○	○	○	○
<i>Luzula capitata</i> Kom. 평의밥; GGS160072, 160329, 160384, 160568	○	○	○	○		
<i>Luzula multiflora</i> (Ehrh.) Lej. 산평의밥; GGS160547	○					
Cyperaceae 사초과						
<i>Bolboschoenus planiculmis</i> (F. Schmidt.) T. V. Egorova. 새섬매자기; GGS160243, 160382, 160521, 160881, 161301	○	○	○	○	○	
<i>Carex bostrichostigma</i> Maxim. 길뚝사초; GGS160437			○			
<i>Carex brownii</i> Tuck. 흰꼬리사초; GGS161026	○					
<i>Carex breviculmis</i> R. Br. 청사초; GGS160065, 160323, 160402, 160589	○	○	○	○		
<i>Carex breviculmis</i> var. <i>fibrillosa</i> (Franch. & Sav.) Kük. ex Matsum. & Hayata. 갯청사초; GGS160160, 160472	○	○				
<i>Carex ciliatmarginata</i> Nakai 털대사초; GGS160009	○					
<i>Carex dimorpholepis</i> Steud. 이삭사초; GGS160178, 160395, 160514, 160824	○	○	○		○	
<i>Carex gibba</i> Wahlenb. 나도별사초; GGS160196		○				
<i>Carex humilis</i> var. <i>nana</i> Ohwi 가는잎그늘사초; GGS160084				○		
<i>Carex kobomugi</i> Ohwi 통보리사초; GGS160208, 162125	○	○				
<i>Carex lanceolata</i> Boott 그늘사초; GGS160043, 160083	○			○		
<i>Carex leiorhyncha</i> C. A. Mey. 산팽이사초; GGS160365		○				
<i>Carex ligulata</i> var. <i>austrokoreensis</i> Ohwi 갈사초; GGS161050	○					
<i>Carex maculata</i> Boott 무늬사초; GGS160500	○					
<i>Carex maximowiczii</i> Miq. 왕비늘사초; GGS160587	○					
<i>Carex mitrata</i> var. <i>aristata</i> Ohwi 까락겨사초; GGS160459			○			
<i>Carex neurocarpa</i> Maxim. 팽이사초; GGS161095	○					
<i>Carex phacota</i> Spreng. 쥐방울사초; GGS160549	○					
<i>Carex polyschoena</i> H. Lév. & Vaniot 가지청사초; GGS160085, 160605, 160689				○	○	○
<i>Carex pumila</i> Thunb. 좁보리사초; GGS160183		○				
<i>Carex scabrifolia</i> Steud. 천일사초; GGS160417, 160522	○		○			
<i>Carex tristachya</i> Thunb. 반들사초; GGS160318, 160446, 160546	○	○	○			
<i>Cyperus amuricus</i> Maxim. 방동산이; GGS161447	○					
<i>Cyperus difformis</i> (Makino) T. Koyama 알방동산이; GGS161065, 161626, 161981, 162040	○	○	○	○		
<i>Cyperus iria</i> Ohwi 참방동산이; GGS161105, 161356, 161625	○		○	○		
<i>Cyperus microiria</i> Steud. 금방동산이; GGS161309, 161401, 161556	○		○	○		
<i>Cyperus nipponicus</i> Franch. & Sav. 푸른방동산이; GGS161623, 162236		○	○			
<i>Cyperus pygmaeus</i> Rottb. 애기방동산이; GGS161588	○					
<i>Cyperus sanguinolentus</i> Vahl 방동산이대가리; GGS161550	○					
<i>Fimbristylis dichotoma</i> (L.) Vahl 하늘지기; GGS161531, 161969	○			○		
<i>Fimbristylis hookeriana</i> Boeckeler 바위하늘지기; GGS161533	○					
<i>Fimbristylis littoralis</i> Gaudich. 바람하늘지기; GGS162468	○					
<i>Fimbristylis sieboldii</i> Miq. ex Franch. & Sav. 갯하늘지기; GGS161726, 162245		○	○			
<i>Fimbristylis subbispicata</i> Nees & Meyen 풀하늘지기; GGS161535	○					
<i>Kyllinga brevifolia</i> Rottb. 가시파대가리; GGS161968, 162449	○			○		

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
<i>Rhynchospora faberi</i> C. B. Clarke 골풀아재비; GGS161508	○					
Poaceae 화본과						
<i>Aegilops cylindrica</i> Host 염소풀; GGS160282		○				
<i>Agropyron ciliare</i> (Trin.) Franch. 속털개밀; GGS160119, 160600, 160757		○			○	○
<i>Agropyron ciliare</i> var. <i>hackelianum</i> (Honda) Ohwi 가는개밀; GGS160609						○
<i>Agropyron tsukushiense</i> var. <i>transiens</i> (Hack.) Ohwi 개밀; GGS160254		○				
<i>Agrostis clavata</i> var. <i>nukabo</i> Ohwi 겨이삭; GGS160566	○					
<i>Alopecurus aequalis</i> Sobol. 독새풀; GGS160515	○					
<i>Arthraxon hispidus</i> (Thunb.) Makino 조개풀; GGS162400	○					
<i>Arundinella hirta</i> (Thunb.) Tanaka 새; GGS161510, 161757, 162180	○	○			○	
<i>Arundinella hirta</i> var. <i>ciliata</i> (Thunb.) Koidz. 털새; GGS161172, 161239, 161411, 162152	○	○	○	○		
<i>Avena fatua</i> L. 메귀리; GGS160144, 160399, 161324			○	○		
<i>Beckmannia syzigachne</i> (Steud.) Fernald 개피; GGS160153, 160531, 160654, 160850	○	○			○	○
<i>Brachypodium sylvaticum</i> (Huds.) P. Beauv. 숲개밀; GGS161916, 162265		○		○		
<i>Bromus catharticus</i> Vuhl 큰이삭풀; GGS160363, 160823		○			○	
<i>Bromus japonicus</i> Thunb. 참새귀리; GGS160189, 160380, 160567, 160660, 160739	○	○	○		○	○
<i>Bromus pauciflorus</i> Hack. 꼬리새; GGS160937						○
<i>Bromus rigidus</i> Roth 긴까락뱀새귀리; GGS160102		○				
<i>Bromus tectorum</i> L. 털뱀새귀리; GGS160273		○				
<i>Calamagrostis arundinacea</i> (L.) Roth 실새풀; GGS162418	○					
<i>Calamagrostis epigeios</i> (L.) Roth 산조풀; GGS160914, 161084, 161223, 162020	○	○		○	○	
<i>Capillipedium assimile</i> (Steud.) A. Camus 나도기름새; GGS161802					○	
<i>Chloris virgata</i> Sw. 나도바랭이; GGS161992				○		
<i>Cymbopogon tortilis</i> ssp. <i>goeringii</i> (Steud.) T. Koyama 개솔새; GGS161549, 161996, 162263	○	○		○		
<i>Cynodon dactylon</i> (L.) Pers. 우산잔디; GGS162274		○				
<i>Dactylis glomerata</i> L. 오리새; GGS160297, 160737		○			○	
<i>Digitaria sanguinalis</i> (L.) Scop. 바랭이; GGS161429, 161558, 161789, 162006	○	○	○		○	
<i>Echinochloa caudata</i> Roshev. 물피; GGS161512	○					
<i>Echinochloa crus-galli</i> (L.) P. Beauv. 돌피; GGS160963, 161303, 161607, 162444	○		○	○	○	
<i>Echinochloa crus-galli</i> var. <i>praticola</i> Ohwi 줌돌피; GGS161196, 161644, 162036	○	○	○			
<i>Eleusine indica</i> (L.) Gaertn. 왕바랭이; GGS160855, 161643, 162022, 162100	○	○	○		○	
<i>Elymus dahuricus</i> Turcz. ex Griseb. 갯보리; GGS160120, 160896, 161103, 161224	○	○		○	○	
<i>Eragrostis cilianensis</i> (All.) Vignolo ex Janch. 참새그렁; GGS160989						○
<i>Eragrostis curvula</i> (Schrud.) Nees 능수참새그렁; GGS160993	○					
<i>Eragrostis ferruginea</i> (Thunb.) P. Beauv. 그렁; GGS161868, 162024	○				○	
<i>Eragrostis japonica</i> (Thunb.) Trin. 각시그렁; GGS161582	○					
<i>Eragrostis multicaulis</i> Steud. 비노리; GGS160943					○	
<i>Eragrostis pilosa</i> (L.) P. Beauv. 큰비노리; GGS161990				○		
<i>Eragrostis poaeoides</i> P. Beauv. 좁새그렁; GGS160971, 162248		○			○	
<i>Eriochloa villosa</i> (Thunb.) Kunth 나도개피; GGS162041		○				
<i>Eulalia speciosa</i> (Debeaux) Kuntze 개역새; GGS161415, 161459, 162290	○	○	○			
<i>Festuca arundinacea</i> Schreb. 큰김의털; GGS160158, 161352		○			○	
<i>Festuca myuros</i> L. 들묵새; GGS160217, 160541, 160938	○	○			○	
<i>Festuca ovina</i> L. 김의털; GGS160328, 160449		○	○			
<i>Festuca parvigluma</i> Steud. 김의털아재비; GGS160141, 160465, 160679, 160682		○	○		○	○
<i>Hemarthria sibirica</i> (Gand.) Ohwi 쇠치기풀; GGS161566	○					
<i>Imperata cylindrica</i> var. <i>koenigii</i> (Retz.) Benth. ex Pilg. 피; GGS160122, 160763, 161350		○		○	○	
<i>Isachne globosa</i> (Thunb.) Kuntze 기장대풀; GGS161081	○					
<i>Ischaemum antephoroides</i> (Steud.) Miq. 갯쇠보리; GGS161839, 162226		○			○	
<i>Ischaemum crassipes</i> (Steud.) Thell. 쇠보리; GGS162460	○					
<i>Koeleria cristata</i> Pers. 도랑이피; GGS160314, 160451						
<i>Leersia japonica</i> (Makino & Honda) Honda 나도겨풀; GGS161096, 161601	○		○			
<i>Leptochloa malabarica</i> (L.) Veldkamp 갯드렁새; GGS161584, 161958, 162244	○	○		○		
<i>Lolium multiflorum</i> Lam. 쥐보리; GGS160179, 161002	○	○				
<i>Lolium perenne</i> L. 호밀풀; GGS161170	○					
<i>Lolium rigidum</i> Gaudin 땃돌보리; GGS160513, 160816	○				○	
<i>Miscanthus sinensis</i> Andersson 억새; GGS161428, 161460, 161855, 161970, 162057	○	○	○	○	○	
<i>Oplismenus undulatifolius</i> (Ard.) Roem. & Schult. 주름조개풀; GGS161744, 161874			○		○	

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
<i>Panicum dichotomiflorum</i> Michx. 미국개기장; GGS161509, 161608, 161960, 162238	○	○	○	○		
<i>Parapholis incurve</i> (L.) C. E. Hubb. 회초리잔디; GGS160200, 160401, 160829		○	○		○	
<i>Paspalum thunbergii</i> Kunth ex Steud. 참새피; GGS161079, 161863	○				○	
<i>Pennisetum alopecuroides</i> (L.) Spreng. 수크령; GGS161779, 162114, 162229	○	○			○	
<i>Phaceurus latifolius</i> (Steud.) Ohwi 모새달; GGS160884, 161089, 162218	○	○			○	
<i>Phaenosperma globosa</i> Munro & Benth. 산기장; GGS160693					○	
<i>Phragmites communis</i> Trin. 갈대; GGS161576, 161722, 161798, 162221	○	○	○		○	
<i>Phyllostachys bambusoides</i> Siebold & Zucc. 왕대 (C); GGS160342		○				
<i>Poa annua</i> L. 새포아풀; GGS160005, 160163, 160470, 160641	○	○	○			○
<i>Poa sphondylodes</i> Trin. 포아풀; GGS160140, 160429, 160533, 160604, 160691	○	○	○		○	○
<i>Polypogon fugax</i> Nees ex Steud. 쇠들피; GGS160281, 160370		○	○			
<i>Polypogon monspeliensis</i> (L.) Desf. 갯쇠들피; GGS160211, 160495, 160825	○	○			○	
<i>Puccinellia chinampoensis</i> Ohwi 각시미꾸리광이; GGS160103, 160419, 160992		○	○		○	
<i>Puccinellia nipponica</i> Ohwi 갯꾸러미풀; GGS160123, 160563, 160822	○	○			○	
<i>Sacciolepis indica</i> (L.) Chase 좁물목새; GGS161536, 162500	○			○		
<i>Sasa japonica</i> (Siebold & Zucc. ex Steud.) Makino 이대 (C); GGS161572, 162285	○	○				
<i>Schizachyrium brevifolium</i> (Sw.) Nees & Büse 쇠풀; GGS161748			○			
<i>Setaria faberi</i> R. A. W. Herrm. 가을강아지풀; GGS161746, 162045, 162103	○	○	○			
<i>Setaria glauca</i> (L.) P. Beauv. 금강아지풀; GGS161555, 161956, 162241	○	○		○		
<i>Setaria viridis</i> (L.) P. Beauv. 강아지풀; GGS160883, 161283				○	○	
<i>Setaria viridis</i> var. <i>pachystachys</i> (Franch. & Sav.) Makino & Nemoto 갯강아지풀; GGS161086	○					
<i>Sorghum halepense</i> (L.) Pers. 시리아수수새; GGS162205		○				
<i>Spodipogon sibiricus</i> Trin. 큰기름새; GGS161419, 161505, 161846, 162177	○	○	○		○	
<i>Sporobolus elongatus</i> R. Br. 쥐꼬리새풀; GGS161565, 161865, 161986, 162023	○	○		○	○	
<i>Stipa pekinensis</i> Hance 나래새; GGS161478, 161939	○			○	○	
<i>Themeda triandra</i> ssp. <i>japonica</i> (Willd.) T. Koyama 솔새; GGS161742, 161756, 161942, 162127	○		○	○	○	
<i>Trisetum bifidum</i> (Thunb.) Ohwi 잠자리피; GGS160320		○				
<i>Zoysia japonica</i> Steud. 잔디; GGS160905, 161171	○				○	
<i>Zoysia sinica</i> Hance 갯잔디; GGS160478	○					
Typhaceae 부들과						
<i>Typha angustifolia</i> L. 애기부들; GGS160879, 161085, 161220, 161600	○		○	○	○	
Liliaceae 백합과						
<i>Aletris spicata</i> (Thunb.) Franch. 쥐꼬리풀; GGS162289		○				
<i>Allium macrostemon</i> Bunge 산달래; GGS160149, 160529, 160604, 160699	○	○			○	○
<i>Allium sacculiferum</i> Maxim. 참산부추; GGS161410, 161948, 162402	○		○	○		
<i>Allium tuberosum</i> Rottler ex Spreng. 부추; GGS162091	○					
<i>Asparagus cochinchinensis</i> (Lour.) Merr. 천문동; GGS160331, 160520, 160628, 160681, 161287	○	○		○	○	○
<i>Disporum smilacinum</i> A. Gray 애기나리; GGS160490	○					
<i>Disporum uniflorum</i> Baker 윤판나물; GGS160717					○	
<i>Disporum viridescens</i> (Maxim.) Nakai 큰애기나리; GGS162174		○				
<i>Hemerocallis hakuunensis</i> Nakai 백운산원추리; GGS160142, 160626, 161025, 161281	○	○		○		○
<i>Lilium lancifolium</i> Thunb. 참나리; GGS160911, 161093, 161252, 162172	○	○		○	○	
<i>Liriope platyphylla</i> F. T. Wang & T. Tang 맥문동; GGS161431, 161761, 161923, 162101	○		○	○	○	
<i>Liriope spicata</i> (Thunb.) Lour. 개맥문동; GGS161739			○			
<i>Ophiopogon japonicus</i> (Thunb.) Ker Gawl. 소엽맥문동; GGS160031, 161288, 161905	○			○	○	
<i>Polygonatum cryptanthum</i> H. Lévl. & Vaniot 목포용동굴레; GGS160135, 161012, 161290	○	○		○		
<i>Polygonatum lasianthum</i> Maxim. 죽대; GGS160222, 160581	○	○				
<i>Polygonatum falcatum</i> A. Gray 진황정; GGS160635						○
<i>Polygonatum odoratum</i> var. <i>pluriflorum</i> (Miq.) Ohwi 둥굴레; GGS160109, 160388, 160559, 160617, 160789	○	○	○		○	○
<i>Scilla scilloides</i> (Lindl.) Druce 무릇; GGS161372, 161488, 161749, 161922	○		○	○	○	
<i>Tulipa edulis</i> (Miq.) Baker 산자고; GGS160012, 160069	○			○		
Amaryllidaceae 수선화과						
<i>Lycoris flavescens</i> M. Y. Kim & S. T. Lee 붉노랑상사화; GGS161834, 162191		○			○	
Iridaceae 붓꽃과						
<i>Iris rossii</i> var. <i>latifolia</i> J. K. Sim & Y. S. Kim 넓은잎각시붓꽃; GGS161256				○		
Smilacaceae 청미래덩굴과						
<i>Smilax china</i> L. 청미래덩굴; GGS160485, 161285, 161405	○		○	○		

Appendix 1. Continued.

Taxa/Collection numbers	Collection sites ^b					
	1	2	3	4	5	6
<i>Smilax nipponica</i> Miq. 선밀나물; GGS160868, 161507	○				○	
<i>Smilax sieboldii</i> Miq. 청가시덩굴; GGS160235		○				
Dioscoreaceae 마과						
<i>Dioscorea oppositifolia</i> L. 마; GGS161094, 161646, 161842, 162138	○	○	○		○	
<i>Dioscorea quinqueloba</i> Thunb. 단풍마; GGS161417, 161522, 161915, 162068	○	○	○	○		
Orchidaceae 난초과						
<i>Cephalanthera erecta</i> (Thunb.) Blume 은난초; GGS160875					○	
<i>Cymbidium goeringii</i> (Rchb. f.) Rchb. f. 보춘화; GGS160002, 160099, 160813	○		○		○	
<i>Epipactis thunbergii</i> A. Gray 닭의난초; GGS161077, 161234	○			○		
<i>Liparis kumokiri</i> F. Maek. 옥잠난초; GGS161687			○			
<i>Platanthera mandarinorum</i> Rchb. 산제비란; GGS160307, 160464, 160560	○	○	○			
<i>Platanthera mandarinorum</i> ssp. <i>neglecta</i> (Schltr.) F. Maek. 하늘산제비란; GGS160309, 160462, 160810		○	○		○	
<i>Pogonia minor</i> (Makino) Makino 방울새란; GGS160461			○			
<i>Spiranthes sinensis</i> (Pers.) Ames 타래난초; GGS160312, 160877, 161040	○	○			○	

^bCollection sites: 1. Sinsi-do; 2. Seonyu-do; 3. Munyeo-do; 4. Yami-do; 5. Bian-do; 6. Duri-do.