

Analysis of Tree Taxa Found in Site of Forest Restoration Projects in Korea

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Abstract

The monitoring data conducted on 72 forest restoration sites in Korea that have implemented the projects from 2008 to 2020 has been analyzed to identify the trees that are mainly found in those sites. First, taxa with overlapping appearances by site were excluded and a list including growth types was developed. The frequency of appearances by taxon was identified by classifying 27 sites according to the forest landscape and ecosystem management area in order to prevent regional bias of the sites and the main tree species were identified through laws and references. The research has identified 225 taxa trees throughout the entire research sites. In terms of growth type, in the following order, deciduous 187 taxa (83.1%), evergreen 34 taxa (15.1%) and semi-evergreen 4 taxa (1.8%). Arboreal was 121 taxa (53.8%), shrub 77 taxa (34.2%) and vine 27 taxa (12.7%) in the said order. The frequency of appearance in the 27 sites is in descending order: *Lespedeza bicolor* Turcz., *Rubus crataegifolius* Bunge, *Pinus densiflora* Siebold & Zucc. etc. The main tree species were 59 taxa (26.2%) of native plants for forest restoration designated by the Korea Forest Service, 49 taxa (21.8%) of trees recommended for reforestation, and 12 taxa (5.3%) of temperate evergreen broadleaf trees. The study result would contribute to identifying the problems of the tree taxa appearing in the restoration sites and to select trees for the future restoration projects.

Scope and main objectives

- The 72 forest restoration project sites by the Korea Forest Service has been monitored during the period of 2008 to 2020 and the tree taxa that appeared as a result of the monitoring was used as the basic data for the analysis.
- The taxa with overlapping occurrences by site were eliminated and growth types were summarized based on this above-said data by referring to Kim and Kim (2018).
- The target sites have been classified into 27 regions according to the forest landscape and ecosystem management area of NIFoS (2009) to identify the appearance frequency by taxon, in order to prevent regional bias.
- As major tree species, native plants for forest restoration, recommended tree species for reforestation (KFS, 2021) and temperate evergreen broadleaf trees (Uyeki, 1941) according to the 「Notice on the Supply of Native Plants and Natural Materials for Forest Restoration」 (KFS, 2020) have been confirmed.
- Through this, it was verified to identify the characteristics of tree taxa appearing in the forest restoration project site.

Results

- 225 taxa trees has identified
- In terms of growth type (Fig. 1)
 - Arboreal** : 121 taxa (53.8%)
 - Shrub** : 77 taxa (34.2%)
 - Vine** : 27 taxa (12.7%)
 - Deciduous** : 187 taxa (83.1%)
 - Evergreen** : 34 taxa (15.1%)
 - Semi-evergreen** : 4 taxa (1.8%)
- In terms of major tree types (Table 1)
 - Native plants for forest restoration** : 59 taxa (26.2%)
such as *Quercus serrata* Murray, *Salix pierotii* Miq., *Rhododendron mucronulatum* Turcz.
 - Recommended tree species for reforestation** : 49 taxa (21.8%)
such as *Robinia pseudoacacia* L., *Fraxinus rhynchophylla* Hance, *Acer palmatum* Thunb.
 - Temperate evergreen broadleaf trees** : 12 taxa (5.3%)
such as *Camellia japonica* L., *Euonymus japonicus* Thunb., *Elaeagnus macrophylla* Thunb.

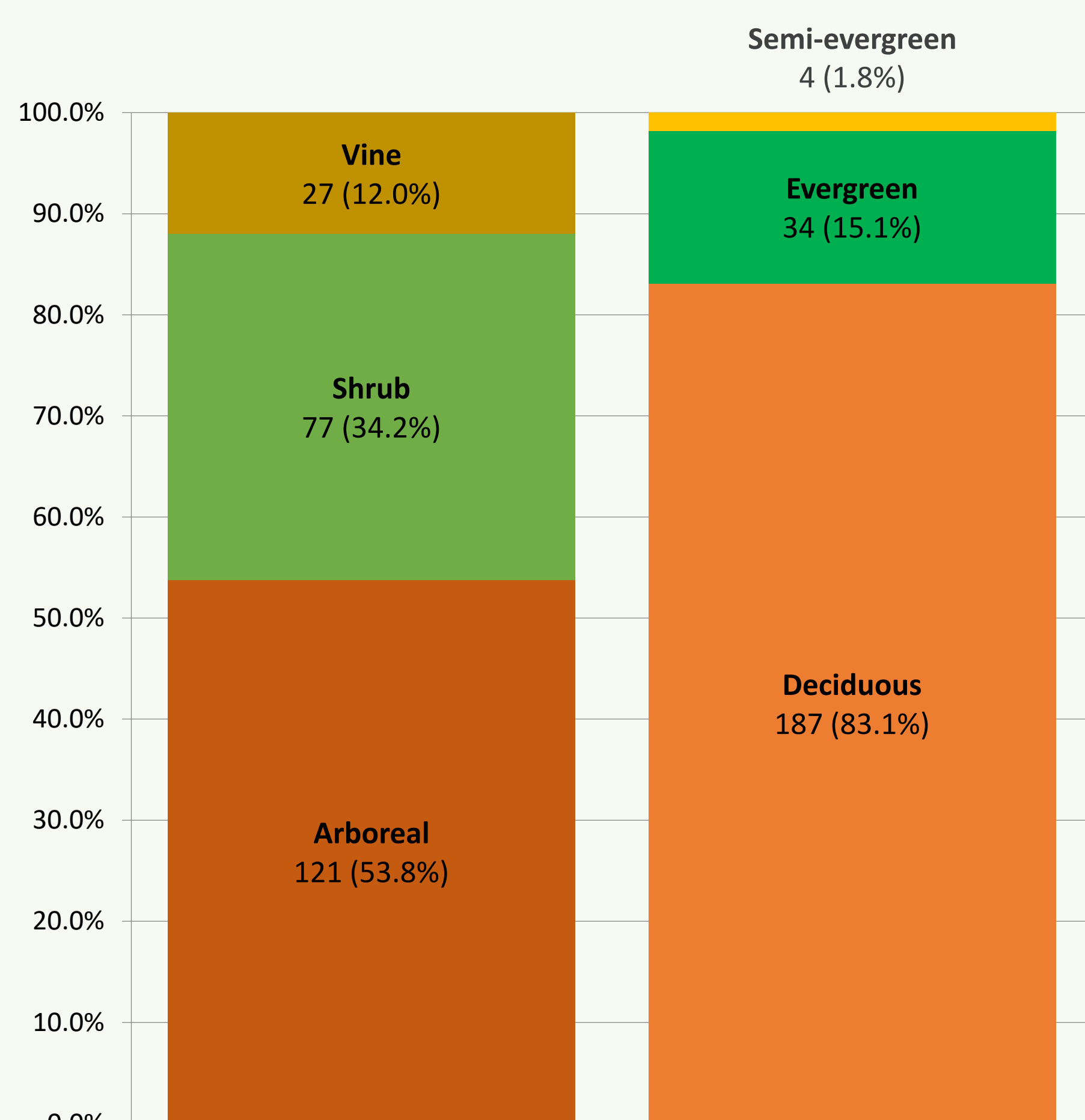


Fig 1. The growth type in forest restoration site

Table 1. The main tree species in forest restoration site

No.	Scientific name	Note*	Freq.**	No.	Scientific name	Note	Freq.
1	<i>Lespedeza bicolor</i> Turcz.	NR	16	51	<i>Chionanthus retusus</i> Lindl. & Paxton	RR	3
2	<i>Rubus crataegifolius</i> Bunge	-	16	52	<i>Cornus kousa</i> Burger ex Hance	NR/RR	3
3	<i>Pinus densiflora</i> Siebold & Zucc.	NR/RR	15	53	<i>Euonymus alatus</i> (Thunb.) Siebold	RR	3
4	<i>Alnus incana</i> subsp. <i>hirsuta</i> (Turcz. ex Spach) Á.Löve & D.Löve	-	14	54	<i>Kalopanax septemlobus</i> (Thunb.) Koidz.	NR/RR	3
5	<i>Lespedeza maximowiczii</i> C.K.Schneid.	NR	14	55	<i>Magnolia sieboldii</i> K.Koch	NR	3
6	<i>Quercus mongolica</i> Fisch. ex Ledeb.	NR/RR	14	56	<i>Quercus aliena</i> Blume	RR	3
7	<i>Aralia elata</i> (Miq.) Seem.	RR	13	57	<i>Quercus myrsinifolia</i> Blume	RR/E	3
8	<i>Fraxinus rhynchophylla</i> Hance	NR/RR	13	58	<i>Sorbus commixta</i> Hedl.	RR	3
9	<i>Parthenocissus tricuspidata</i> (Siebold & Zucc.) Planch.	-	13	59	<i>Trachelospermum asiaticum</i> (Siebold & Zucc.) Nakai	E	3
10	<i>Pueraria lobata</i> (Willd.) Ohwi	-	13	60	<i>Viburnum erosum</i> Thunb.	NR	3
11	<i>Quercus acutissima</i> Carruth.	NR/RR	13	61	<i>Zelkova serrata</i> (Thunb.) Makino	NR/RR	3
12	<i>Rhus chinensis</i> Mill.	NR	13	62	<i>Abies nephrolepis</i> (Trautv. ex Maxim.) Maxim.	NR/RR	2
13	<i>Salix pierotii</i> Miq.	NR	13	63	<i>Betula costata</i> Trautv.	NR/RR	2
14	<i>Stephanandra incisa</i> (Thunb.) Zabel	NR	13	64	<i>Camellia japonica</i> L.	NR/RR/E	2
15	<i>Weigela subsessilis</i> (Nakai) L.H.Bailey	NR	13	65	<i>Chamaecyparis obtusa</i> (Siebold & Zucc.) Endl.	RR	2
16	<i>Lespedeza cyrtobotrya</i> Miq.	NR	12	66	<i>Cornus officinalis</i> Siebold & Zucc.	RR	2
17	<i>Quercus serrata</i> Murray	NR/RR	12	67	<i>Diospyros kaki</i> L.f.	RR	2
18	<i>Robinia pseudoacacia</i> L.	RR	12	68	<i>Euonymus japonicus</i> Thunb.	NR/E	2
19	<i>Rhododendron mucronulatum</i> Turcz.	NR	11	69	<i>Ginkgo biloba</i> L.	RR	2
20	<i>Acer pseudosieboldianum</i> (Pax) Kom.	NR/RR	10	70	<i>Maackia amurensis</i> Rupr.	RR	2
21	<i>Prunus serrulata</i> f. <i>spontanea</i> (E.H.Wilson) Chin S.Chang	RR	10	71	<i>Pinus strobus</i> L.	RR	2
22	<i>Quercus variabilis</i> Blume	NR/RR	10	72	<i>Quercus glauca</i> Thunb.	NR/RR/E	2
23	<i>Rosa multiflora</i> Thunb.	NR	10	73	<i>Quercus salicina</i> Blume	NR/RR/E	2
24	<i>Lindera obtusiloba</i> Blume	NR	9	74	<i>Taxus cuspidata</i> Siebold & Zucc.	RR	2
25	<i>Rhododendron yedoense</i> f. <i>poukhanense</i> (H.Lév.) Sugim. ex T.Yamaz.	NR	9	75	<i>Abies koreana</i> E.H.Wilson	NR/RR	1
26	<i>Acer palmatum</i> Thunb.	RR	8	76	<i>Alnus japonica</i> (Thunb.) Steud.	RR	1
27	<i>Betula pendula</i> Roth	RR	8	77	<i>Carpinus turczaninowii</i> Hance	NR	1
28	<i>Cornus controversa</i> Hemsl.	NR/RR	8	78	<i>Castanopsis sieboldii</i> (Makino) Hatus.	NR	1
29	<i>Styrax obassis</i> Siebold & Zucc.	NR/RR	8	79	<i>Cinnamomum camphora</i> (L.) J.Presl	RR/E	1
30	<i>Toxicodendron trichocarpum</i> (Miq.) Kuntze	NR	8	80	<i>Cryptomeria japonica</i> (Thunb. ex L.f.) D.Don	RR	1
31	<i>Larix kaempferi</i> (Lamb.) Carrière	RR	7	81	<i>Elaeagnus macrophylla</i> Thunb.	E	1
32	<i>Platycarya strobilacea</i> Siebold & Zucc.	NR	7	82	<i>Euonymus fortunei</i> var. <i>radicans</i> (Siebold ex Miq.) Rehder	E	1
33	<i>Quercus dentata</i> Thunb.	NR/RR	7	83	<i>Eurya japonica</i> Thunb.	NR/RR/E	1
34	<i>Symplocos sawafutagi</i> Nagam.	NR	7	84	<i>Hedera rhombea</i> (Miq.) Siebold & Zucc. ex Bean	E	1
35	<i>Acer pictum</i> var. <i>mono</i> (Maxim.) Maxim. ex Franch.	NR/RR	6	85	<i>Ilex rotunda</i> Thunb.	NR/E	1
36	<i>Castanea crenata</i> Siebold & Zucc.	RR	6	86	<i>Juniperus chinensis</i> L.	RR	1
37	<i>Celtis sinensis</i> Pers.	NR	6	87	<i>Koeleruteria paniculata</i> Laxm.	NR	1
38	<i>Corylus heterophylla</i> Fisch. ex Trautv.	NR	6	88	<i>Ligustrum japonicum</i> Thunb.	NR/E	1
39	<i>Lindera erythrocarpa</i> Makino	NR	6	89	<i>Liriodendron tulipifera</i> L.	RR	1
40	<i>Paulownia coreana</i> Uyeki	RR	6	90	<i>Mallotus japonicus</i> (L.f.) Müll.Arg.	NR	1
41	<i>Pinus thunbergii</i> Parl.	NR/RR	6	91	<i>Philadelphus schrenkii</i> Rupr.	NR	1
42	<i>Ailanthus altissima</i> (Mill.) Swingle	RR	5	92	<i>Pittosporum tobira</i> (Thunb.) W.T.Aiton	NR/E	1
43	<i>Aria alnifolia</i> (Siebold & Zucc.) Decne.	NR	5	93	<i>Populus × canadensis</i> Moench	RR	1
44	<i>Styrax japonicus</i> Siebold & Zucc.	NR/RR	5	94	<i>Stewartia koreana</i> Nakai ex Rehder	RR	1
45	<i>Abies holophylla</i> Maxim.	RR	4	95	<i>Temstroemia gymnanthera</i> (Wight & Arn.) Bedd.	E	1
46	<i>Juniperus rigida</i> Siebold & Zucc.	NR	4	96	<i>Tilia amurensis</i> Rupr.	NR/RR	1
47	<i>Pinus koraiensis</i> Siebold & Zucc.	NR/RR	4	97	<i>Toxicodendron vernicifluum</i> (Stokes) F.A.Barkley	RR	1
48	<i>Prunus sargentii</i> Rehder	RR	4	98	<i>Vaccinium oldhamii</i> Miq.	NR	1
49	<i>Ulmus davidiana</i> var. <i>japonica</i> (Rehder) Nakai	RR	4	99	<i>Viburnum odoratissimum</i> var. <i>awabuki</i> (K.Koch) Zabel	NR/RR/E	1
50	<i>Carpinus laxiflora</i> (Siebold & Zucc.) Blume	NR/RR	3	100	<i>Vitex rotundifolia</i> L.f.	NR	1

■ Top 15 taxa by frequency

* Frequency of 27 regions according to forest landscape and ecosystem management regions

** NR : native plants for forest restoration, RR : recommended trees for reforestation, E : temperate evergreen broadleaf trees

Conclusions

- This study is data derived using monitoring data conducted for 72 forest restoration sites in Korea from 2008 to 2020, and it is a study that has not been attempted before.
- Through this result, it was possible to secure basic data on which tree taxa appeared in the forest restoration site.
- Therefore it can be used in the overall project from planning and designing to selecting trees for planting for the future forest restoration projects.