

Supplementary Materials

Table A1. Selection of dominant species in and outside nature reserve for dominant species abundance analysis.

Latin name	Outside	Inside	Latin name	Outside	Inside
Tree			Shrub		
<i>Betula platyphylla</i>	16%	14%	<i>Corylus mandshurica</i>	12%	31%
<i>Acer mono</i>	7%	12%	<i>Spiraea salicifolia</i>	24%	12%
<i>Picea koraiensis</i>	9%	11%	<i>Acanthopanax senticosus</i>	5%	11%
<i>Pinus koraiensis</i>	7%	9%	<i>Philadelphus schrenkii</i>	10%	7%
<i>Ulmus davidiana</i>	6%	9%	<i>Corylus heterophylla</i>	3%	6%
<i>Larix gmelinii</i>	22%	7%	<i>Lonicera maackii</i>	8%	6%
<i>Tilia amurensis</i>	1%	7%	<i>Syringa reticulata</i>	2%	4%
<i>Abies nephrolepis</i>	2%	6%	<i>Ribes mandshuricum</i>	1%	4%
<i>Syringa reticulata</i>	0%	5%	<i>Sect. Deutzia</i>	0%	4%
<i>Fraxinus mandschurica</i>	4%	3%	<i>Euonymus verrucosus</i>	3%	3%
<i>Quercus mongolica</i>	3%	1%	<i>Lonicera caerulea</i>	3%	1%
<i>Pinus sylvestris</i>	3%	0%	<i>Syringa oblata</i>	8%	0%
<i>Tilia mandshurica</i>	4%	0%	<i>Spiraea fritschiana</i>	4%	0%
Herb					
<i>Aegopodium alpestre</i>	6%	15%			
<i>Carex pilosa</i>	1%	8%			
<i>Oxalis corniculata</i>	1%	8%			
<i>Filipendula palmata</i>	11%	6%			
<i>Impatiens nolitangere</i>	4%	4%			
<i>Urtica angustifolia</i>	3%	4%			
<i>Pteridium aquilinum</i>	2%	4%			
<i>Eriophorum vaginatum</i>	1%	4%			
<i>Carex siderosticta</i>	4%	3%			
<i>Maianthemum dilatatum</i>	1%	3%			
<i>Deyeuxia angustifolia</i>	1%	3%			
<i>Circaea cordata</i>	0%	3%			
<i>Chrysosplenium</i>	0%	3%			
<i>Galium davuricum</i>	0%	3%			
<i>Athyrium brevifrons</i>	7%	2%			
<i>Carex arnellii</i>	3%	0%			
<i>Pseudocystopteris spinulosa</i>	4%	0%			

Notes: The relative abundance in family and genus were not listed here for the ease of understanding for audiences.

Table A2. Differences in dominant species abundance, forest structure and species diversity in plantation forests, secondary forests and natural forests of pooled plots used in this paper.

Factors	Plantations	Secondary forests	Natural original forests
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Structural parameters			
th	13.30a	11.47b	14.33a
dbh	14.50a	14.15a	20.66b
td	0.15a	0.12a	0.07b
hh	0.30ab	0.36a	0.26b
Species diversity			
TD	0.52a	0.71b	0.77b
TH'	1.15a	1.59b	1.78b
TJsw	0.57a	0.75b	0.83c
Dominant species abundance			
<i>Betula platyphylla</i>	0.10a	0.21b	0.12a
<i>Acer mono</i>	0.04a	0.08ab	0.12b
<i>Larix gmelinii</i>	0.41a	0.06b	0.01b
<i>Betula</i>	0.11a	0.23b	0.15a
<i>Acer</i>	0.05a	0.09a	0.19b
<i>Larix</i>	0.41a	0.06b	0.01b
Pinaceae	0.65a	0.32b	0.38b
Betulaceae(tree)	0.11a	0.26b	0.16a
Aceraceae	0.05a	0.09a	0.19b
<i>Corylus mandshurica</i>	0.09a	0.17a	0.28b
<i>Acanthopanax senticosus</i>	0.04a	0.08ab	0.14b
<i>Corylus</i>	0.11a	0.21ab	0.32b
<i>Acanthopanax</i>	0.04a	0.09ab	0.15b
<i>Syringa</i>	0.12a	0.11a	0.03b
Betulaceae(shrub)	0.11a	0.21ab	0.32b
Rosaceae(shrub)	0.21a	0.19a	0.04b
<i>Filipendula palmata</i>	0.10a	0.12a	0.04b
<i>Athyrium brevifrons</i>	0.03a	0.07b	0.03a
<i>Athyrium</i>	0.03a	0.07b	0.03a
Rosaceae(herb)	0.10ab	0.12a	0.06b

Notes: Only significantly changed factors were included

Table A3. The edge effect on the forest parameters.

Factors	Outside	The edge	Inside
Structural parameters			
th	10.50a	14.20b	14.24b
dbh	12.19a	16.47b	19.59c
td	0.17a	0.10b	0.08b
sh	1.17a	1.43b	1.35b
sd	0.69a	0.33b	0.41b
hh	0.37a	0.31ab	0.27b

Species diversity			
TR	7.38a	9.00b	9.52b
TD	0.57a	0.69b	0.76b
TH '	1.22a	1.59b	1.77b
TJsw	0.63a	0.72b	0.80b
Dominant species abundance			
<i>Acer mono</i>	0.05a	0.09ab	0.11b
<i>Larix gmelinii</i>	0.23a	0.19a	0.05b
<i>Acer</i>	0.07a	0.09a	0.15b
<i>Larix</i>	0.23a	0.19a	0.05b
Aceraceae	0.07a	0.09a	0.15b
<i>Corylus mandshurica</i>	0.11a	0.14a	0.27b
<i>Lonicera</i>	0.12a	0.03b	0.01b
<i>Syringa</i>	0.12a	0.13a	0.04b
Saxifragaceae	0.09a	0.11a	0.20b
Rosaceae	0.31a	0.09b	0.03b
<i>Aegopodium alpestre</i>	0.04a	0.11b	0.14b
<i>Carex pilosa</i>	0.00a	0.03a	0.10b
<i>Oxalis corniculata</i>	0.01a	0.02a	0.07b
<i>Filipendula palmata</i>	0.11a	0.13a	0.05b
<i>Athyrium brevifrons</i>	0.07a	0.03a	0.03a
<i>Aegopodium</i>	0.04a	0.11b	0.14b
<i>Oxalis</i>	0.01a	0.02a	0.07b
<i>Filipend</i>	0.11a	0.13a	0.06b
<i>Athyrium</i>	0.07a	0.03a	0.03a
Umbelliferae	0.06a	0.12b	0.14b
Oxalidaceae	0.01a	0.02a	0.07b
Rosaceae	0.12a	0.14a	0.06b
Athyriaceae	0.12a	0.01b	0.03b

Notes: Only significantly changed factors were included, and the bold-font manifested no-differences with the edge plots

Table A4. The Pearson correlation analysis on structure attributes.

	Th	DBH	Td	Sh	Sc	Sd	Hc	Hh
Th	1							
DBH	.738**	1						
Td	-.544**	-.613**	1					
Sh	0.107	.184*	-.272**	1				
Sc	-0.013	-0.02	-.215*	.213*	1			
Sd	-.213*	-0.111	-0.072	0.014	.520**	1		
Hc	.200*	0.141	0.029	-0.016	-0.127	-.297**	1	
Hh	-.281**	-.300**	0.107	0.001	0.029	-0.014	-0.011	1

Table A5. The Pearson correlation analysis on species diversity.

	TR	TD	TH	TJsw	SR	SD	SH	SJsw	HR	HD	HH
TD	.715**	1									
TH	.846**	.959**	1								
TJsw	.505**	.937**	.860**	1							
SR	.245**	.194*	.222*	0.138	1						
SD	.295**	.241**	.276**	0.161	.673**	1					
SH	.296**	.211*	.258**	0.133	.844**	.950**	1				
SJsw	.239**	.262**	.269**	.211*	.306**	.870**	.714**	1			
HR	0.129	0.101	0.113	0.031	-0.05	0.059	0.045	0.105	1		
HD	-0.083	-0.042	-0.072	-0.043	0.017	-0.014	-0.004	-0.002	.476**	1	
HH	-0.004	0.013	-0.002	-0.017	0.009	0.044	0.043	0.065	.777**	.896**	1
HJsw	-0.161	-0.097	-0.139	-0.064	0.112	0.011	0.041	-0.026	.203*	.902**	.757**

Table A6. PCA analysis of dominant tree, shrub and herb.

Different layer	Principal component formula
Arbor	Arbor1=-0.207Acer-0.207Aceraceae
	Arbor2=-0.24Larix-0.227Pinaceae
	Arbor3=0.406Picea+0.404Picea koraiensis
Shrub	Shrub1=-0.231Rosaceae-0.215Spiraea-0.207Spiraea salicifolia
	Shrub2=0.254Betulaceae+0.254Corylus+0.232Corylus mandshurica
	Shrub3=0.427Acanthopanax+0.423Acanthopanax senticosus
	Shrub4=-0.404Lonicera
Herb	Herb1=0.178Oxalis corniculata +0.178Oxalis+0.178Oxalidaceae
	Herb2=-0.209Umbelliferae-0.201Aegopodium-0.199Aegopodium alpestre
	Herb3=-0.221Carex-0.218Cyperaceae

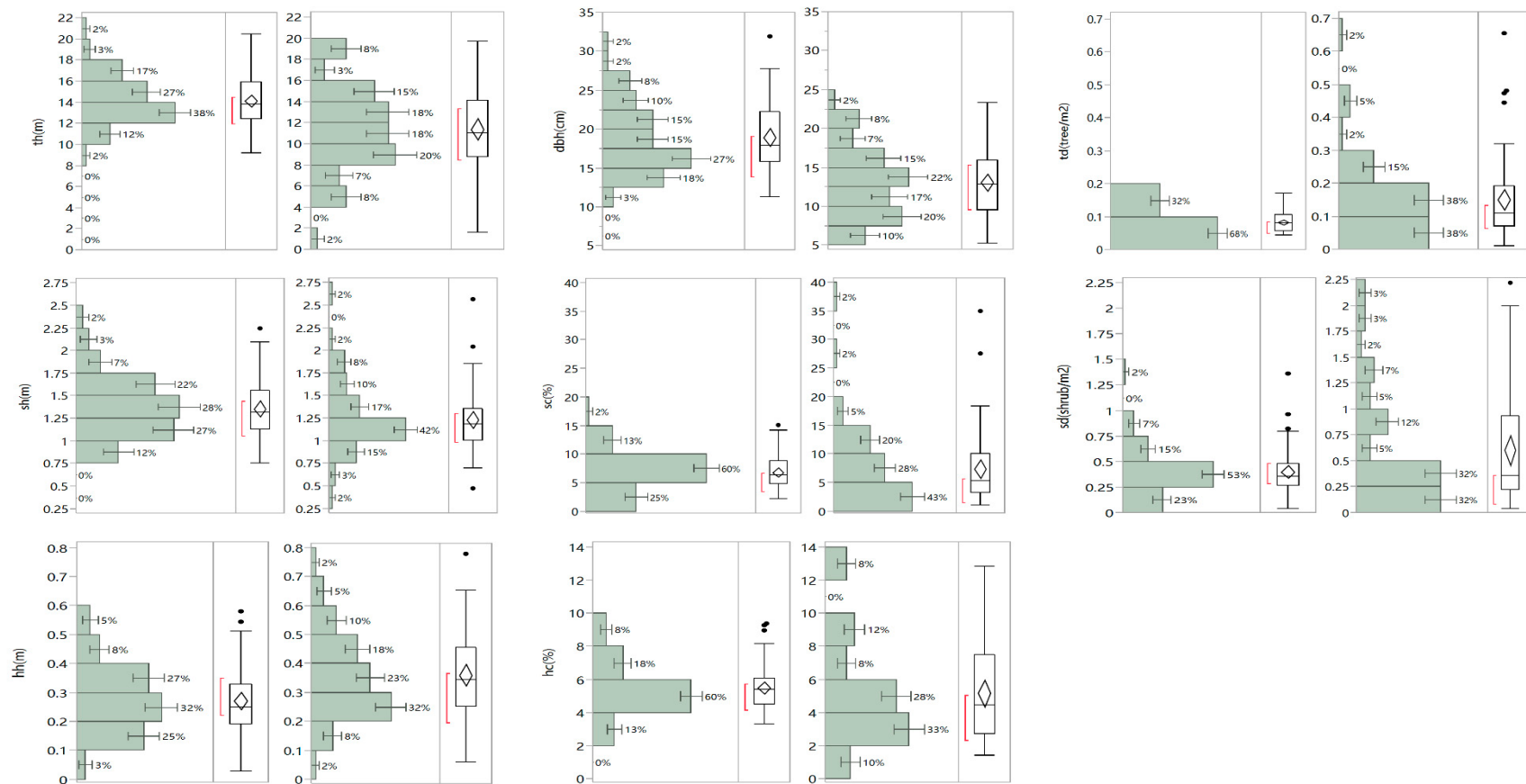


Figure A1. The distribution of tree, shrub, herb structural characteristics inside the reserve (left) and outside the reserve (right). Notes: th (tree height); dbh (diameter at breast height); td (tree density); sh (shrub height); sc (shrub coverage); sd (shrub density; hc (herb coverage); hh (herb height).

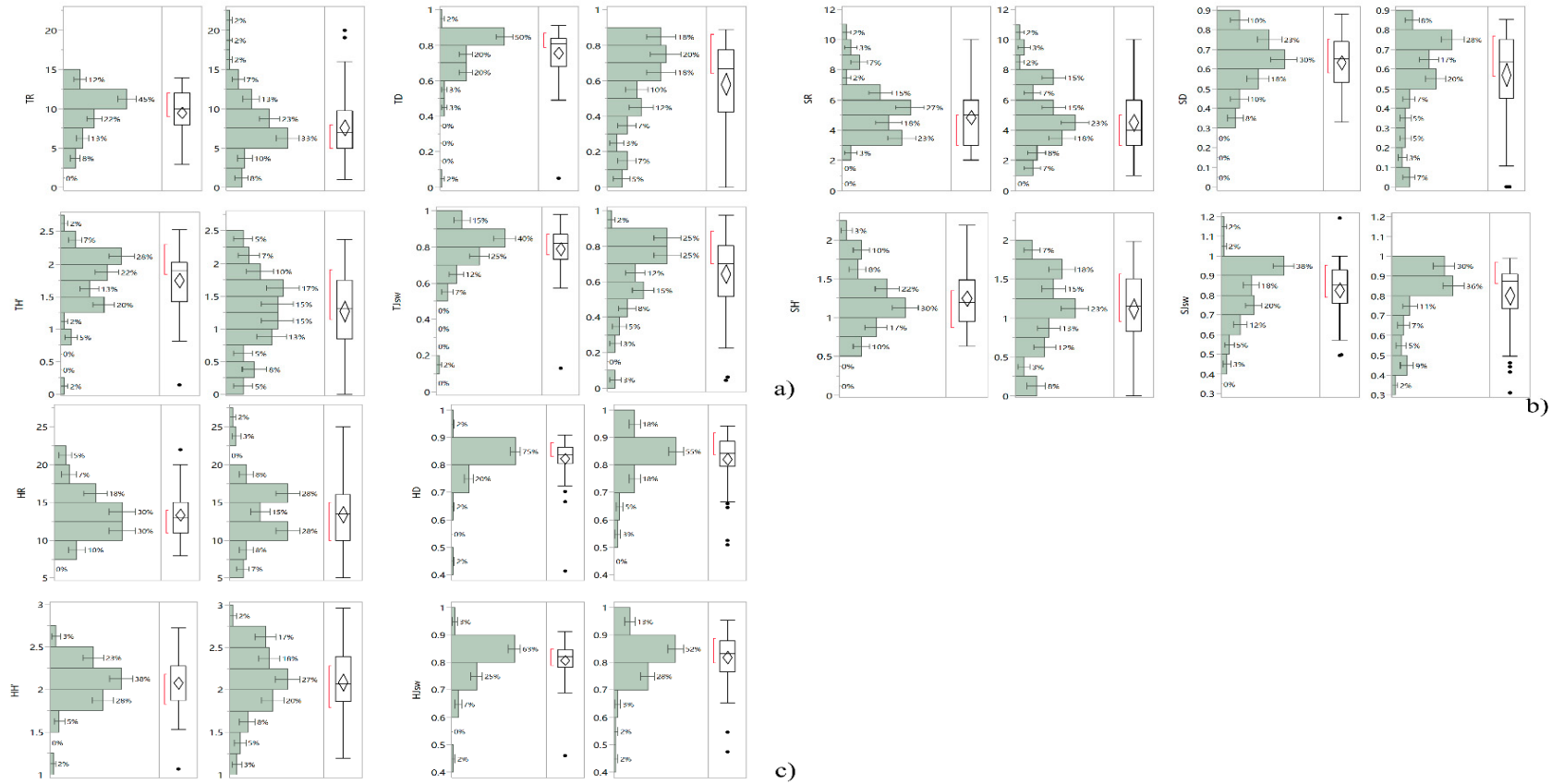
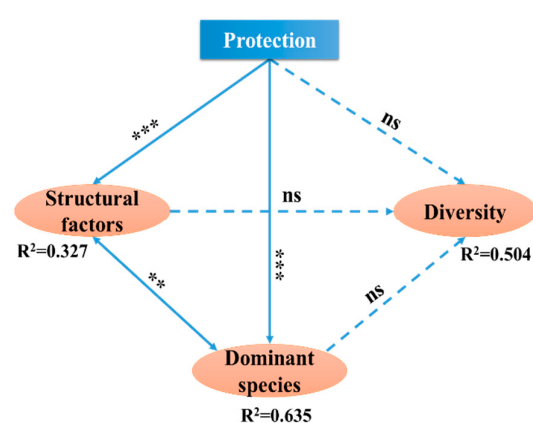
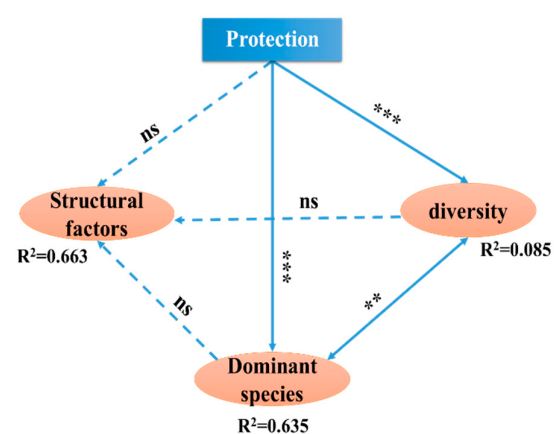


Figure A2. The distribution of tree(a), shrub(b), herb(c) diversity inside the reserve (left) and outside the reserve(right). Notes: TR,TD,TH',TJsw, are the abundance index, Simpson index, Shannon-wiener index, Pielou evenness index of arbor layer;SR,SD,SH',SJsw are the abundance index, Simpson index, Shannon-wiener index, Pielou evenness index of shrub layer;HR,HD,HH',HJsw are the abundance index, Simpson index, Shannon-wiener index, Pielou evenness index Jsw of herb layer.



(a)



(b)

Response variable	Mediate variable	Predictor variable	Pathway	Standard	P-value	Sig. / total
Direct effects						
Structure		Protection	Direct	0.854	0.000	
Abundance		Protection	Direct	-0.783	0.000	
Diversity		Protection	Direct	-0.746	0.38	
Diversity		Structure	Direct	-0.568	0.251	
Diversity		Abundance	Direct	-2.159	0.174	50%
Abundance		Structure	Inter	-0.111	0.004	(3/6)
Indirect effects						
Diversity	Abundance	Structure	Indirect	0.24	0.213	
Diversity	Structure	Protection	Indirect	-0.485	0.258	
Diversity	Abundance	Protection	Indirect	1.69	0.175	0%
Diversity	Structure	Abundance	Indirect	0.063	0.325	(0/4)
Total effects						
Diversity		Protection	Total	0.459	0.000	
Diversity		Structure	Total	-0.328	0.299	33%
Diversity		Abundance	Total	-2.096	0.174	(1/3)

Response variable	Mediate variable	Predictor variable	Pathway	Standard	P-value	Sig. / total
Direct effects						
Structure		Protection	Direct	-0.37	0.657	
Abundance		Protection	Direct	-0.783	0.000	
Diversity		Protection	Direct	0.459	0.000	
Structure		Diversity	Direct	-0.35	0.174	
Abundance		Diversity	Inter	-0.127	0.001	50%
Structure		Abundance	Direct	-1.769	0.146	(3/6)
Indirect effects						
Structure	Abundance	Protection	Indirect	1.384	0.147	
Structure	Diversity	Protection	Indirect	-0.161	0.203	
Structure	Abundance	Diversity	Indirect	0.224	0.138	0%
Structure	Diversity	Abundance	Indirect	0.044	0.204	(0/4)
Total effects						
Structure		Protection	Total	1.683	0.05	0%
Structure		Diversity	Total	-0.126	0.31	(0/3)
Structure		Abundance	Total	-1.725	0.147	

Figure A3. The probable pathway clarifications for conservation on (a) species diversity and (b) forest structure.