Supplementary Materials: Soil Elements Influencing Community Structure in an Old-Growth Forest in Northeastern China

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Table S1. Number of individuals of the 33 most abundant species in the 30-ha study area.

Life Form	Tree Species	Number of Individuals
tree	*Betula platyphylla*	71
tree	*Acer mandshuricum*	5447
tree	*Padus racemosa*	722
tree	*Abies nephrolepis*	233
tree	*Ulmus davidiana var. japonica*	94
tree	*Ulmus macrocarpa*	213
tree	*Betula costata*	829
tree	*Betula dahurica*	76
tree	*Pinus koraiensis*	1339
tree	*Juglans mandshurica*	834
tree	*Sorbus pohuashanensis*	61
tree	*Phellodendron amurense*	824
tree	*Tilia mandschurica*	110
tree	*Ulmus laciniata*	2813
tree	*Quercus mongolica*	151
tree	*Carpinus cordata*	6682
tree	*Acer tegmentosum*	1818
tree	*Acer mono*	4112
tree	*Abies holophylla*	464
tree	*Fraxinus mandshurica*	408
tree	*Sorbus alnifolia*	1065
tree	*Populus koreana*	41
tree	*Tilia amurensis*	1962
small tree	*Syringa reticulata* var.*amurensis*	3025
small tree	*Acer barbinerve*	6937
small tree	*Tilia mandschurica*	293
small tree	*Acer ukurunduense*	2058
small tree	*Lonicera maackii*	38
shrub	*Euonymus macropterus*	30
shrub	*Eleutherococcus senticosus*	30
shrub	*Euonymus pauciflorus*	418
shrub	*Corylus mandshurica*	5387
shrub	*Rhamnus davurica*	79

Table S2. Pearson's correlations among soil nutrients and pH values.

Upper Soil Layer																	
	AN	**TN**	**AK**	**TK**	**AP**	**TP**	**OC**	**Cu**	**Ni**	**Cd**	**As**	**Pb**	**Zn**	**Mo**	**Cr**	**Mn**	**Mg**
TN	0.28 ***	1															
AK	0.03	0.10	1														
TK	−0.17 *	−0.27 ***	−0.16 *	1													
AP	0.00	0.09	−0.07	0.05	1												
TP	−0.06	0.13	0.10	0.02	−0.09	1											
OC	0.14	0.17 *	0.25 ***	−0.45 ***	−0.28 ***	0.02	1										
Cu	0.00	0.06	0.20 **	−0.15 *	0.11	−0.02	0.00	1									
Ni	−0.21 **	−0.13	−0.15 *	0.06	0.00	−0.06	0.07	0.02	1								
Cd	0.18 *	0.00	−0.18 *	0.23 **	0.05	0.10	−0.40 ***	0.15 *	0.15	1							
As	0.05	0.10	−0.03	0.14	0.38 ***	−0.07	−0.51 ***	0.22 **	0.10	0.47 ***	1						
Pb	−0.01	0.02	0.13	−0.26 ***	−0.11	0.00	0.10	0.43 ***	0.04	−0.11	−0.03	1					
Zn	0.22 **	−0.08	−0.10	0.17 *	−0.06	−0.03	−0.06	−0.08	0.35 ***	0.34 ***	0.20 **	−0.13	1				
Mo	0.13	−0.02	−0.22 **	0.39 ***	0.14	0.04	−0.63 ***	−0.01	0.05	0.84 ***	0.52 ***	−0.15	0.30 ***	1			
Cr	0.22 **	−0.08	−0.09	0.18 *	−0.07	−0.02	−0.05	−0.09	0.33 ***	0.33 ***	0.18 *	−0.14	0.99 ***	0.29 ***	1		
Mn	0.00	0.07	−0.05	0.01	0.08	−0.05	−0.11	0.20 **	0.14	0.13	0.11	0.05	0.17 *	0.19 **	0.15	1	
Mg	0.02	−0.18	−0.20 **	0.11	−0.10	−0.03	−0.23 **	−0.02	0.28 ***	0.46 ***	−0.09	−0.01	0.29 ***	0.48 ***	0.28 ***	0.46 ***	1
pH	0.09	0.22 **	0.45 ***	−0.08	0.15 *	0.04	0.25 ***	0.12	−0.26 ***	−0.21 **	−0.16 *	0.07	−0.10	−0.20 ***	−0.10	0.04	−0.24 **
Lower Soil Layer																	
	AN	**TN**	**AK**	**TK**	**AP**	**TP**	**OC**	**Cu**	**Ni**	**Cd**	**As**	**Pb**	**Zn**	**Mo**	**Cr**	**Mn**	**Mg**
TN	0.41 ***	1															
AK	0.28 ***	0.30 ***	1														
TK	−0.07	−0.015	0.08	1													
AP	0.14	0.10	0.20 **	−0.05	1												
TP	−0.12	0.08	−0.06	0.01	0.00	1											
OC	0.30 ***	0.28 ***	0.07	−0.13	0.07	−0.06	1										
Cu	0.12	0.09	0.20 **	−0.14	0.14	0.04	−0.05	1									
Ni	−0.3 ***	−0.18 *	0.00	−0.02	0.06	0.09	−0.13	0.08	1								
Cd	0.021	0.02	0.014	−0.06	−0.17 *	0.00	−0.31 ***	0.21 **	0.21 ***	1							
As	0.06	0.12	0.36 ***	−0.10	0.11	0.08	−0.34 ***	0.29 ***	0.15	0.48 ***	1						
Pb	−0.05	−0.06	−0.02	−0.14	0.12	0.14	0.02	0.64 ***	−0.03	−0.02	0.06	1					
Zn	0.11	−0.01	0.00	0.01	−0.09	−0.01	0.03	0.02	0.33 ***	0.28 ***	0.20 **	−0.03	1				

Mo	0.03	0.02	0.12	0.11	−0.14	0.01	−0.44 ***	0.08	0.16*	0.85 ***	0.52 ***	−0.06	0.32 ***	1			
Cr	0.13	0.01	0.01	0.02	−0.07	0.00	0.04	0.03	0.30 ***	0.25 ***	0.19*	−0.02	0.99 ***	0.30 ***	1		
Mn	0.26 ***	0.19 *	0.15 *	−0.04	0.08	−0.05	0.12	0.11	0.13	0.17 *	0.14	−0.02	0.30 ***	0.22**	0.27 ***	1	
Mg	−0.10	−0.12	−0.14	−0.07	−0.04	0.03	−0.16 *	0.02	0.42 ***	0.56 ***	0.12	−0.01	0.32 ***	0.57 ***	0.29 ***	0.401 ***	1
pH	0.28 ***	0.36 ***	0.27 ***	−0.05	0.08	−0.07	0.29 ***	0.03	−0.289 ***	−0.14	−0.06	0.09	−0.11	−0.13	−0.11	0.27 ***	−0.24 **

* indicates $p < 0.05$; ** indicates $p < 0.01$; *** indicates $p < 0.001$

Table S3. Variation coefficients of soil variables within the study area.

Soil Variables	Upper Soil Layer	Lower Soil Layer
AN (mg/kg)	0.26	0.30
TN (g/kg)	0.22	0.29
AK (μg/g)	0.28	0.44
TK (g/kg)	0.30	0.24
AP (μg/g)	0.19	0.23
TP (mg/kg)	0.17	0.16
OC (g/kg)	0.33	0.46
Cu (mg/kg)	1.49	1.54
Ni (mg/kg)	0.65	0.64
Cd (mg/kg)	0.69	0.70
As (mg/kg)	0.54	0.53
Pb (mg/kg)	1.73	1.64
Zn (mg/kg)	0.29	0.33
Mo (mg/kg)	0.35	0.33
Cr (mg/kg)	0.28	0.31
Mn (mg/kg)	0.20	0.27
Mg (mg/kg)	0.14	0.15
pH	0.05	0.06

Table S4. Descriptive statistics of the soil variables.

Soil Variable	Upper Soil Layer					Lower Soil Layer			
	n	**Mean**	**Standard Error**	**Minimum**	**Maximum**	**Mean**	**Standard Error**	**Minimum**	**Maximum**
AN (mg/kg)	180	563.68	10.82	49.98	961.58	408.54	9.02	58.76	851.12
TN (g/kg)	180	1.31	0.02	0.53	2.70	0.87	0.02	0.34	1.96
AK (μg/g)	180	512.95	10.58	236.35	1060.29	379.46	12.48	133.72	975.91
TK (g/kg)	180	58.49	1.28	23.78	114.41	67.16	1.19	26.89	136.87
AP (μg/g)	180	36.87	0.52	20.83	54.11	26.66	0.45	12.13	55.38
TP (mg/kg)	180	1235.99	15.26	766.76	1737.44	672.02	7.86	358.49	1058.77
OC (g/kg)	180	118.06	2.91	41.94	236.88	69.13	2.36	3.14	250.21
Cu (mg/kg)	180	0.26	0.03	0.02	2.50	0.22	0.02	0.02	2.80
Ni (mg/kg)	180	3.65	0.18	0.31	9.91	3.61	0.17	0.36	9.41
Cd (mg/kg)	180	0.04	0.00	0.00	0.10	0.04	0.00	0.00	0.11
As (mg/kg)	180	0.27	0.01	0.01	0.53	0.30	0.01	0.01	0.59
Pb (mg/kg)	180	1.38	0.18	0.16	16.26	1.29	0.16	0.12	24.93
Zn (mg/kg)	180	0.18	0.00	0.09	0.49	0.17	0.00	0.06	0.47
Mo (mg/kg)	180	0.41	0.01	0.05	0.64	0.46	0.01	0.10	0.76
Cr (mg/kg)	180	0.07	0.00	0.04	0.19	0.07	0.00	0.03	0.18
Mn (mg/kg)	180	0.98	0.01	0.39	1.50	1.05	0.02	0.40	2.11
Mg (mg/kg)	180	6.21	0.06	3.45	10.48	6.68	0.07	2.82	10.49
pH	180	6.07	0.02	5.31	6.87	5.57	0.03	4.69	6.49