

Ecography

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2011. Leaf nitrogen and phosphorus concentrations of
woody plants differ in responses to climate, soil and
plant growth form. – *Ecography* 34: xxx–xxx.

Supplementary material

Appendix 1

Table A1. Site descriptions. MAT: mean annual temperature; AP: annual precipitation.

Site	Latitude	Longitude	Altitude (m)	Vegetation type	MAT (°C)	AP (mm)	Soil type	Soil N (mg g ⁻¹)	Soil P (mg g ⁻¹)	No. of Species
Genhe, Daxing'anling Mountains	50°54'N	121°30'E	805	Temperate coniferous forest	-5.7	427	Brown coniferous forest soil	3.28	1.14	18
Liangshui, Xiaoxing'anling Mountains	47°11'N	128°53'E	374	Broad-leaved Korean pine forest	-0.3	680	Dark brown forest soil	6.85	1.12	39
Mao'er Mountain, Heilongjiang	45°16'N	127°35'E	342	Secondary deciduous broad-leaved forest	2.7	780	Dark brown forest soil	6.28	1.09	37
Changbai Mountain, Jilin	42°3'N	128°4'E	1857	Subalpine <i>Betula ermanii</i> forest	-3.3	1038	Mountain soddy forest soil	3.00	1.10	12
Changbai Mountain, Jilin	42°23'N	128°6'E	800	Broad-leaved Korean pine forest	2.8	713	Dark brown forest soil	6.9	1.29	39
Saihanba, Hebei	42°20'N	117°16'E	1400	Artificial coniferous forest	-1.3	423	Grey forest soil	1.93	0.317	19
Dongling Mountain, Beijing	39°58'N	115°26'E	1350	Warm temperate deciduous broad-leaved forest	6.8	660	Grown soil	4.31	0.760	68
Yi Mountain, Shandong	36°12'N	118°37'E	309	Warm temperate deciduous broad-leaved forest	10.8	846	Grown soil	4.35	0.776	22

Lao Mountain, Shandong	36°13'N	120°36'E	294	Warm temperate deciduous broad-leaved forest	11.9	743	Grown soil	2.25	0.496	27
Taibai Mountain, Qinling Mountains	34°5'N	107°42'E	1129	Warm temperate deciduous broad-leaved forest	11.8	734	Cinnamon soil	2.93	0.826	49
Dujiangyan, Sichuan	30°42'N	103°30'E	750	Subtropical evergreen broad-leaved forest	15.2	1244	Yellow soil	4.00	0.458	74
Tiantong Mountain, Zhejiange	29°48'N	121°47'E	171	Subtropical evergreen broad-leaved forest	16	1551	Red soil	3.10	0.413	53
Dinghu Mountain, Guangdong Province	23°10'N	112°32'E	200	Monsoon evergreen broad-leaved forest	21	1996	Lateritic red soil	1.47	0.378	40
Jianfengling Mountain, Hainan Province	18°40'N	108°50'E	80	Tropical seasonal semi-deciduous forest	25.3	2031	Laterite soil	2.28	0.439	42

Table A2. Leaf N, P and N:P of woody plants for all 14 sites in eastern China. D, deciduous broadleaved plants; E, evergreen broadleaved plants; C, coniferous plants.

1. Genhe, Daxing'anling Mountains (121°30'E, 50°54'N, 805 m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Betula fruticosa</i>	D	21.2	4.18	5.08
<i>Betula platyphylla</i>	D	25.4	2.96	8.72
<i>Larix gmelini</i>	C	19.4	2.85	7.23
<i>Ledum palustre</i>	E	16.9	1.55	10.95
<i>Lonicera maackii</i>	D	18.5	3.49	5.32
<i>Potentilla fruticosa</i>	D	20.3	4.72	4.4
<i>Rhododendron dauricum</i>	E	21.1	2.11	10.08
<i>Ribes pauciflorum</i>	D	19.2	4.61	4.39
<i>Rosa davurica</i>	D	19.5	4.63	5.25
<i>Salix dunnii</i>	D	26.2	2.48	10.59
<i>Salix rosmarinifolia</i>	D	22.1	3.37	6.56
<i>Salix siuzevii</i>	D	32	5.58	5.78
<i>Salix viminalis</i>	D	31.3	5.23	6.2
<i>Sorbaria sorbifolia</i>	D	29.3	3.12	9.63
<i>Spiraea sp.</i>	D	19.6	2.88	7.51
<i>Spiraea salicifolia</i>	D	19.4	5.24	3.78
<i>Vaccinium uliginosum</i>	E	22.9	2.37	9.74
<i>Vaccinium vitis-idaea</i>	E	11.7	1.28	9.21

2. Liangshui, Xiaoxing'anling Mountains (128°53'E, 47°11'N, 374m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Abies nephrolepis</i>	C	15.3	1.22	12.84
<i>Acanthopanax senticosus</i>	D	31	2.66	11.85
<i>Acer mono</i>	D	29.5	1.83	16.53
<i>Acer tegmentosum</i>	D	27.5	2.11	12.92
<i>Acer ukurunduense</i>	D	24.9	2	10.59
<i>Actinidia arguta</i>	D	30.3	2.19	14.41
<i>Alnus sibirica</i>	D	32.2	2.04	16.62
<i>Aralia elata</i>	D	39.7	3.58	11.47
<i>Berberis ferdinandi-coburgii</i>	D	24.4	1.45	16.91

<i>Betula costata</i>	D	30.7	2.77	11.15
<i>Betula platyphylla</i>	D	25.5	2.99	8.62
<i>Corylus heterophylla</i>	D	22.4	2.39	9.4
<i>Deutzia amurensis</i>	D	28.2	2.16	12.99
<i>Euonymus alatus</i>	D	23.4	1.91	12.85
<i>Euonymus verrucosus</i>	D	28.5	2.92	10.76
<i>Fraxinus mandshurica</i>	D	34.1	2.63	13.39
<i>Larix gmelini</i>	C	19.9	1.79	11.26
<i>Lespedeza bicolor</i>	D	40	1.86	21.66
<i>Lonicera maackii</i>	D	23.1	1.99	12.06
<i>Maackia amurensis</i>	D	37	1.83	20.64
<i>Philadelphus schrenkii</i>	D	35.5	2.91	12.27
<i>Picea koraiensis</i>	C	11.7	1.21	9.63
<i>Pinus koraiensis</i>	C	14	1.32	10.74
<i>Populus koreana</i>	D	22.3	1.75	12.76
<i>Prunus padus</i>	D	22.1	2.56	9.21
<i>Quercus mongolica</i>	D	27.5	1.95	14.29
<i>Rubus saxatilis</i>	D	31.2	2.57	12.05
<i>Salix rorida</i>	D	18.5	2.34	8.06
<i>Salix viminalis</i>	D	23	3.1	7.39
<i>Sambucus williamsii</i>	D	46.3	2.78	16.6
<i>Schisandra chinensis</i>	D	25	2.63	9.86
<i>Sorbaria sorbifolia</i>	D	28.6	2.78	10.83
<i>Syringa reticulata</i>	D	25.9	1.33	19.52
<i>Tilia amurensis</i>	D	31.2	2.09	14.92
<i>Tilia mandshurica</i>	D	24.6	1.83	13.43
<i>Ulmus japonica</i>	D	22.3	1.99	11.99
<i>Ulmus macrocarpa</i>	D	26.5	2.2	12.95
<i>Viburnum sargentii</i>	D	16.8	1.29	13.14
<i>Vitis amurensis</i>	D	29.5	1.89	15.56

3. Mao'er Mountain, Heilongjiang Province (127°35'E, 45°16'N, 342m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Acanthopanax senticosus</i>	D	33.1	2.99	11.11
<i>Acer ginnala</i>	D	22.3	2.9	8.19
<i>Acer mono</i>	D	21.3	2.85	9.1
<i>Acer negundo</i>	D	30.7	4.57	6.97
<i>Berberis ferdinandi-coburgii</i>	D	21.6	1.36	15.91
<i>Corylus mandshurica</i>	D	20.4	2.86	7.71
<i>Crataegus pinnatifida</i>	D	19.4	2.89	7.18

<i>Euonymus alatus</i>	D	19.7	2.45	9.68
<i>Euonymus grandiflorus</i>	D	33.9	4.88	7.51
<i>Fraxinus mandshurica</i>	D	33.4	2.28	14.69
<i>Juglans mandshurica</i>	D	31.5	2.63	12.06
<i>Larix gmelini</i>	C	18.9	2.11	9.22
<i>Lespedeza bicolor</i>	D	36.2	1.96	18.48
<i>Lonicera maackii</i>	D	24.8	1.72	14.54
<i>Malus baccata</i>	D	20.4	1.77	12.2
<i>Philadelphus schrenkii</i>	D	19.5	3.1	6.47
<i>Picea wilsonii</i>	C	27.8	2.4	11.88
<i>Pinus koraiensis</i>	C	13	1.44	9.28
<i>Prunus padus</i>	D	19.6	1.79	11.49
<i>Quercus mongolica</i>	D	25.6	2.08	12.35
<i>Rhamnus parvifolia</i>	D	28.7	1.23	23.91
<i>Rhamnus ussuriensis</i>	D	29.8	2.42	12.33
<i>Rubus crataegifolius</i>	D	25.4	2.74	10.7
<i>Salix integra</i>	D	25.1	2.33	11.36
<i>Salix siuzevii</i>	D	25.6	1.83	13.98
<i>Sambucus williamsii</i>	D	39.8	3.06	13.36
<i>Schisandra chinensis</i>	D	29.1	2.81	10.6
<i>Sorbaria sorbifolia</i>	D	32.4	4.49	7.54
<i>Spiraea sp.</i>	D	18	1.51	12.33
<i>Syringa reticulata</i>	D	19.7	3.57	6.62
<i>Tilia amurensis</i>	D	28.4	2.64	10.88
<i>Tilia mandshurica</i>	D	25.6	2.27	11.86
<i>Ulmus japonica</i>	D	9.9	1.16	8.7
<i>Ulmus macrocarpa</i>	D	33.2	2.27	14.64
<i>Viburnum burejaeticum</i>	D	20.2	2.45	8.25
<i>Viburnum sargentii</i>	D	16.1	1.96	8.38
<i>Vitis amurensis</i>	D	35.4	3.78	9.45

4. Changbai Mountain, Jilin Province (128°4'E, 42°3'N, 1857m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Abies nephrolepis</i>	C	14.9	0.93	16.64
<i>Acer ukurunduense</i>	D	30.3	2.08	14.73
<i>Alnus sibirica</i>	D	35.8	2.57	14.23
<i>Betula ermanii</i>	D	37.6	2.36	15.97
<i>Lonicera caerulea</i>	D	27	1.75	15.72
<i>Picea jezoensis</i>	C	15.2	1.16	13.49
<i>Rhododendron chrysanthum</i>	E	15.1	1.28	11.91

<i>Rhododendron confertissimum</i>	E	20.8	1.39	15.09
<i>Salix divaricata</i>	D	27.1	2.18	12.49
<i>Sorbus pohuashanensis</i>	D	28.6	2.4	12.82
<i>Vaccinium uliginosum</i>	E	23.6	1.23	19.22
<i>Vaccinium vitis-idaea</i>	E	15.2	1.35	11.5

5. Changbai Mountain, Jilin Province (128°6'E, 42°23'N, 800m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Acanthopanax senticosus</i>	D	20.8	1.9	11.01
<i>Acer mono</i>	D	21.5	1.6	13.76
<i>Acer pseudosieboldianum</i>	D	22.2	1.45	15.77
<i>Acer tegmentosum</i>	D	23.6	1.9	12.67
<i>Actinidia arguta</i>	D	33.8	1.93	17.61
<i>Alnus sibirica</i>	D	34	1.69	20.78
<i>Betula platyphylla</i>	D	21.4	1.84	11.96
<i>Corylus mandshurica</i>	D	23.3	1.68	14.03
<i>Deutzia amurensis</i>	D	27.7	1.86	15.75
<i>Euonymus alatus</i>	D	19.1	1.56	13
<i>Euonymus verrucosus</i>	D	20.6	1.42	14.6
<i>Fraxinus mandshurica</i>	D	23.8	1.77	13.77
<i>Larix gmelini</i>	C	21.2	1.71	12.69
<i>Lespedeza bicolor</i>	D	42.3	1.74	24.69
<i>Lonicera tatarinowii</i>	D	22	1.43	15.66
<i>Maackia amurensis</i>	D	33.1	1.7	19.6
<i>Malus baccata</i>	D	17.8	1.08	16.64
<i>Phellodendron amurense</i>	D	31.9	2.03	15.7
<i>Philadelphus schrenkii</i>	D	24.3	2.36	10.74
<i>Pinus koraiensis</i>	C	11.5	1.45	8.08
<i>Populus davidiana</i>	D	19.1	1.75	12.49
<i>Populus koreana</i>	D	18.6	1.67	11.72
<i>Quercus mongolica</i>	D	25	1.68	15.12
<i>Ribes komarovii</i>	D	19.2	1.34	14.49
<i>Ribes mandshuricum</i>	D	31.5	1.61	19.59
<i>Rosa davurica</i>	D	19.8	1.53	13.07
<i>Salix rorida</i>	D	20.1	1.71	11.8
<i>Salix siuzevii</i>	D	15	1.62	9.62
<i>Salix viminalis</i>	D	23.4	2.59	9.08
<i>Sambucus williamsii</i>	D	36.7	2.21	16.64
<i>Schisandra chinensis</i>	D	22.3	2.06	10.98
<i>Sorbaria sorbifolia</i>	D	20.9	1.82	11.22

<i>Spiraea sp.</i>	D	16	1.99	8.58
<i>Spiraea salicifolia</i>	D	19.8	1.45	13.73
<i>Syringa reticulata</i>	D	20.4	1.11	18.34
<i>Tilia amurensis</i>	D	26.6	2.11	12.68
<i>Tilia mandshurica</i>	D	29.4	2.29	12.97
<i>Ulmus japonica</i>	D	23.7	1.83	13.13
<i>Ulmus laciniata</i>	D	21.9	1.71	12.74

6. Saihanba, Hebei Province (42°20'N, 117°16'E, 1400m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Betula chinensis</i>	D		1.53	
<i>Betula platyphylla</i>	D	26.5	2.52	10.52
<i>Cotoneaster integerrimus</i>	D	21.5	2.84	7.55
<i>Crataegus kansuensis</i>	D	17.8	2.37	7.51
<i>Larix gmelini</i>	C		2.3	
<i>Pinus sylvestris</i>	C	13.5	1.35	10
<i>Populus simonii</i>	D		4.14	
<i>Potentilla fruticosa</i>	D	23.4	2.71	8.64
<i>Prunus padus</i>	D	19.7		
<i>Rhamnus ussuriensis</i>	D	27.7	1.94	14.28
<i>Ribes diacanthum</i>	D	23.4		
<i>Rosa bella</i>	D	22.1	1.73	12.75
<i>Salix linearistipularis</i>	D	25.9	2.69	9.63
<i>Salix microstachya</i>	D	24.5	1.81	13.54
<i>Salix purpurea</i>	D	30.6	2.67	11.46
<i>Salix siuzevii</i>	D	28.9	1.81	16
<i>Salix triandra</i>	D	24.2	1.95	12.37
<i>Salix viminalis</i>	D	36.5	2.91	12.55
<i>Spiraea Salicifolia</i>	D	18	1.43	12.59

7. Dongling Mountain, Beijing (39°58'N, 115°26'E, 1350m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Abelia biflora</i>	D	16.9	0.95	17.79
<i>Acanthopanax senticosus</i>	D	36.3	4	9.08
<i>Acer truncatum</i>	E	25.1		
<i>Ampelopsis humulifolia</i>	D	22	1.28	17.19
<i>Ampelopsis sinica</i>	D	33.4	2.45	13.63

<i>Berberis poiretii</i>	D	18	1.25	14.4
<i>Betula dahurica</i>	D	29.5	1.56	18.95
<i>Carpinus turczaninowii</i>	D	24.3	1.14	21.32
<i>Celastrus orbiculatus</i>	D	28.5	2.44	11.68
<i>Celtis bungeana</i>	E		0.97	
<i>Celtis koraiensis</i>	E	44.7	2.26	19.76
<i>Corylus heterophylla</i>	D	19.8	1.27	17.52
<i>Corylus mandshurica</i>	D	20		
<i>Deutzia hamata</i>	D	21.2	1.13	18.76
<i>Deutzia parviflora</i>	D	32.1	1.66	19.34
<i>Elsholtzia stauntonii</i>	E	30.6	2.34	13.08
<i>Euonymus bungeanus</i>	D	35.1	2.76	12.72
<i>Fraxinus americana</i>	D	25.8	1.1	23.59
<i>Fraxinus bungeana</i>	D	20.9	0.86	24.3
<i>Fraxinus chinensis</i>	D	29.8	1.21	24.59
<i>hippophae rhamnoides</i>	D	26.5	2.82	9.4
<i>Hydrangea bretschneideri</i>	D	29.7	1.37	21.68
<i>Juglans mandshurica</i>	D	36.9	1.72	21.45
<i>Juniperus communis</i>	C	14.5	1.68	8.63
<i>Larix gmelini</i>	C		1.41	
<i>Leptodermis oblonga</i>	D		1.65	
<i>Leptopus chinensis</i>	D	27	1.12	24.22
<i>Lespedeza bicolor</i>	D	36.7	0.69	53.19
<i>Lespedeza davurica</i>	D	28	1.25	22.4
<i>Lonicera chrysantha</i>	D	22.5	1.48	15.2
<i>Malus baccata</i>	D	23.3	3.96	5.89
<i>Morus mongolica</i>	D	31.7	0.98	32.3
<i>Myriopholis dioica</i>	D	18.9	0.77	24.55
<i>Parthenocissus quinquefolia</i>	D	23.2		
<i>Phellodendron amurense</i>	D	33.2	2.34	14.19
<i>Populus cathayana</i>	D		1.85	
<i>Populus davidiana</i>	D	23.6	1.78	13.26
<i>Populus maximowiczii</i>	D	18.7	2.46	7.58
<i>Prunus armeniaca</i>	D	24.7	1.05	23.49
<i>Prunus humilis</i>	D	25.3	1.04	24.33
<i>Quercus mongolica</i>	D	26.6	0.99	26.82
<i>Rhamnus arguta</i>	D	23.5	0.93	25.41
<i>Rhamnus parvifolia</i>	D	18.4	1.11	16.58
<i>Rhamnus schneideri</i>	D	22.4	0.79	28.35
<i>Rhododendron micranthum</i>	E	20.4	1.02	20
<i>Ribes mandshuricum</i>	D	26.7	1.65	16.18

<i>Rubus crataegifolius</i>	D	24.4	1.26	19.4
<i>Salix caprea</i>	D	36	1.45	16
<i>Salix matsudana</i>	D	22.7	1.55	14.65
<i>Sambucus williamsii</i>	D	37.8	3.43	11.01
<i>Schisandra chinensis</i>	D	26.2	2.11	12.45
<i>Sorbus pohuashanensis</i>	D	23.4	1.69	13.89
<i>Spiraea pubescens</i>	D	30.1	1.19	25.29
<i>Spiraea trilobata</i>	D	23.2	1.08	21.48
<i>Swida walteri</i>	D	17.2	1.73	9.97
<i>Syringa villosa</i>	D	23.3	1.72	13.52
<i>Syringa pekinensis</i>	D		1.3	
<i>Syringa pubescens</i>	D	15.7	1.01	15.62
<i>Syringa reticulata</i>	D	30	1.78	16.85
<i>Tilia amurensis</i>	D	23.9	2.44	9.8
<i>Tilia mandshurica</i>	D	27.3	1.4	19.5
<i>Tilia mongolica</i>	D	27.5	1.76	15.63
<i>Ulmus laciniata</i>	D	30.8	1.51	20.4
<i>Ulmus macrocarpa</i>	D	25.2		
<i>Ulmus pumila</i>	D	32.1		
<i>Viburnum mongolicum</i>	D	17.2	1.21	14.21
<i>Viburnum sargentii</i>	D	21.5	1.17	18.33
<i>Vitis amurensis</i>	D	35.9	1.48	24.26

8. Yi Mountain, Shandong Province (118°37'E, 36°12'N, 309m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Acer davidii</i>	D	29.3	1.45	20.15
<i>Carpinus turczaninowii</i>	D	23.5	0.86	27.69
<i>Castanea mollissima</i>	D	21.7	0.93	23.54
<i>Celastrus orbiculatus</i>	D	27.6	1.55	17.84
<i>Deutzia grandiflora</i>	D	16.7	0.76	22.24
<i>Dioscorea nipponica</i>	D	27.4	1.16	23.71
<i>Euonymus alatus</i>	D	24.5	1.1	22.26
<i>Euonymus oxyphyllus</i>	D	24.3	1.46	16.81
<i>Fraxinus chinensis</i>	D	26	1.51	18.12
<i>Lespedeza bicolor</i>	D	29.1	1.09	27.13
<i>Ligustrum obtusifolium</i>	D	24.9	0.99	26.59
<i>Lonicera maackii</i>	D	22.1	1.3	16.94
<i>Morus cathayana</i>	D	33.9	1.61	21.16
<i>Pinus tabulaeformis</i>	C	13	0.76	16.19
<i>Prunus padus</i>	D	21	1.25	16.84
<i>Rhamnus globosa</i>	D	22.6	0.85	26.55

<i>Robinia pseudoacacia</i>	D	36	1.45	24.9
<i>Rubus crataegifolius</i>	D	26.5	1.43	18.74
<i>Sorbus alnifolia</i>	D	21.6	1.01	22.36
<i>Spiraea fritschiana</i>	D	29.7	1.39	21.4
<i>Spiraea trilobata</i>	D	26.2	1.38	20.21
<i>Weigela florida</i>	D	18.9	1.05	17.97

9. Lao Mountain, Shandong Province (120°36'E, 36°13'N, 294m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Acer palmatum</i>	D	22.5	1.69	13.84
<i>Ailanthus altissima</i>	D	33.3	1.96	17.25
<i>Albizia kalkora</i>	D	41.1	1.45	28.72
<i>Alnus sibirica</i>	D	27.2	1.28	21.32
<i>Amygdalus davidiana</i>	D	34	1.42	23.93
<i>Cerasus japonica</i>	D	27.3	0.93	29.49
<i>Diospyros lotus</i>	D	24.7	1.17	21.48
<i>Euonymus alatus</i>	D	23.2	1.19	19.68
<i>Fraxinus chinensis</i>	D	25.3	0.96	26.88
<i>Grewia biloba</i>	D	30.2	1.62	19.84
<i>Lespedeza cyrtobotrya</i>	D	25.9	0.95	27.2
<i>Lespedeza floribunda</i>	D	30.5	1.43	21.46
<i>Picrasma quassioides</i>	D	28.2	1.34	21.02
<i>Pinus thunbergii</i>	C	11.2	0.27	41.91
<i>Pistacia chinensis</i>	D	22.6	1.14	19.79
<i>Pterocarya rhoifolia</i>	D	29.3	1.24	24.04
<i>Quercus acutissima</i>	D	27.8	1.28	21.74
<i>Quercus wutaishanica</i>	D	27.2	1.16	23.7
<i>Rhus chinensis</i>	D	29.7	1.49	20.21
<i>Robinia pseudoacacia</i>	D	33.2	1.58	21.28
<i>Rubus crataegifolius</i>	D	26.4	1.39	19.42
<i>Spiraea trilobata</i>	D	23.7	0.98	24.19
<i>Stephanandra incisa</i>	D	24.6	1.05	21.91
<i>Ulmus macrocarpa</i>	D	23.3	1.09	21.69
<i>Vitis amurensis</i>	D	23.5	1.17	20.11
<i>Weigela florida</i>	D	17.7	0.83	21.6
<i>Zanthoxylum simulans</i>	D	30.1	1.39	21.99

10. Taibai Mountain, Qinling Mountains (107°42'E, 34°5'N, 1129m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Acer grosseri</i>	D	19.2	1.79	11.59
<i>Ailanthus altissima</i>	D	30.4	2.17	14.07
<i>Alangium chinense</i>	D	30.2	1.97	16.89
<i>Aralia chinensis</i>	D	26.1	1.58	16.52
<i>Berberis dolichobotrys</i>	D	14.4	3.84	3.83
<i>Berchemia sinica</i>	D	16.9	0.99	17.16
<i>Carpinus turczaninowii</i>	D	18.6	1.39	13.46
<i>Castanea mollissima</i>	D	21.8	1.46	15.48
<i>Celastrus orbiculatus</i>	D	21.7	1.18	19.59
<i>Cephalotaxus fortunei</i>	E	21	1.73	12.08
<i>Cercis chinensis</i>	D	25.8	1.27	20.63
<i>Clerodendrum bungei</i>	D	32.2	2.71	11.83
<i>Corylus heterophylla</i>	D	23	1.67	14.36
<i>Cotinus coggygia</i>	D	22	1.33	17.96
<i>Crataegus wilsonii</i>	D	16	2.02	7.93
<i>Dendrobenthamia japonica</i>	D	17.1	3.57	4.93
<i>Diospyros kaki</i>	D	19.9	1.3	15.33
<i>Diospyros lotus</i>	D	20.4	1.19	17.31
<i>Elaeagnus umbellata</i>	D	33.3	1.49	22.57
<i>Euonymus alatus</i>	D	20.9	1.38	15.08
<i>Euptelea pleiosperma</i>	D	21.4	0.98	22.69
<i>Forsythia suspensa</i>	D	20.6	1.9	10.85
<i>Grewia biloba</i>	D	36.6	1.65	22.24
<i>Jasminum mesnyi</i>	E	22.6	1.03	22.02
<i>Juglans regia</i>	D	26.3	2.59	12.64
<i>Kerria japonica</i>	D	20.2	1.48	13.71
<i>Koelreuteria paniculata</i>	D	24.8	2.42	10.23
<i>Lespedeza bicolor</i>	D	28.1	1.53	18.4
<i>Ligustrum obtusifolium</i>	D	24.1	2.3	12.13
<i>Litsea pungens</i>	D	25.7	2.36	11.73
<i>Lonicera japonica</i>	D	19.1	2.46	9.58
<i>Macrocarpium officinale</i>	D	18.1	2.43	7.95
<i>Paulownia tomentosa</i>	D	20.2	2.09	9.74
<i>Picrasma quassioides</i>	D	26.4	1.75	15.49
<i>Pinus tabulaeformis</i>	C	14.6	1.24	12.08
<i>Prunus davidiana</i>	D	28.9	1.47	20.16
<i>Prunus tomentosa</i>	D	19	1.37	14.68
<i>Quercus aliena</i>	D	29.8	1.47	20.25
<i>Quercus dolicholepis</i>	E	21.8	1.34	17.97
<i>Quercus variabilis</i>	D	19.6	1.37	14.87
<i>Smilax stans</i>	D	18.1	0.89	20.25

<i>Sophora japonica</i>	D	33.8	1.51	22.42
<i>Sorbaria arborea</i>	D	28.6	2.05	14.05
<i>Spiraea blumei</i>	D	19.1	1	19.13
<i>Swida walteri</i>	D	20.5	3.22	6.46
<i>Toxicodendron vernicifluum</i>	D	20.8	1.66	12.46
<i>Ulmus japonica</i>	D	21.9	3.9	6.4
<i>Ulmus parvifolia</i>	D	25.1	3.05	9.27
<i>Viburnum betulifolium</i>	D	17	1.26	14.14

11. Dujiangyan, Sichuan Province (103°30'E, 30°42'N, 750m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Acer fabri</i>	E	15.6	1.7	9.78
<i>Alangium chinense</i>	D	35.9	2.53	14.17
<i>Albizia julibrissin</i>	D	37.1	1.74	21.37
<i>Anodendron punctatum</i>	E	18.2	0.69	26.48
<i>Aphananthe aspera</i>	D	29.3	1.76	16.58
<i>Aralia chinensis</i>	D	45.4	2.11	21.47
<i>Ardisia crenata</i>	E	27.5	1.73	15.47
<i>Ardisia pusilla</i>	E	21.1	1.04	20.38
<i>Boehmeria nivea</i>	D	41.4	1.92	21.55
<i>Broussonetia kazinoki</i>	D	43.6	2.92	14.94
<i>Broussonetia papyrifera</i>	D	34.6	2.26	16.12
<i>Callicarpa pedunculata</i>	D	27.1	1.77	15.41
<i>Camellia sinensis</i>	E	12.9	0.6	21.57
<i>Castanopsis carlesii</i>	E	17.5	0.76	24.24
<i>Castanopsis fargesii</i>	E	17.1	0.82	21.2
<i>Choerospondias axillaris</i>	D	28.8	1.66	17.4
<i>Cinnamomum camphora</i>	E	18.1	1.02	17.82
<i>Cinnamomum longepaniculatum</i>	E	22.5	1.03	26.33
<i>Cryptomeria fortunei</i>	C	15.9	1.02	15.67
<i>Cunninghamia lanceolata</i>	C	15.2	0.92	16.59
<i>Dalbergia hupeana</i>	D	33.1	1.11	30.29
<i>Debregeasia edulis</i>	E	41.1	2.43	16.89
<i>Desmodium stenophyllum</i>	D	31.8	1.26	25.16
<i>Dioscorea opposita</i>	D	29	1.37	21.15
<i>Diospyros lotus</i>	D	20	1.64	12.22
<i>Ehretia macrophylla</i>	D	38.6	2.29	16.84
<i>Eriobotrya japonica</i>	E	15.5	0.87	17.74

<i>Eurya alata</i>	E	14.3	0.59	24.3
<i>Eurya groffii</i>	D	13.4	0.59	23.43
<i>Ficus formosana</i>	E	28.2	1.42	19.84
<i>Ficus henryi</i>	E	27.1	1.39	19.63
<i>Ficus heteromorpha</i>	D	33.4	2.16	15.74
<i>Ilex ciliospinosa</i>	E	14	0.76	18.39
<i>Ilex franchetiana</i>	E	16.9	0.61	27.56
<i>Ilex intermedia</i>	E	17.9	0.58	30.71
<i>Ilex szechwanensis</i>	E	13.8	0.81	17.02
<i>Ilex viridis</i>	E	18.5	0.92	20.16
<i>Ilex yunnanensis</i>	E	15.3	0.77	19.93
<i>Kalopanax septemlobus</i>	D	30.6	1.77	17.63
<i>Lespedeza pilosa</i>	D	27.5	1.5	18.34
<i>Ligustrum sinense</i>	D	32.9	1.47	22.44
<i>Lindera fragrans</i>	E	16	0.89	17.97
<i>Lithocarpus harlandii</i>	D	21.4	1.07	20.86
<i>Litsea elongata</i>	D	26.4	1.98	13.35
<i>Machilus pingii</i>	E	19.9	1.16	17.24
<i>Magnolia officinalis</i>	D	14.4	1.24	11.58
<i>Mallotus philippinensis</i>	D	27.2	1.17	23.45
<i>Millettia dielsiana</i>	D	28.9	1.25	23.38
<i>Mussaenda pubescens</i>	D	29.7	1.64	18.25
<i>Neolitsea aurata</i>	E	21.3	1.09	19.58
<i>Neosinocalamus affinis</i>	D	33.8	1.39	24.56
<i>Oreocnide frutescens</i>	D	23.4	1.44	16.26
<i>Paliurus hemsleyanus</i>	D	21.2	1.34	15.83
<i>Pertya sinensis</i>	D	24.9	1.3	19.22
<i>Phoebe zhennan</i>	E	20.9	1.09	20.36
<i>Phyllostachys bissetii</i>	D	26.3	1.04	25.28
<i>Pistacia chinensis</i>	D	27.2	1.46	18.62
<i>Pittosporum tobira</i>	D	21	1.15	18.24
<i>Prunus padus</i>	D	34.4	1.38	24.88
<i>Quercus glandulifera</i>	D	22.5	1.31	17.23
<i>Rhus chinensis</i>	D	25.6	1.51	17
<i>Rhus succedanea</i>	D	22.9	1.12	19.98
<i>Rubus corchorifolius</i>	D	25.6	1.04	24.61
<i>Symplocos laurina</i>	E	14.9	0.78	19.82
<i>Symplocos stellaris</i>	E	14.9	0.6	24.98
<i>Symplocos sumuntia</i>	E	16.3	0.92	17.75
<i>Tetrastigma planicaule</i>	D	40.1	1.92	20.89
<i>Trachelospermum gracilipes</i>	E	17.2	1.18	14.55
<i>Trema cannabina</i>	D	24.5	1.03	23.49
<i>Trema nitida</i>	D	24.1	1.65	14.73

<i>Uncaria sinensis</i>	D	29.9	1.32	22.63
<i>Viburnum brevityubum</i>	D	23.3	1.22	19.19
<i>Zanthoxylum dimorphophyllum</i>	D	27.5	1.29	21.34
<i>Zanthoxylum piasezkii</i>	D	32.5	1.34	24.37

12. Tiantong Mountain, Zhejiang Province (121°47'E, 29°48'N, 171m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Alniphyllum fortunei</i>	D	24.4	1.03	23.76
<i>Camellia fraterna</i>	E	13.3	0.66	20.72
<i>Camellia japonica</i>	E	12.3	0.57	22.18
<i>Carpinus londoniana</i>	D	20.6	0.86	24.39
<i>Castanopsis carlesii</i>	E	15.8	0.78	20.15
<i>Castanopsis fargesii</i>	E	15.9	0.78	21.76
<i>Castanopsis sclerophylla</i>	E	17.4	0.64	27.53
<i>Choerospondias axillaris</i>	D	8.6	0.33	26.39
<i>Clerodendrum cyrtophyllum</i>	D	36.7	1.12	33.17
<i>Cleyera japonica</i>	E	12.5	0.44	28.37
<i>Cunninghamia lanceolata</i>	C	10.7	0.63	17.01
<i>Cyclobalanopsis glauca</i>	E	15.6	0.45	34.53
<i>Cyclobalanopsis gracilis</i>	E	14.6	0.64	23.51
<i>Cyclobalanopsis myrsinifolia</i>	E	16.1	0.62	26.5
<i>Daphniphyllum macropodum</i>	E	17.4	0.74	23.6
<i>Dendrobenthamia japonica</i>	D	13.4	0.85	15.68
<i>Diplospora dubia</i>	E	21.1	0.63	33.27
<i>Distylium myricoides</i>	E	11.4	0.43	26.93
<i>Elaeocarpus decipiens</i>	E	23	1.08	21.2
<i>Elaeocarpus japonicus</i>	E	17.3	0.61	28.4
<i>Eurya groffii</i>	D	19.4	0.82	24.1
<i>Gardenia jasminoides</i>	E	18.1	0.69	26.4
<i>Glochidion puberum</i>	D	17.5	0.76	22.9
<i>Helicia cochinchinensis</i>	D	15.5	0.51	31.3
<i>Ilex micrococca</i>	E	15.2	0.71	21.37
<i>Ilex rotunda</i>	E	15	0.56	27.47
<i>Illicium lanceolatum</i>	E	13.6	0.8	17.29
<i>Liquidambar formosana</i>	D	19.4	0.8	24.87

<i>Lithocarpus glaber</i>	E	17.7	0.75	24.2
<i>Lithocarpus henryi</i>	E	16.8	0.8	21.95
<i>Litsea elongata</i>	E	14.4	0.68	21.36
<i>Machilus thunbergii</i>	E	13.1	0.62	20.91
<i>Myrica rubra</i>	E	15.8	0.32	50.55
<i>Neolitsea aurata</i>	E	13.3	0.51	26.47
<i>Ormosia henryi</i>	E	29.1	1.39	21.09
<i>Photinia serratifolia</i>	E	8.4	0.46	18.51
<i>Phyllanthus glaucus</i>	D	29.4	1.34	21.9
<i>Quercus acutissima</i>	D	25.2	0.88	28.53
<i>Quercus fabri</i>	D	22	0.88	25.24
<i>Rhododendron ovatum</i>	E	12.8	0.46	27.94
<i>Sassafras tzumu</i>	D	27.3	1.08	25.25
<i>Schima superba</i>	E	14.4	0.42	34.84
<i>Styrax confusus</i>	D	20.2	0.73	27.77
<i>Symplocos anomala</i>	E	19.4	0.75	26.59
<i>Symplocos heishanensis</i>	E	13.5	0.51	26.53
<i>Symplocos setchuensis</i>	E	12.7	0.54	24.65
<i>Symplocos stellaris</i>	E	13.5	0.46	29.65
<i>Symplocos sumuntia</i>	E	13.7	0.57	25.98
<i>Syzygium buxifolium</i>	E	11.4	0.47	24.52
<i>Tarenna mollissima</i>	E	23	0.6	41.37
<i>Ternstroemia gymnanthera</i>	E	12.2	0.45	27.22
<i>Vaccinium bracteatum</i>	E	14.6	0.44	38.41
<i>Vaccinium mandarinorum</i>	E	11.8	0.36	32.42

13. Dinghu Mountain, Guangdong Province (112°32'E, 23°10'N, 200m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Acmena acuminatissima</i>	E	15.3	0.86	19.01
<i>Acronychia pedunculata</i>	E	26.5	0.99	27.63
<i>Aporusa yunnanensis</i>	E	16.6	0.93	17.81
<i>Ardisia punctata</i>	E	13.3	0.56	23.94
<i>Ardisia quinqueгона</i>	E	17.2	0.71	24.92
<i>Blastus cochinchinensis</i>	E	19.1	0.88	22.05
<i>Bridelia monoica</i>	E	24.4	1.12	21.72
<i>Canarium album</i>	E	19	0.76	32.68
<i>Caryota ochlandra</i>	E	28.4	1.56	18.08
<i>Castanea henryi</i>	D	15.2	0.9	16.11
<i>Castanopsis fissa</i>	E	16.2	0.62	26.97

<i>Craibiodendron scleranthum</i>	E	10.8	0.39	27.62
<i>Cryptocarya chinensis</i>	E	19.9	0.69	29.58
<i>Cryptocarya concinna</i>	E	20.6	0.49	39.99
<i>Desmos chinensis</i>	E	24.4	1.22	20.12
<i>Dimocarpus longan</i>	E	20.8	1.36	15.93
<i>Euphorbia milii</i>	E	18.9	1	19.37
<i>Ficus fistulosa</i>	E	24.1	1.55	15.5
<i>Ficus fulva</i>	E	27.6	1.32	20.87
<i>Ficus microcarpa</i>	E	17.9	1.33	14
<i>Ficus variegata</i>	E	20	1	20
<i>Fissistigma glaucescens</i>	E	17.4	1.21	14.33
<i>Garcinia oblongifolia</i>	E	24.4	0.85	30.26
<i>Gironniera subaequalis</i>	E	36.7	0.99	36.9
<i>Lindera chunii</i>	E	17.8	0.84	21.3
<i>Machilus breviflora</i>	E	13.1	0.62	21.89
<i>Maesa salicifolia</i>	E	19	0.78	25.79
<i>Mallotus paniculatus</i>	E	25.9	1.69	15.36
<i>Memecylon ligustrifolium</i>	E	11.6	0.29	41.66
<i>Michelia macclurei</i>	E	14.4	0.76	18.98
<i>Pithecellobium lucidum</i>	E	56.4	1.39	42.32
<i>Psychotria rubra</i>	E	14.3	0.64	26.21
<i>Randia canthioides</i>	E	22.6	0.62	36.95
<i>Rapanea neriifolia</i>	E	12.8	0.56	22.9
<i>Sarcosperma laurinum</i>	E	17	0.88	21.57
<i>Schefflera octophylla</i>	E	18	1.02	18.45
<i>Schima superba</i>	E	13.8	0.41	34.2
<i>Sterculia lanceolata</i>	E	23.4	1.29	18.23
<i>Syzygium jambos</i>	E	13.7	0.88	15.9
<i>Uvaria microcarpa</i>	E	22.5	0.98	23.67

14. Jianfengling Mountain, Hainan Province (108°50'E, 18°40'N, 80m)

Species	Growth form	N (mg·g ⁻¹)	P (mg·g ⁻¹)	N:P
<i>Acmena acuminatissima</i>	E	14.3		
<i>Adenanthera pavonina</i>	D	29.8	1.5	19.9
<i>Aphanamixis polystachya</i>	E	17.8	1.91	10.26
<i>Artocarpus nitidus</i>	E	15.2	0.96	15.93
<i>Bauhinia acuminata</i>	D	18	1.12	16
<i>Burretiodendron hsienmu</i>	E	16.4	1.26	13.54
<i>Calophyllum inophyllum</i>	E	10.2	1.04	9.85
<i>Castanopsis fabri</i>	E	17	1.17	10.44

<i>Castanopsis hainanensis</i>	E	13.7	1.23	11.11
<i>Chukrasia tabularis</i>	D	17.3	2	8.72
<i>Cinnamomum camphora</i>	E	16.6	0.99	16.83
<i>Cryptocarya chinensis</i>	E	15.3	2.07	8.33
<i>Dillenia turbinata</i>	E	10.1	1.1	9.16
<i>Dimocarpus Longan</i>	E	14.9	1.16	13.1
<i>Dolichandrone cauda-felina</i>	E	24.1	1.76	13.73
<i>Dracontomelon macrocarpum</i>	E	16.1	1.55	10.41
<i>Erythrophleum fordii</i>	E	42.5	1.87	22.77
<i>Fraxinus griffithii</i>	D	15.2	0.46	32.71
<i>Garcinia multiflora</i>	E	17.6	0.75	23.38
<i>Garcinia oblongifolia</i>	E	17	0.67	25.48
<i>Garcinia xanthochymus</i>	E	11.2	0.88	12.9
<i>Harpullia cupanioides</i>	E	19.9	1.95	10.54
<i>Heritiera parvifolia</i>	E	12.9	1.07	12.8
<i>Holarrhena antidysenterica</i>	E	24.1	1.73	14.12
<i>Hopea hainanensis</i>	E	16.9	1.09	15.8
<i>Hydnocarpus hainanensis</i>	E	18.2	1.75	10.64
<i>Leucaena leucocephala</i>	D	40.8	1.49	27.22
<i>Machilus salicina</i>	E	17.5	1.32	13.45
<i>Madhuca hainanensis</i>	E	10.9	0.65	16.77
<i>Mesua ferrea</i>	E	9.7	0.72	13.4
<i>Michelia mediocris</i>	E	15.2	1.3	12.1
<i>Mussaenda hainanensis</i>	E	22.8	1.23	18.48
<i>Ormosia henryi</i>	E	30.7	1.27	24.21
<i>Ormosia pinnata</i>	E	24.7	1.13	21.88
<i>Oroxylum indicum</i>	D	29.8	1.62	19.17
<i>Polyalthia cerasoides</i>	E	22.1	1.65	13.36
<i>Sterculia hainanensis</i>	E	19.3	2.2	8.8
<i>Styrax chinensis</i>	D	15.7	0.97	16.25
<i>Styrax subnivea</i>	D	10.4	0.6	17.42
<i>Syzygium odoratum</i>	E	16.3	0.99	16.57
<i>Terminalia catappa</i>	D	13.8	1.8	8.31
<i>Vatica mangachapoi</i>	E	14.9	1.11	14.41

Table A3. Correlations among environmental variables. Pearson coefficients and *P* values are shown in the lower left and upper right sections, respectively. MAT, mean annual temperature; AP, annual precipitation; SoilN, soil N concentration; SoilP, soil P concentration.

	MAT	AP	SoilN	SoilP
MAT		<0.001	<0.001	<0.001
AP	0.77		<0.001	<0.001
SoilN	-0.62	-0.50		<0.001
SoilP	-0.79	-0.59	0.79	

Table A4. General linear models for leaf N, P and N:P. Explanation terms in bold were significant terms with *P* < 0.05. AIC, Akaike's Information Criterion; GF, plant growth form; MAT, mean annual temperature; AP, annual temperature; SoilN, soil N concentration; SoilP, soil P concentration.

Dependence variable	Model	Explanation terms	AIC
logN	Main-effect model	GF+MAT+site	
		GF+AP+site	
		GF+SoilN+site	
		GF+SoilP+site	
	Final model	GF+site	
logP	Main-effect model	GF+MAT+site	
		GF+AP+site	
		GF+SoilN+site	
		GF+SoilP+site	
	Final model	GF+MAT+site+GF:MAT	-548.71
		GF+SoilP+site+GF:SoilP	-543.25
logN:P	Main-effect model	GF+MAT+site	
		GF+AP+site	
		GF+SoilN+site	
		GF+SoilP+site	
	Final model	GF+MAT+site+GF:MAT	-674.52
		GF+SoilP+site+GF:SoilP	-671.91