

Supplementary Materials

Seasonal dynamics of litterfall in a sub-alpine spruce-fir forest on the eastern Tibetan Plateau: allometric scaling relationships based on one year of observations

Changkun Fu, Wanqin Yang, Bo Tan, Zhenfeng Xu, Yu Zhang, Jiaping Yang, Xiangyin Ni, Fuzhong Wu

Table S1. Some detailed characteristics of the three sites studied in a sub-alpine spruce-fir forest on the eastern Tibetan Plateau.

Table S2. Seasonal periods, months, sampling times and the corresponding sampling time series. MG: middle growing season, LG: late growing season, SF: snow-formation period, SC: snow-cover period, ST: snow-melting period, and EG: early growing season. August 1st, 2015, was the first day of the sampling time series.

Table S3. Total annual litter production of each species in a spruce-fir forest on the eastern Tibetan Plateau. Values are the means±standard deviation.

Table S4. Comparisons of aboveground litter production based on results from previous studies and the present observations. A slash indicates that the information is not available in the literature.

Figure S1. Relationship between total and foliar litter production. The linear equation, adjusted R^2 , p and n value are shown.

Figure S2. Cumulative data of Litter production of annual total litter (a), foliar litter (b), woody litter (c), reproductive litter (d), epiphytic litter (e) and miscellaneous litter (f) in the sub-alpine forest from August 2015 to July 2016. MG: middle growing season, LG: late growing season, SF: snow-formation period, SC: snow-cover period, ST: snow-melting period, and EG: early growing season. August 1st, 2015, was the first day of the sampling time series. The vertical scale varies from graph to graph.

Table S1. Some detailed characteristics of the three sites studied in a sub-alpine spruce-fir forest on the eastern Tibetan Plateau.

No.	Detailed characteristics	Site 1	Site 2	Site 3
1	Area (m ²)	50×50-m	50×50-m	50×50-m
2	Geographic coordinates (°)	31.23~31.32 N, 102.88~102.95 E		
3	Mean annual temperature (°C)	2.7	2.7	2.7
4	Altitude (above sea level, m)	3006	3009	3011
5	Slope degree (°)	10~20	15~20	10~15
6	Aspect (°)	Southeast 38~52		
7	Tree age (years)	60~150	60~180	65~160
8	Canopy openness	0.20	0.25	0.20
9	Density (trees·ha ⁻¹)	1109 (fir 28.2%, spruce 42.7%)	1117 (fir 29.1%, spruce 44.4%)	1098 (fir 28.9%, spruce 44.1%)
	1) Evergreen & tree (%)	70.9	73.5	73.0
	2) Evergreen & shrub (%)	0	0	0
	3) Deciduous & tree (%)	10.9	12.7	11.2
	4) Deciduous & shrub (%)	18.2	13.8	15.8

Table S2. Seasonal periods, months, sampling times and the corresponding sampling time series. MG: middle growing season, LG: late growing season, SF: snow-formation period, SC: snow-cover period, ST: snow-melting period, and EG: early growing season. August 1st, 2015, was the first day of the sampling time series.

Seasonal periods	MG	LG		SF	SC				ST	EG		MG		
	Aug., 2015	Sep., 2015	Oct., 2015	Nov., 2015	Dec., 2015	Jan., 2016	Feb., 2016	Mar., 2016	Apr., 2016	May, 2016	Jun., 2016	Jul., 2016		
Sampling times	1	1	2	1	1				2	1	1	1		
Sampling time series (d)	31	61	76	92	122	244				259	274	305	335	366
Sample collection days (d)	31	30	15	16	30	122				15	15	31	30	31

Table S3. Total annual litter production of each species in a spruce-fir forest on the eastern Tibetan Plateau. Values are the mean±standard deviation ($n=3$).

Species	Litter production (kg·ha ⁻¹ ·yr ⁻¹)	Percentage (%)	Species type	Basal area (m ² ·ha ⁻¹)	Canopy cover (%)
<i>Abies faxoniana</i>	923.67±216.78	38.81±11.71	Evergreen tree	10.2±3.4	67.9±6.5
<i>Acer caudatum</i>	9.77±5.57	0.41±0.23	Deciduous tree	0.2±0.1	2.8±0.6
<i>Acer laisuense</i>	3.56±2.35	0.15±0.10	Deciduous tree	0.1±0.05	2.6±0.6
<i>Berberis silva-taroucana</i>	8.17±2.08	0.34±0.09	Deciduous shrub	/	1.2±0.8
<i>Cerasus conadenia</i>	240.42±30.85	10.10±1.40	Deciduous tree	0.5±0.2	6.6±2.2
<i>Cerasus pleiocerasus</i>	94.46±37.07	3.97±1.86	Deciduous tree	0.3±0.2	5.5±1.2
<i>Lonicera lanceolata</i>	1.04±0.04	0.04±0.03	Deciduous shrub	/	0.2±0.1
<i>Lonicera tangutica</i>	3.18±1.58	0.13±0.07	Deciduous shrub	/	1.2±0.4
<i>Lonicera trichosantha</i>	13.84±5.00	0.58±0.21	Deciduous shrub	/	1.8±0.8
<i>Padus racemosa</i>	1.57±0.76	0.07±0.05	Deciduous tree	0.2±0.1	2.5±0.9
<i>Picea balfouriana</i>	703.21±186.75	29.55±8.15	Evergreen tree	11.3±4.1	52.1±3.2
<i>Populus davidiana</i>	11.40±6.34	0.48±0.29	Deciduous tree	0.2±0.05	2.9±0.5
<i>Rosa omeiensis</i>	13.55±6.34	0.57±0.27	Deciduous shrub	/	1.9±0.5
<i>Rubus parvifolius</i>	1.04±0.02	0.04±0.02	Deciduous shrub	/	0.3±0.1
<i>Salix cupularis</i>	55.92±5.96	2.35±0.25	Deciduous shrub	/	3.8±0.5
<i>Salix luctuosa</i>	5.33±3.12	0.22±0.13	Deciduous shrub	/	0.8±0.4
<i>Salix paraplesia</i>	58.91±9.25	2.48±0.29	Deciduous shrub	/	4.4±1.5
<i>Sorbus scalaris</i>	45.09±9.88	1.89±0.42	Deciduous tree	0.2±0.1	3.1±1.7

Table S4. Comparisons of aboveground litter production based on results from previous studies and the present observations. A slash indicates that the information is not available in the literature.

Forest type	Study area	Altitude (above sea level, m)	Geographic coordinates (°)	Mean annual temperature (°C)	Density (trees·ha ⁻¹)	Tree DBH (cm)	Tree height (m)	Tree age (years)	Average aboveground litter production (kg·ha ⁻¹ ·yr ⁻¹)	Peak months of litterfall	Reference
Spruce-dominated forest	Wanglang, China	2900	32.91N, 104.05E	1.2	650	/	/	350	1212	2, 3, 10	17
Norway spruce forest	Southern Finland	252	66.332N, 26.645E	-4–13	621	/	29.5	70–118	1170	3, 8, 9	20
Fir-dominated forest	Wanglang, China	2600	32.98N, 104.08E	2.9	1049	/	/	200	3483	2, 10	17
Spruce-fir forest	Changbai Mountain, China	1110–1180	42.05–42.4N, 128.07–128.25E	-3.7–2.5	1352 (fir 35%, spruce 38%)	19.3	14.2	60–200	2472	7, 10	32
Spruce-fir forest	Xiaoxing'an Mountains, China	285–688	48.03N, 128.67–129.25E	-0.5	944 (fir 51%, spruce 13%)	17.41	16.54	50–200	3440	9, 10	19
Spruce-fir forest	East-central Maine, USA	60	45.10N, 68.06 W	5–6	(fir 27.3%, spruce 50%)	/	/	45–130	2105	/	34
Spruce-fir forest	Bipenggou, China	3006–3011	31.23–31.32N, 102.88–102.95E	2.7	1108 (fir 28.7%, spruce 43.8%)	18.2	13.4	60–180	2380	4, 10	This study

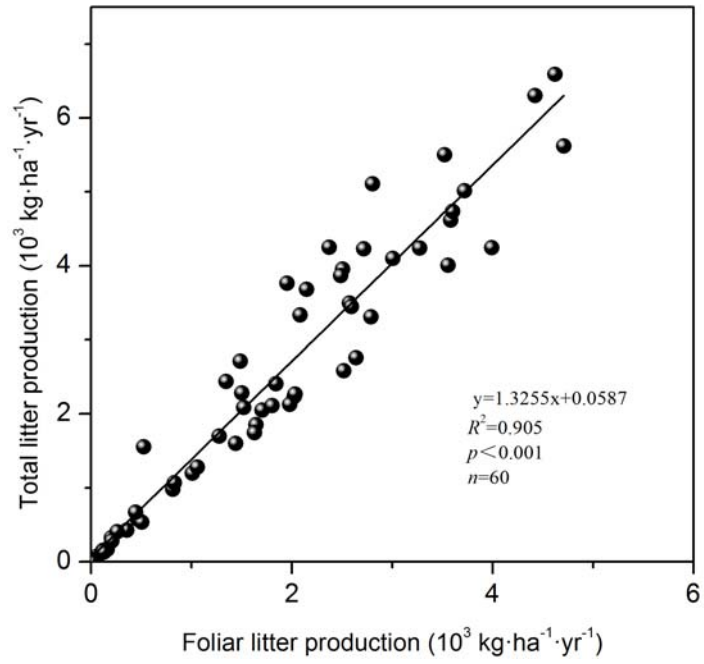


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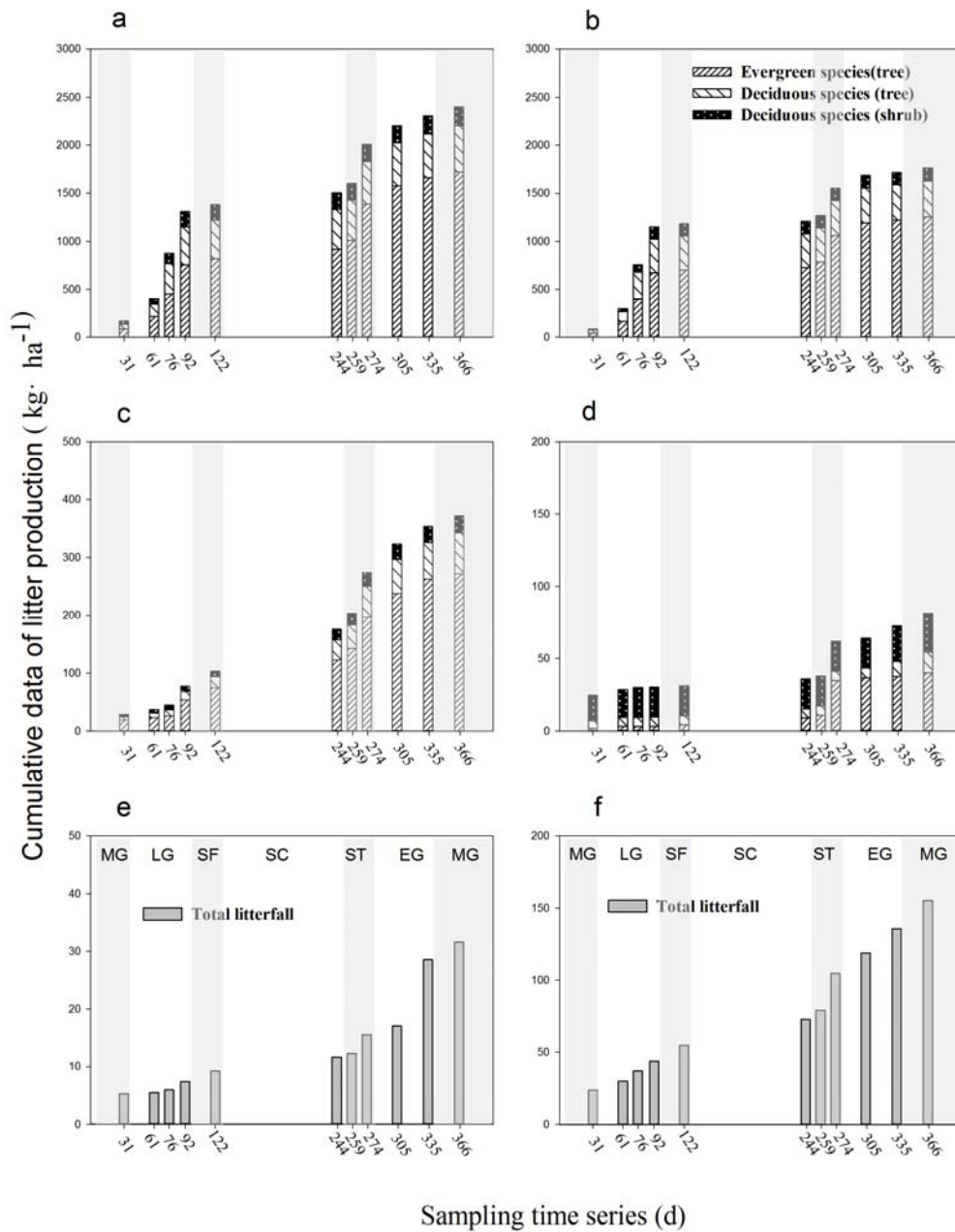


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