

Table 1. The concentrations of the chemical parameters in the porewater during the growing season in the control chambers

Treatment time (month-date)	Chemical Parameters (mg L ⁻¹)				
	NH ₄ ⁺ -N	NO ₃ ⁻ -N	DOC	SO ₄ ²⁻	Cl ⁻
5-21	0.58 ±0.03	0.86±0.24	3.41±1.30	11.63±0.99	5.03±0.18
6-3	0.46 ±0.09	0.64±0.23	2.47±0.30	24.80±1.29	4.93±0.60
6-22	0.12±0.01	0.18±0.10	2.13±0.03	24.41±0.25	8.35±1.32
7-6	0.19±0.02	0.65±0.31	2.16±0.03	35.29±0.14	7.43±0.63
7-21	0.22±0.07	0.47±0.11	2.63±0.10	26.85±3.57	5.08±0.57
8-6	0.29±0.17	0.40±0.15	2.74±0.27	29.74±2.19	5.29±0.36
8-21	0.35±0.02	0.31±0.05	2.35±0.13	20.20±2.34	8.60±1.05
9-6	0.40±0.09	0.19±0.05	3.00±0.09	38.25±6.09	5.34±0.38
9-20	0.41±0.01	0.23±0.11	4.46±0.37	39.63±2.25	5.00±0.95
10-4	0.34±0.02	0.33±0.04	3.49±0.18	35.86±0.46	7.18±0.34
10-18	0.26±0.04	0.70±0.04	4.58±0.24	41.52±3.93	6.57±0.26

Table 2. The concentrations of the chemical parameters in the porewater during the growing season in the +S chambers

Treatment time (month-date)	Chemical Parameters (mg L ⁻¹)				
	NH ₄ ⁺ -N	NO ₃ ⁻ -N	DOC	SO ₄ ²⁻	Cl ⁻
5-21	0.94±0.14	0.71±0.24	2.53±0.11	427.71±46.02	4144.52±92.90
6-3	0.34±0.07	0.57±0.19	2.50±0.23	487.18±89.81	4119.26±181.19
6-22	0.16±0.00	0.32±0.19	2.13±0.06	438.91±32.56	3340.05±232.52
7-6	0.37±0.00	0.50±0.24	2.44±0.16	490.33±31.17	3644.96±68.10
7-21	0.54±0.28	0.98±0.28	3.66±0.45	588.92±25.67	4195.60±448.50
8-6	0.61±0.06	0.43±0.01	2.17±0.06	619.54±15.21	5073.78±98.97
8-21	0.41±0.04	0.47±0.04	2.10±0.09	571.68±20.43	4828.49±180.83
9-6	0.42±0.05	0.40±0.02	2.60±0.11	539.58±24.42	4375.91±180.69
9-20	0.32±0.07	0.20±0.11	3.42±0.30	644.33±33.16	5027.06±343.91
10-4	0.42±0.06	0.39±0.13	3.32±0.30	780.10±79.57	5469.30±276.61
10-18	0.27±0.02	0.80±0.11	3.05±0.14	762.65±48.23	5846.80±524.05

Table 3. The concentrations of the chemical parameters in the porewater during the growing season in the +C chambers

Treatment time (month-date)	Chemical Parameters (mg L ⁻¹)				
	NH ₄ ⁺ -N	NO ₃ ⁻ -N	DOC	SO ₄ ²⁻	Cl ⁻
5-21	0.25±0.04	0.18±0.09	11.33±4.59	19.41±2.14	5.97±0.86
6-3	0.22±0.01	0.12±0.01	2.30±0.02	25.12±2.50	4.73±0.41
6-22	0.09±0.03	0.03±0.01	2.53±0.19	20.46±1.19	3.37±0.66
7-6	0.17±0.07	0.19±0.04	2.23±0.21	28.13±2.42	3.94±0.44
7-21	0.12±0.01	0.02±0.01	6.39±0.11	21.76±0.53	4.89±1.01
8-6	0.30±0.10	0.03±0.01	3.35±0.25	22.85±6.73	9.37±0.68
8-21	0.29±0.14	0.24±0.11	10.94±3.46	17.30±6.20	8.13±1.02
9-6	0.28±0.08	0.03±0.01	3.30±0.20	43.83±4.60	6.63±0.34
9-20	0.29±0.10	0.08±0.03	6.49±1.81	46.33±1.61	7.19±0.61
10-4	0.18±0.07	0.07±0.02	11.34±3.79	40.66±4.81	8.15±0.17
10-18	0.06±0.02	0.93±0.77	5.02±0.30	49.72±2.08	12.63±1.19

Table 4. The concentrations of the chemical parameters in the porewater during the growing season in the +S+C chambers

Treatment time (month-date)	Chemical Parameters (mg L ⁻¹)				
	NH ₄ ⁺ -N	NO ₃ ⁻ -N	DOC	SO ₄ ²⁻	Cl ⁻
5-21	0.68±0.03	0.35±0.16	10.56±4.14	459.34±27.69	3898.40±108.40
6-3	0.30±0.17	0.08±0.04	3.39±0.54	582.12±51.09	4657.82±133.14
6-22	0.25±0.12	0.03±0.01	2.35±0.20	435.87±16.29	3107.58±26.72
7-6	0.09±0.06	0.13±0.03	3.84±0.47	600.78±40.45	5450.39±186.45
7-21	0.08±0.02	0.61±0.03	7.62±0.89	624.35±24.48	5199.07±169.80
8-6	0.11±0.02	0.11±0.05	5.67±2.32	599.88±46.18	4838.66±274.29
8-21	0.11±0.01	0.44±0.01	13.20±1.13	590.91±37.97	4683.42±161.18
9-6	0.24±0.09	0.01±0.01	7.10±3.54	627.88±9.33	5109.62±162.54
9-20	0.41±0.02	0.01±0.00	10.45±0.74	642.85±39.32	4922.05±293.46
10-4	0.24±0.06	0.10±0.01	9.70±3.19	775.78±35.80	6276.42±268.92
10-18	0.33±0.05	0.25±0.13	13.33±4.55	910.91±23.49	7423.41±96.38

Table 5. The ecosystem carbonaceous-gas emissions during the growing season in the control chambers

Treatment time (month-date)	Gas emissions (mg m ⁻² h ⁻¹)	
	CO ₂	CH ₄
5-21	475.96±90.65	1.03±0.11
6-3	310.29±7.82	0.45±0.08
6-22	439.70±46.45	1.48±0.50
7-6	407.64±78.59	0.07±0.01
7-21	212.64±23.10	0.21±0.04
8-6	319.51±178.24	0.27±0.09
8-21	257.50±63.91	0.62±0.34
9-6	530.62±133.55	0.12±0.02
9-20	419.07±133.31	0.14±0.08
10-4	725.66±78.78	0.06±0.01
10-18	479.44±34.20	0.13±0.04

Table 6. The ecosystem carbonaceous-gas emissions during the growing season in the +S chambers

Treatment time (month-date)	Gas emissions (mg m ⁻² h ⁻¹)	
	CO ₂	CH ₄
5-21	350.08±25.29	0.84±0.07
6-3	343.78±43.17	0.26±0.04
6-22	782.56±96.63	0.41±0.02
7-6	568.17±15.24	0.05±0.02
7-21	438.83±78.45	0.07±0.01
8-6	532.18±58.57	0.11±0.05
8-21	476.41±93.49	0.06±0.03
9-6	590.21±110.94	0.10±0.01
9-20	571.87±77.82	0.02±0.02
10-4	500.22±59.15	0.04±0.03
10-18	504.77±20.69	0.07±0.05

Table 7. The ecosystem carbonaceous-gas emissions during the growing season in the +C chambers

Treatment time (month-date)	Gas emissions (mg m ⁻² h ⁻¹)	
	CO ₂	CH ₄
5-21	661.70±65.03	2.01±0.14
6-3	599.68±279.73	0.55±0.04
6-22	906.56±39.87	3.13±0.82
7-6	677.77±145.34	0.23±0.15
7-21	593.41±29.84	0.30±0.04
8-6	545.29±24.36	0.47±0.23
8-21	963.22±92.96	0.79±0.12
9-6	855.85±37.03	0.28±0.07
9-20	825.75±120.38	0.18±0.02
10-4	645.26±7.79	0.20±0.04
10-18	570.86±44.12	0.46±0.21

Table 8. The ecosystem carbonaceous-gas emissions during the growing season in the +S+C chambers

Treatment time (month-date)	Gas emissions (mg m ⁻² h ⁻¹)	
	CO ₂	CH ₄
5-21	443.90±114.41	1.35±0.20
6-3	889.56±181.91	0.51±0.10
6-22	700.94±49.05	2.96±0.35
7-6	590.05±137.62	0.09±0.03
7-21	447.98±159.16	0.05±0.02
8-6	477.35±187.36	0.37±0.20
8-21	1168.94±219.52	0.36±0.04
9-6	920.10±160.23	0.15±0.03
9-20	521.12±81.57	0.22±0.02
10-4	619.14±99.82	0.15±0.01
10-18	459.85±51.47	0.38±0.06

Table 9. The environmental factors during the growing season in the control chambers

Treatment time (month-date)	Environmental factors			
	plant height (cm)*	air temperature (°C)#	soil conductivity (mS cm ⁻¹)	soil temperature (°C)
5-21	57.00±0.70	26.07±0.27	0.40±0.30	25.83±0.44
6-3	69.03±2.92	32.00±0.32	0.26±0.01	30.13±0.43
6-22	96.43±0.54	31.37±0.23	0.21±0.04	32.20±0.15
7-6	99.97±1.29	34.83±0.22	0.22±0.01	33.33±0.09
7-21	114.43±5.45	32.80±0.15	0.31±0.01	31.63±0.37
8-6	120.87±2.83	33.43±0.26	0.26±0.03	33.63±0.35
8-21	125.53±3.67	30.97±0.04	0.19±0.03	28.30±0.80
9-6	125.63±3.66	32.40±0.10	0.26±0.04	30.53±0.19
9-20		26.93±0.09	0.26±0.04	26.47±0.12
10-4		26.58±0.16	0.21±0.02	22.97±0.37
10-18		25.67±0.07	0.23±0.01	21.47±0.17

*the plants matured in early September, so the data of plant heights were not measured since late September

#because the chambers among different treatment were close, it was assumed that the air temperature was the same for all treatment chambers.

Table 10. The environmental factors during the growing season in the +S chambers

Treatment time (month-date)	Environmental factors		
	plant height (cm) *	soil conductivity (mS cm ⁻¹)	soil temperature (°C)
5-21	56.83±1.06	0.31±0.01	25.30±0.17
6-3	71.17±5.80	1.40±0.14	29.57±0.12
6-22	101.37±3.41	1.89±0.38	31.77±0.09
7-6	108.27±1.01	1.63±0.05	33.07±0.09
7-21	114.83±1.45	3.05±0.19	28.63±1.07
8-6	114.83±1.59	2.23±0.06	32.73±0.20
8-21	130.30±8.50	2.99±0.32	28.23±0.18
9-6	130.37±8.49	2.47±0.08	30.03±0.15
9-20		4.29±0.20	26.03±0.03
10-4		3.94±0.30	22.90±0.21
10-18		4.76±0.09	21.03±0.15

*the plants matured in early September, so the data of plant heights were not measured since late September

Table 11. The environmental factors during the growing season in the +C chambers

Treatment time (month-date)	Environmental factors		
	plant height (cm) *	soil conductivity (mS cm ⁻¹)	soil temperature (°C)
5-21	57.00±0.84	0.12±0.00	25.57±0.03
6-3	71.60±4.61	0.24±0.01	28.83±0.30
6-22	104.10±0.56	0.35±0.05	31.93±0.09
7-6	106.63±1.10	0.23±0.02	34.30±0.53
7-21	108.80±4.33	0.31±0.05	30.43±0.19
8-6	114.13±5.09	0.35±0.03	33.80±0.51
8-21	126.60±9.02	0.33±0.01	29.60±0.15
9-6	124.90±8.30	0.32±0.03	30.63±0.18
9-20		0.34±0.05	26.27±0.09
10-4		0.36±0.04	22.87±0.18
10-18		0.38±0.01	21.90±0.15

*the plants matured in early September, so the data of plant heights were not measured since late September

Table 12. The environmental factors during the growing season in the +S+C chambers

Treatment time (month-date)	Environmental factors		
	plant height (cm) *	soil conductivity (mS cm ⁻¹)	soil temperature (°C)
5-21	57.00±0.81	0.32±0.01	25.53±0.09
6-3	75.87±2.30	2.75±0.05	30.00±0.32
6-22	92.93±3.51	1.95±0.04	32.23±0.17
7-6	98.87±3.67	2.10±0.05	33.70±0.35
7-21	103.97±3.42	2.72±0.34	29.83±0.09
8-6	120.93±5.82	3.31±0.06	33.63±0.09
8-21	148.43±3.12	3.61±0.23	29.70±0.06
9-6	147.77±3.29	3.40±0.18	31.23±0.45
9-20		4.37±0.08	26.20±0.06
10-4		4.62±0.18	23.00±0.21
10-18		5.57±0.14	23.27±0.20

*the plants matured in early September, so the data of plant heights were not measured since late September

Table 13. The activities of soil extracellular enzymes among different treatment chambers

extracellular enzymes (nmol h ⁻¹ g ⁻¹)	Treatment			
	Control	+S	+C	+S+C
βG	10.51±0.17	6.00±1.26	13.57±3.66	13.39±2.19
CBH	9.09±1.80	4.86±2.36	5.80±1.92	18.82±5.04
NAG	47.20±0.32	81.18±11.46	14.46±0.81	44.39±7.38
AP	45.06±2.15	55.28±8.67	55.63±0.54	96.18±2.64