

Supplementary

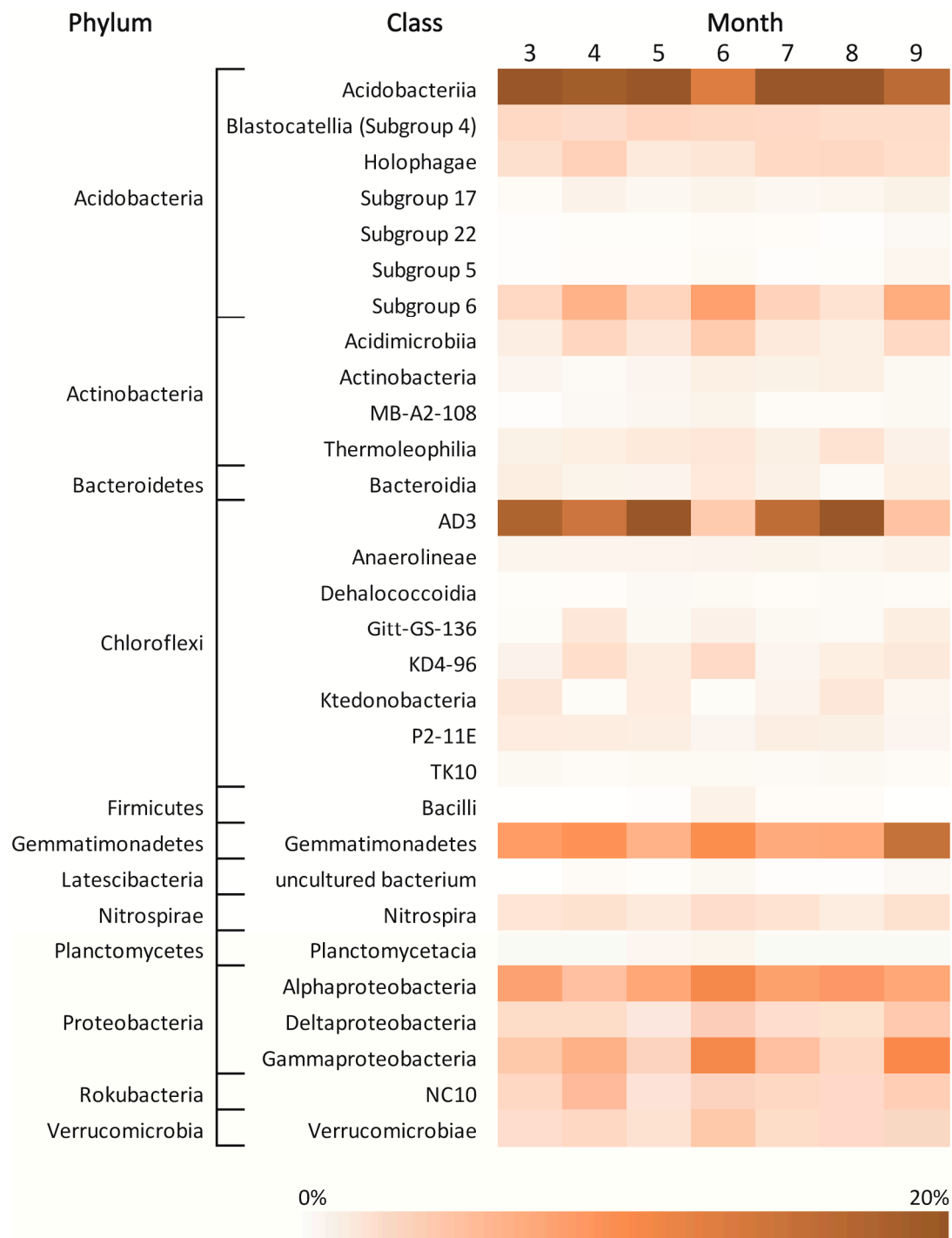


Figure S1. Heatmap of relative abundances of different classes in the total bacterial communities in the lower soil horizon throughout the season.

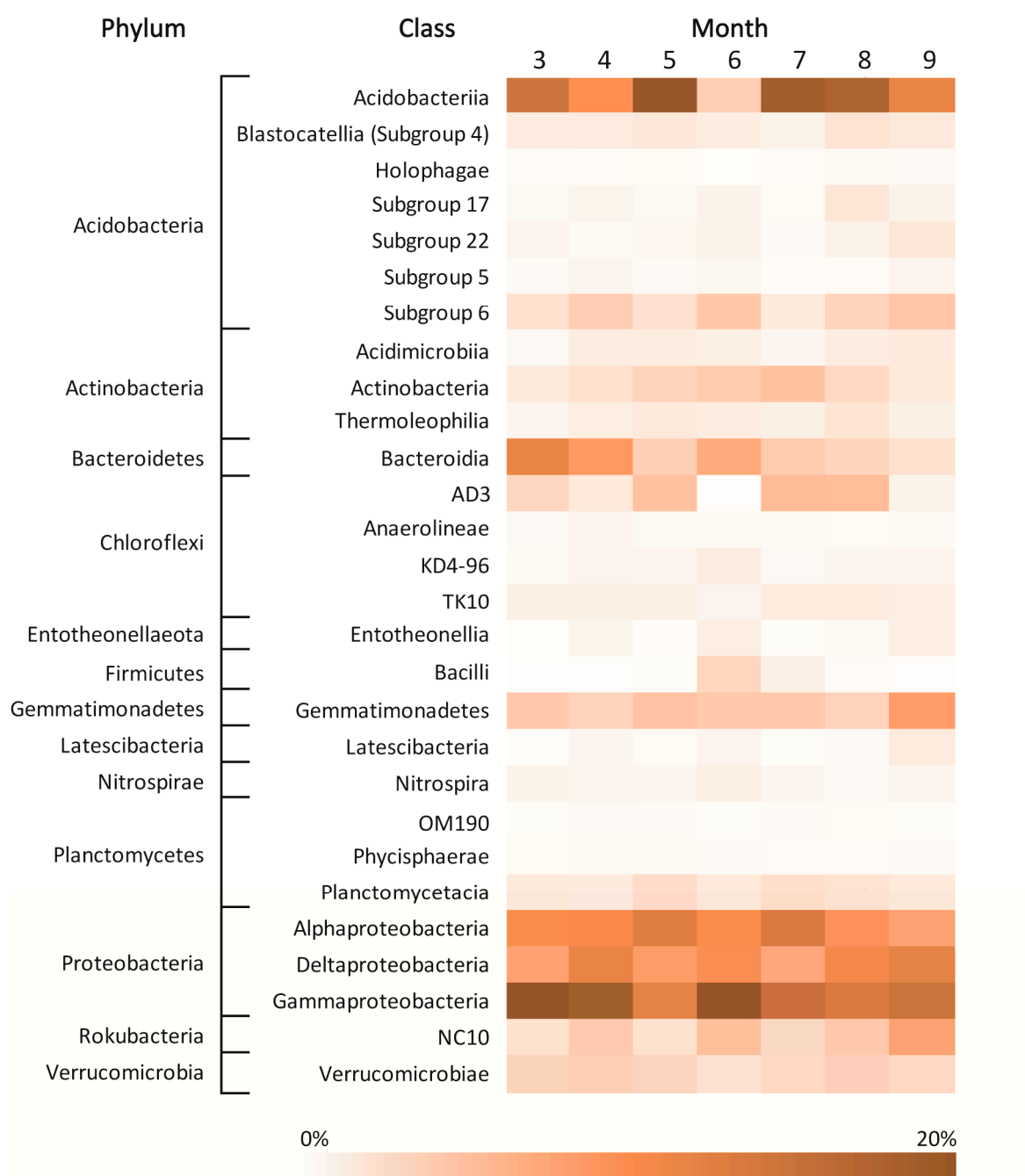


Figure S2. Heatmap of relative abundances of different classes in the active bacterial communities in the lower soil horizon throughout the season.

Table S1. Water extractable organic carbon and nitrogen contents in two soil horizons.

Sampling month	Sampling date	10 cm				55 cm			
		WEOC, %		WEON, %		WEOC, %		WEON, %	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
3	23.03.2017	2.61×10^{-2}	4.29×10^{-3}	3.84×10^{-3}	1.91×10^{-3}	5.08×10^{-3}	1.02×10^{-3}	3.62×10^{-4}	2.33×10^{-4}
4	04.05.2017	2.92×10^{-2}	3.21×10^{-3}	3.34×10^{-3}	5.36×10^{-4}	6.33×10^{-3}	6.45×10^{-4}	4.83×10^{-4}	3.05×10^{-5}
5	30.05.2017	7.41×10^{-3}	7.92×10^{-4}	2.36×10^{-4}	1.10×10^{-4}	1.81×10^{-3}	4.38×10^{-4}	2.76×10^{-5}	1.33×10^{-5}
6	29.06.2017	3.23×10^{-2}	2.38×10^{-3}	2.82×10^{-3}	5.79×10^{-4}	6.26×10^{-3}	5.70×10^{-4}	4.43×10^{-4}	1.71×10^{-4}
7	26.07.2017	7.71×10^{-3}	1.05×10^{-3}	4.36×10^{-4}	1.99×10^{-4}	2.40×10^{-3}	1.02×10^{-3}	4.73×10^{-5}	2.86×10^{-5}
8	30.08.2017	7.26×10^{-3}	1.32×10^{-3}	2.96×10^{-4}	1.25×10^{-4}	1.86×10^{-3}	1.63×10^{-4}	3.06×10^{-5}	1.15×10^{-5}
9	28.09.2017	1.35×10^{-2}	5.68×10^{-3}	1.17×10^{-3}	1.02×10^{-3}	3.54×10^{-3}	8.90×10^{-4}	1.94×10^{-4}	1.45×10^{-4}
10	30.10.2017	3.18×10^{-2}	1.67×10^{-3}	3.08×10^{-3}	4.25×10^{-4}	6.82×10^{-3}	7.13×10^{-4}	6.03×10^{-4}	1.06×10^{-4}
11	30.11.2017	2.29×10^{-2}	6.31×10^{-3}	1.09×10^{-3}	4.30×10^{-4}	5.04×10^{-3}	6.81×10^{-4}	1.24×10^{-4}	9.07×10^{-5}
12	25.12.2017	8.36×10^{-3}	1.02×10^{-3}	2.62×10^{-4}	7.57×10^{-5}	1.76×10^{-3}	4.63×10^{-4}	3.17×10^{-5}	1.23×10^{-5}
1	30.01.2018	1.72×10^{-2}	1.50×10^{-3}	1.71×10^{-3}	8.01×10^{-4}	4.31×10^{-3}	5.66×10^{-4}	1.30×10^{-4}	2.66×10^{-5}
2	01.03.2018	3.02×10^{-2}	6.47×10^{-3}	2.80×10^{-3}	4.34×10^{-4}	6.31×10^{-3}	1.57×10^{-3}	1.84×10^{-4}	1.16×10^{-4}

Table S2. Pearson correlations between estimated physical and microbiological parameters in upper horizons of studied soil (for all year). Pairwise deletion of missing data. * $p < 0.050$. ** $p < 0.01$ and *** $p < 0.001$.

	Soil moisture	WEOC	WEON	DNA content µg/g of soil	air temperature	soil temperature	Bact. 16S gene conc. in DNA	Bact. 16S gene conc. in RNA	Arch 16S gene conc. in DNA
WEOC	0.3135 *								
WEON	0.4308 **	0.8285 ***							
DNA content µg/g of soil	0.0912	-0.1913	-0.0559						
air temperature	-0.3705 **	-0.3725 **	-0.2643	0.7180 ***					
soil temperature	-0.5389 ***	-0.3967 **	-0.3482 **	0.6323 ***	0.9626 ***				
Bact. 16S gene conc. in DNA	0.1631	-0.3455 *	-0.2118	0.6766 ***	0.5879 ***	0.4477 **			
Bact. 16S gene conc. in RNA	0.2405	-0.3121 *	-0.1236	0.5957 ***	0.5544 ***	0.4309 **	0.8142 ***		
Arch 16S gene conc. in DNA	0.1185	-0.0177	0.0905	0.7381 ***	0.5353 ***	0.5074 ***	0.3947 **	0.4636 ***	
Arch 16S gene conc. in RNA	-0.0679	-0.4091 **	-0.2678	0.4842 ***	0.4155 **	0.4667 ***	0.2933	0.5595 ***	0.5392 ***

Table S3. Pearson correlations between estimated physical and microbiological parameters in lower horizons of studied soil (for all year). Pairwise deletion of missing data. * $p < 0.050$. ** $p < 0.01$ and *** $p < 0.001$

	Soil moisture	WEOC	WEON	DNA content μg/g of soil	air temperature	soil temperature	Bact. 16S gene conc. in DNA	Bact. 16S gene conc. in RNA	Arch 16S gene conc. in DNA
WEOC	0.1429								
WEON	0.1642	0.7948 ***							
DNA content μg/g of soil	0.0255	0.2607	0.1510						
air temperature	-0.1677	-0.3581 **	-0.1615	0.0783					
soil temperature	-0.3931 **	-0.3604 **	-0.1701	0.0550	0.9525 ***				
Bact. 16S gene conc. in DNA	0.2512	0.0071	0.0220	0.6405 ***	0.1712	0.0368			
Bact. 16S gene conc. in RNA	0.3947 **	0.0350	0.1354	0.4507 **	0.2354	0.0860	0.7617 ***		
Arch 16S gene conc. in DNA	0.0128	0.2461	0.3478 *	0.7297 ***	0.1454	0.1755	0.5564 ***	0.3297 *	
Arch 16S gene conc. in RNA	0.3170 *	0.1257	0.2632	0.1591	-0.0709	-0.1482	0.3417 *	0.7232 ***	0.1375

Table S4. α -diversity indices estimated for prokaryotic communities using the analysis of 16S rRNA gene library for upper and lower horizons.

Depth	Sampling month	PD whole tree		Chao1		Observed otus		Shannon	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
10 cm	3	91.69	2.29	2376.50	83.69	1334.60	63.55	9.50	0.13
	4	98.22	5.52	2495.56	231.06	1426.40	71.24	9.68	0.10
	5	96.44	3.78	2485.85	216.72	1385.60	63.38	9.59	0.11
	6	98.69	3.56	2636.73	341.47	1440.40	87.20	9.69	0.12
	7	92.67	2.80	2407.70	141.91	1355.40	26.14	9.55	0.06
	8	96.81	5.55	2612.53	171.99	1409.00	110.26	9.60	0.25
	9	99.10	3.45	2471.52	119.59	1424.60	54.74	9.69	0.09
	10	76.20	4.04	1691.88	123.02	1154.50	42.23	9.30	0.06
	12	79.06	13.32	1907.64	592.52	1184.25	243.56	9.33	0.33
	2	69.98	18.19	1507.82	720.70	996.50	367.28	8.99	0.70
	3	66.70	10.31	1795.95	402.20	900.25	180.69	7.92	0.60
55 cm	4	68.61	11.25	1658.26	342.34	925.40	198.35	8.19	0.63
	5	67.17	16.23	1705.11	562.05	891.75	258.27	7.63	0.77
	6	78.81	4.58	2089.94	222.92	1113.00	73.54	8.78	0.19
	7	65.40	4.31	1538.92	79.86	854.25	62.71	7.89	0.17
	8	72.64	6.15	1943.24	239.22	961.20	101.78	7.90	0.44
	9	75.72	10.50	1909.91	346.70	1018.40	173.19	8.55	0.52

Table S5. α -diversity indices for prokaryotic communities using the analysis of 16S rRNA gene transcripts library for upper and lower horizons.

Depth	Sampling month	PD whole tree		Chao1		Observed otus		Shannon	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
10 cm	3	115.39	4.97	2735.83	359.20	1798.80	89.36	9.86	0.04
	4	113.64	2.73	2724.62	143.34	1744.50	66.00	9.66	0.18
	5	118.68	5.26	2912.80	183.08	1838.60	81.26	9.86	0.12
	6	113.38	7.23	2943.73	557.20	1818.60	198.80	9.66	0.27
	7	113.84	4.87	2999.35	61.08	1817.80	26.92	9.69	0.11
	8	111.73	6.83	2762.86	299.11	1773.25	127.38	9.78	0.16
	9	113.08	3.77	2772.05	162.61	1788.00	71.40	9.85	0.10
	10	116.68	10.36	3250.55	330.61	1930.00	175.27	9.87	0.30
	12	116.42	7.60	3091.58	282.11	1899.40	161.72	9.92	0.25
	2	120.79	5.35	3153.16	148.53	1952.40	123.92	9.97	0.15
	3	90.27	8.35	1981.42	435.08	1326.67	191.92	8.77	0.27
55 cm	4	103.77	15.20	2613.69	601.39	1615.25	290.58	9.41	0.51
	5	108.72	1.38	2818.33	126.45	1716.00	63.32	9.28	0.20
	6	105.09	9.06	2899.94	328.56	1675.00	178.96	9.35	0.19
	7	93.23	5.87	2456.92	167.95	1411.50	117.39	8.72	0.37
	8 [#]	102.84	n/a	2613.81	n/a	1617.00	n/a	9.05	n/a
	9	81.72	3.82	1818.11	223.71	1195.00	60.81	8.70	0.27

[#]for August, only 1 sample for the lower horizon was available after the filtering based on the number of sequences for the sample.