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Role of plants in determining the soil response to either a single freeze-thaw or dry-wet event

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Supplementary documents

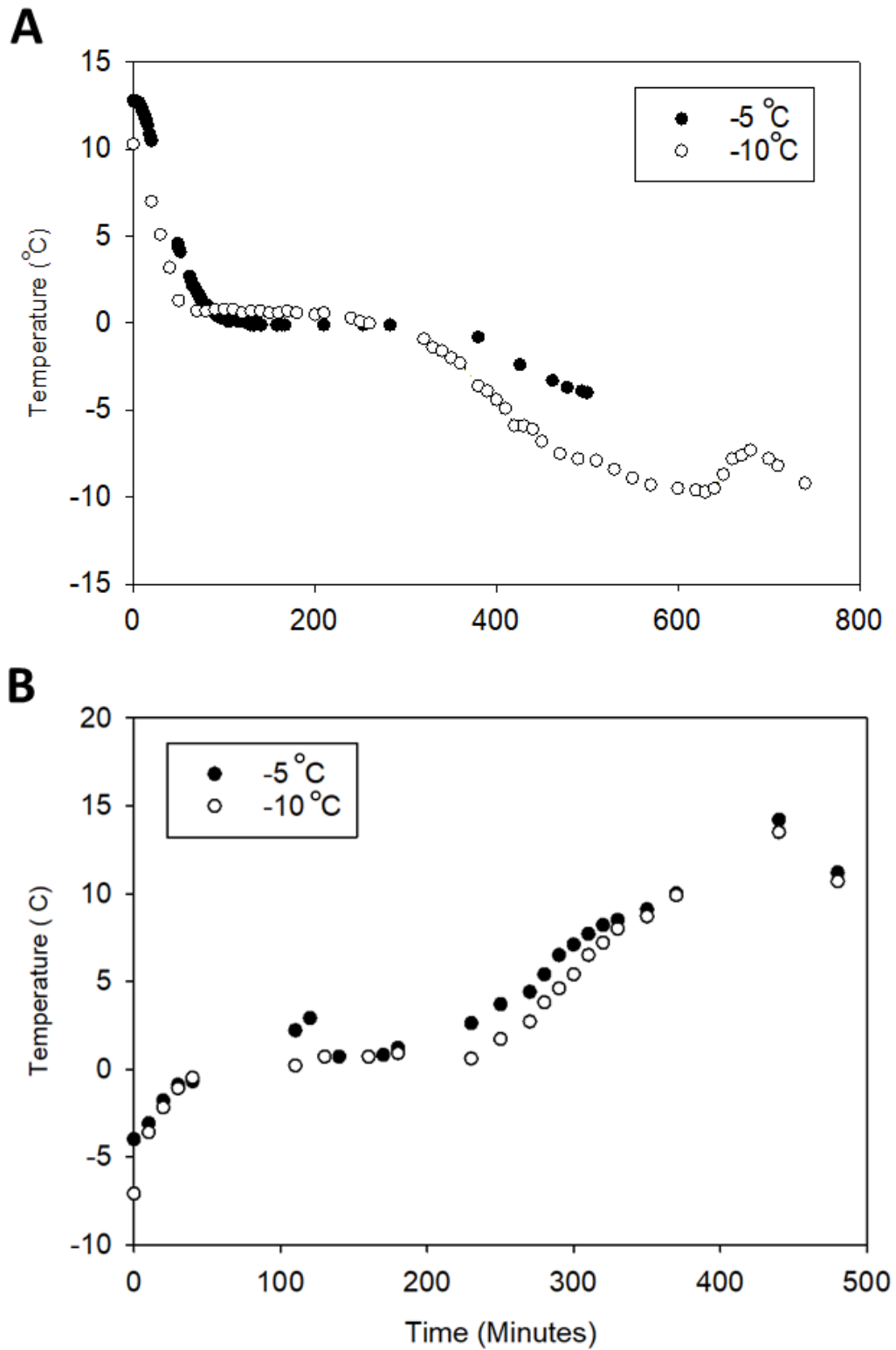


Fig. S1. Soil temperature during soil freezing to either -5°C or -10°C (Panel A) and subsequent thawing (Panel B).

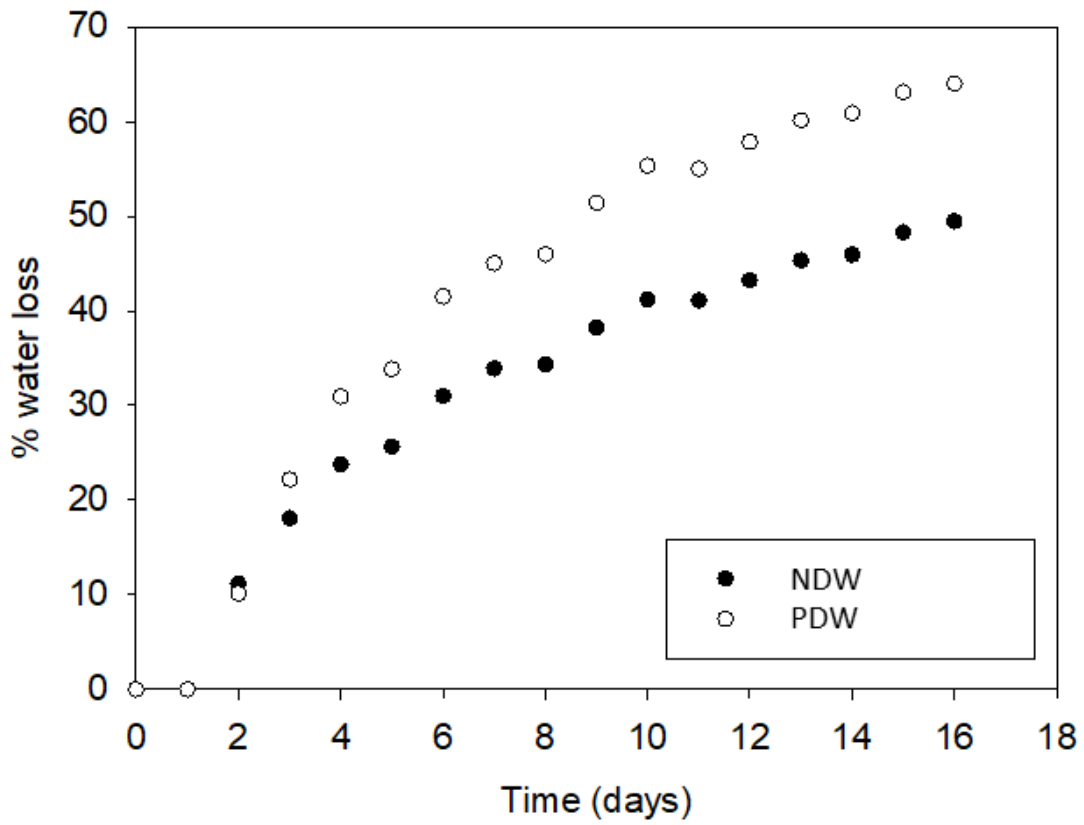


Fig. S2. Soil water loss following removal of watering (carried out during the pre-treatment period) for both the planted (PDW) and non-planted (NDW) soil during the initial stages of the drying treatment.

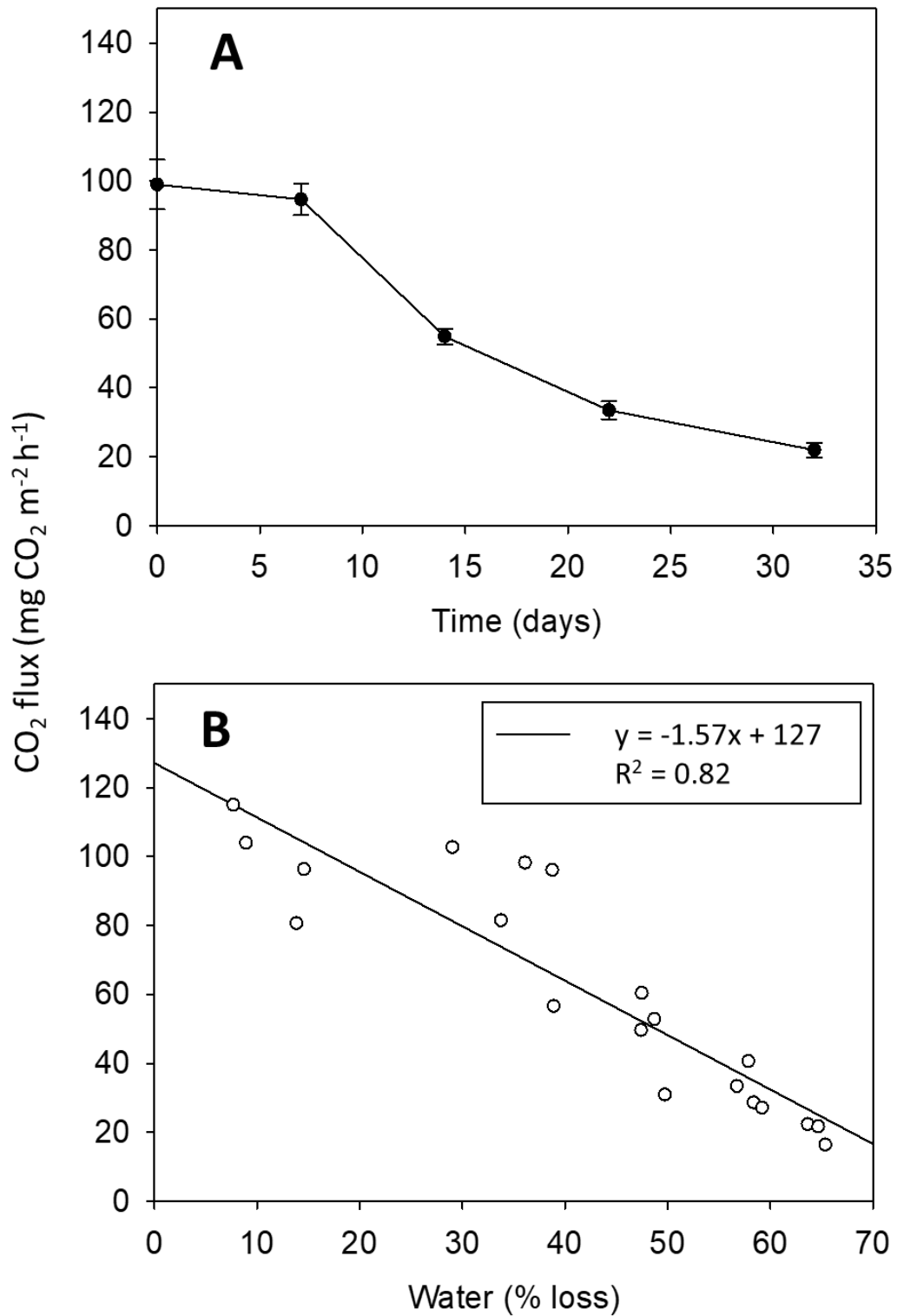


Fig. S3. Effect of drought on night-time respiration. (A) CO₂ flux in night-time from planted soil during drought period, (B) Relationship between night-time CO₂ flux and the amount of water lost from the planted soil (Pearson's product-moment correlation). Values represent means \pm SEM ($n = 4$).

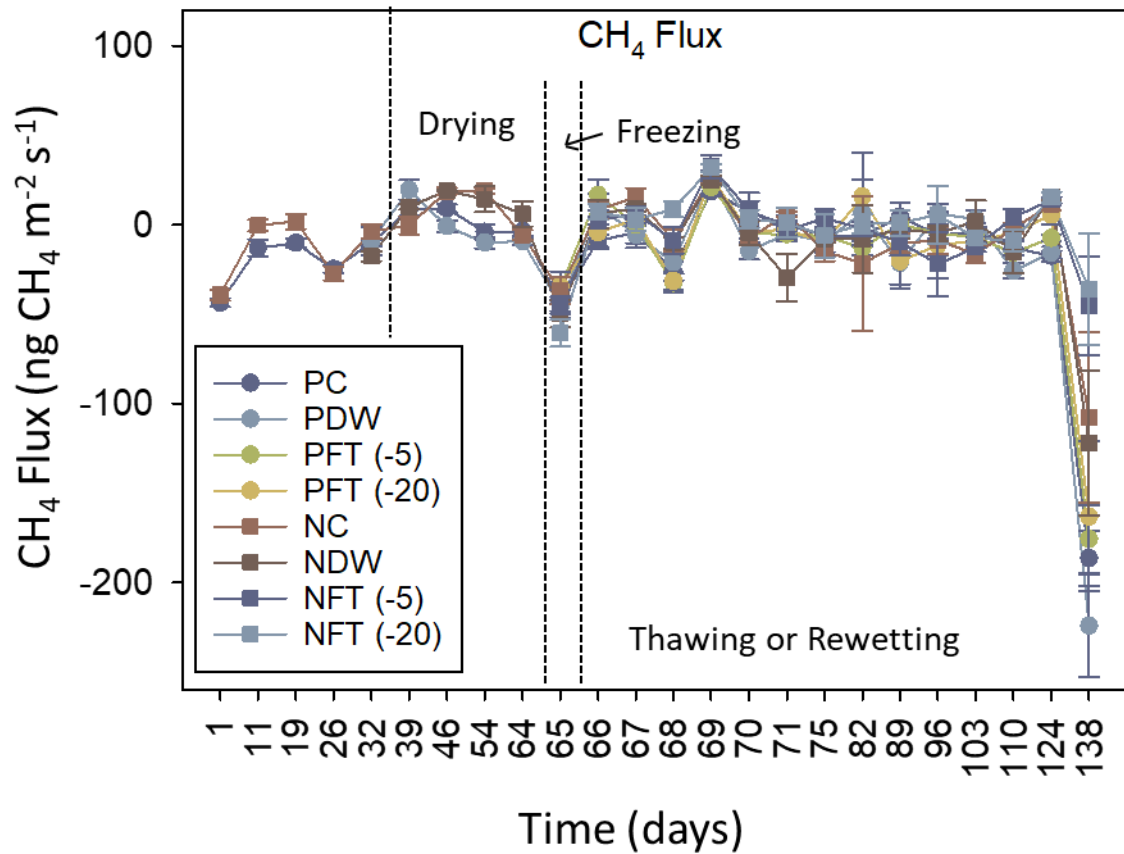


Fig. S4. CH₄ flux from soil chemistry before and after applying a single freeze-thaw (-5°C or -10°C) or dry-wet treatment in either planted or unplanted soil. Values represent means ± SEM ($n = 16$ for pre-treatments, $n = 12$ for pre-freeze-thaw treatments and $n = 4$ during drying and after thawing or rewetting). PC = Control with plants (+10°C), PDW = Dry-wet with plants, PFT (-5) = Freeze-thaw (-5°C/+10°C) with plants, PFT (-10) = Freeze-thaw (-10°C/+10°C) with plants, NC = Control without plants (+10°C), NDW = Dry-wet without plants (+10°C), NFT (-5) = Freeze-thaw (-5°C/+10°C) without plants, NFT (-10) = Freeze-thaw (-10°C/+10°C) without plants.

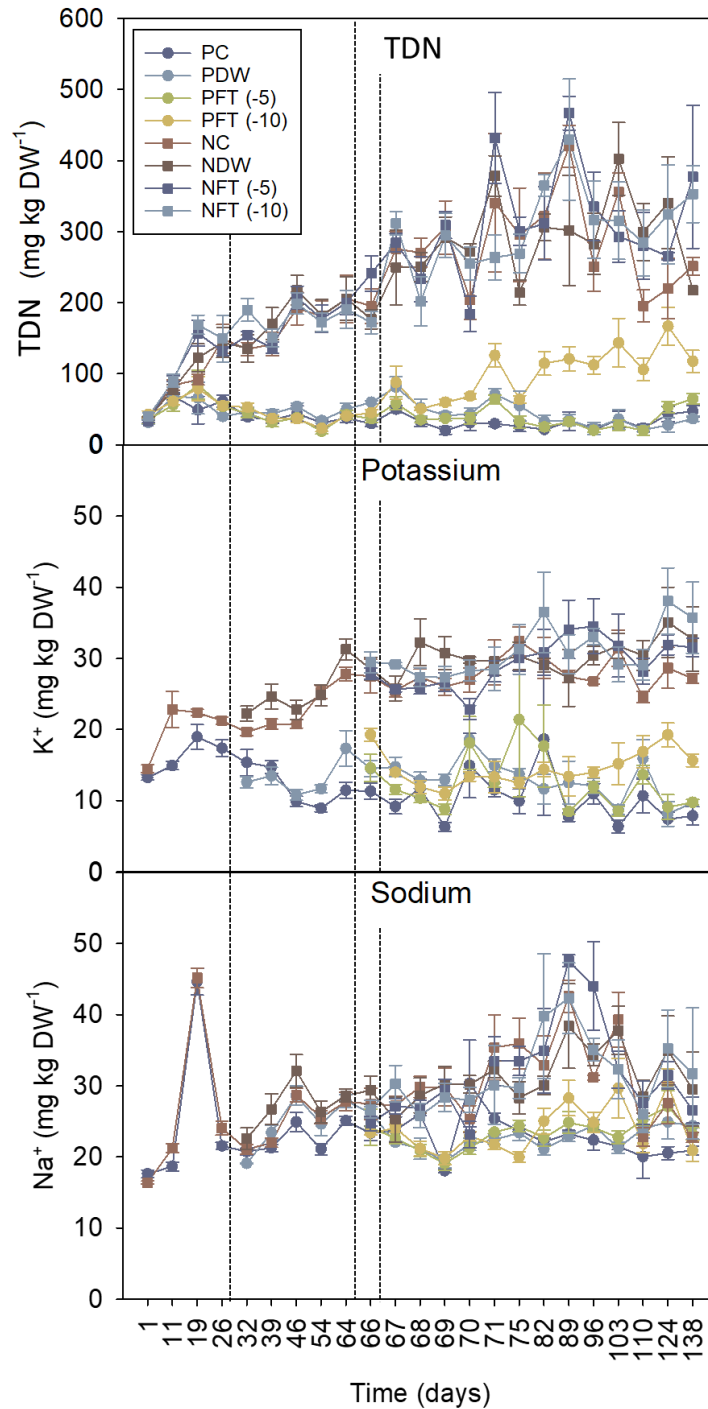


Fig. S5. Total dissolved N (TDN), K⁺, and Na⁺ in soil solution before and after applying a single freeze-thaw (-5°C or -10°C) or dry-wet treatment in either planted or unplanted soil. Values represent means \pm SEM ($n = 16$ for pre-treatments, $n = 12$ for pre-freeze-thaw treatments and $n = 4$ during drying and after thawing or rewetting). PC = Control with plants (+10°C), PDW = Dry-wet with plants, PFT (-5) = Freeze-thaw (-5°C/+10°C) with plants, PFT (-10) = Freeze-thaw (-10°C/+10°C) with plants, NC = Control without plants (+10°C), NDW = Dry-wet without plants (+10°C), NFT (-5) = Freeze-thaw (-5°C/+10°C) without plants, NFT (-10) = Freeze-thaw (-10°C/+10°C) without plants.

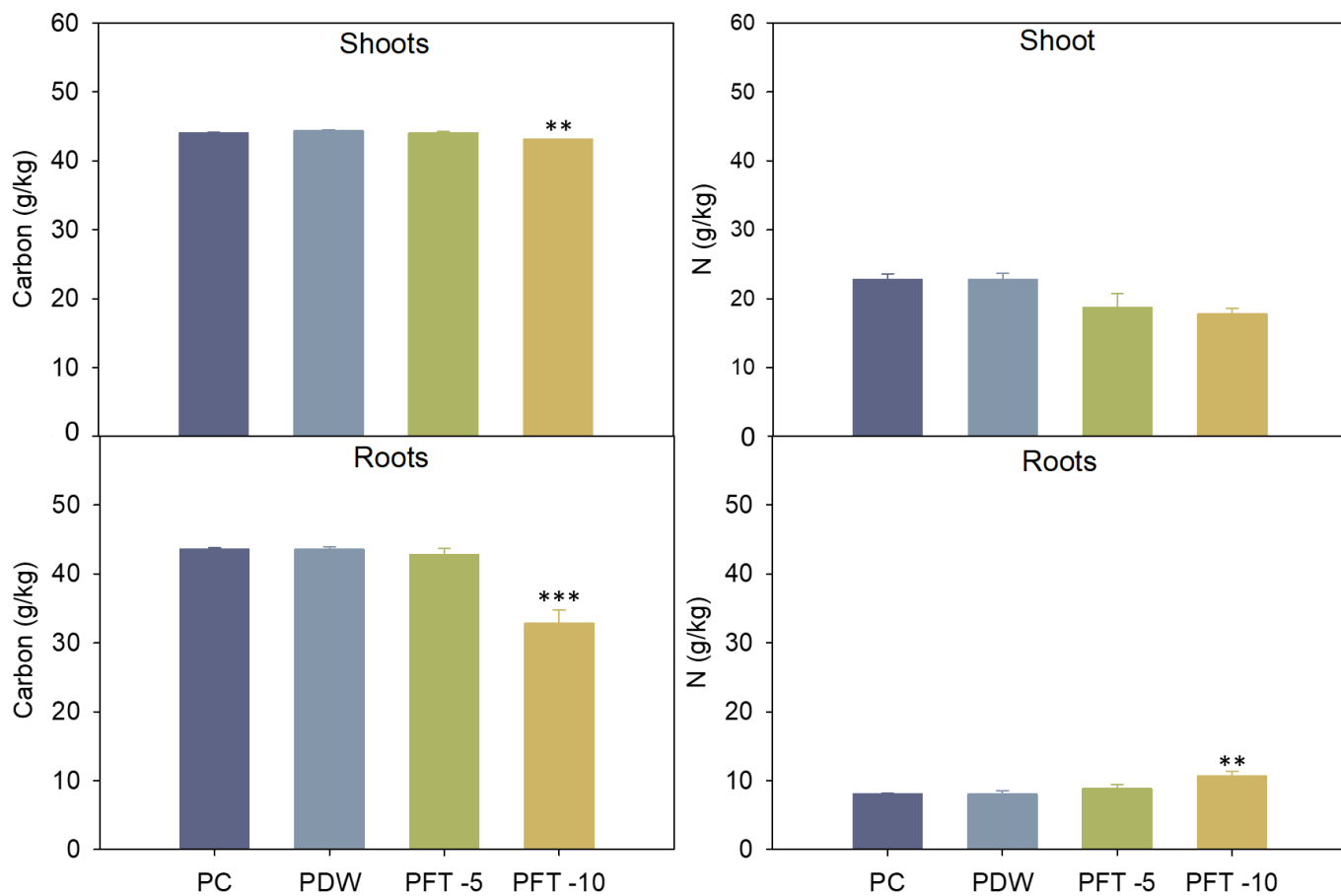


Fig. S6. C and N contents in shoots and roots at the end of the experiment after applying a single freeze-thaw (-5°C or -10°C) or dry-wet treatment. Stars above the plots denote significant differences (*, ** and *** indicate $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively) when compared with the control treatment. Values represent means \pm SEM ($n = 4$). PC = Control with plants (+10°C), PDW = Dry-wet with plants, PFT (-5) = Freeze-thaw (-5°C/+10°C) with plants, PFT (-10) = Freeze-thaw (-10°C/+10°C) with plants.

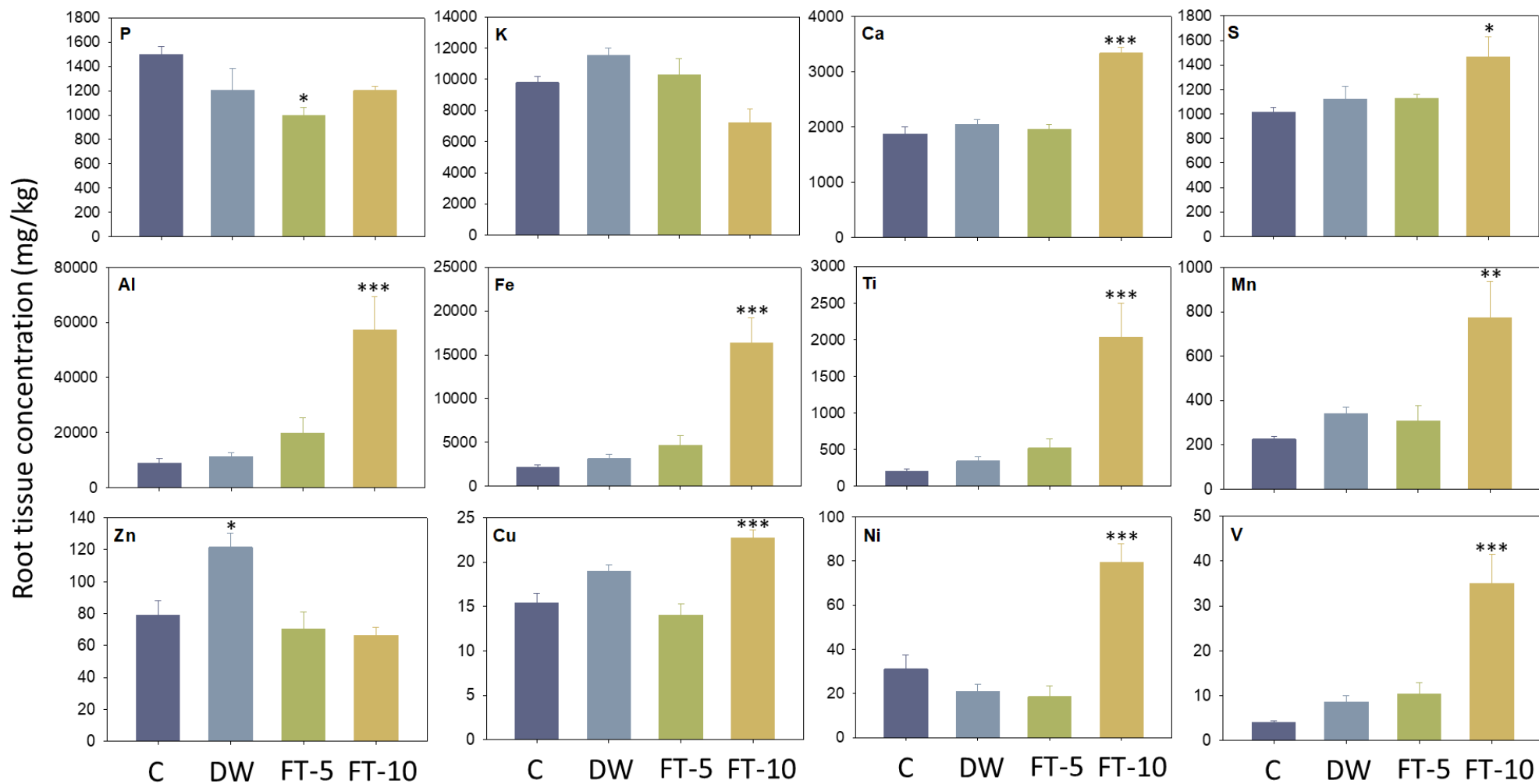


Fig. S7. Macronutrient and micronutrient concentration in roots at the end of the experiment after applying a single freeze-thaw (-5°C or -10°C) or dry-wet treatment. Stars above the plots denote significant differences (*, ** and *** indicate $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively) when compared with the control treatment. Values represent means \pm SEM ($n = 4$). PC = Control with plants ($+10^{\circ}\text{C}$), PDW = Dry-wet with plants, PFT (-5) = Freeze-thaw ($-5^{\circ}\text{C}/+10^{\circ}\text{C}$) with plants, PFT (-10) = Freeze-thaw ($-10^{\circ}\text{C}/+10^{\circ}\text{C}$) with plants.

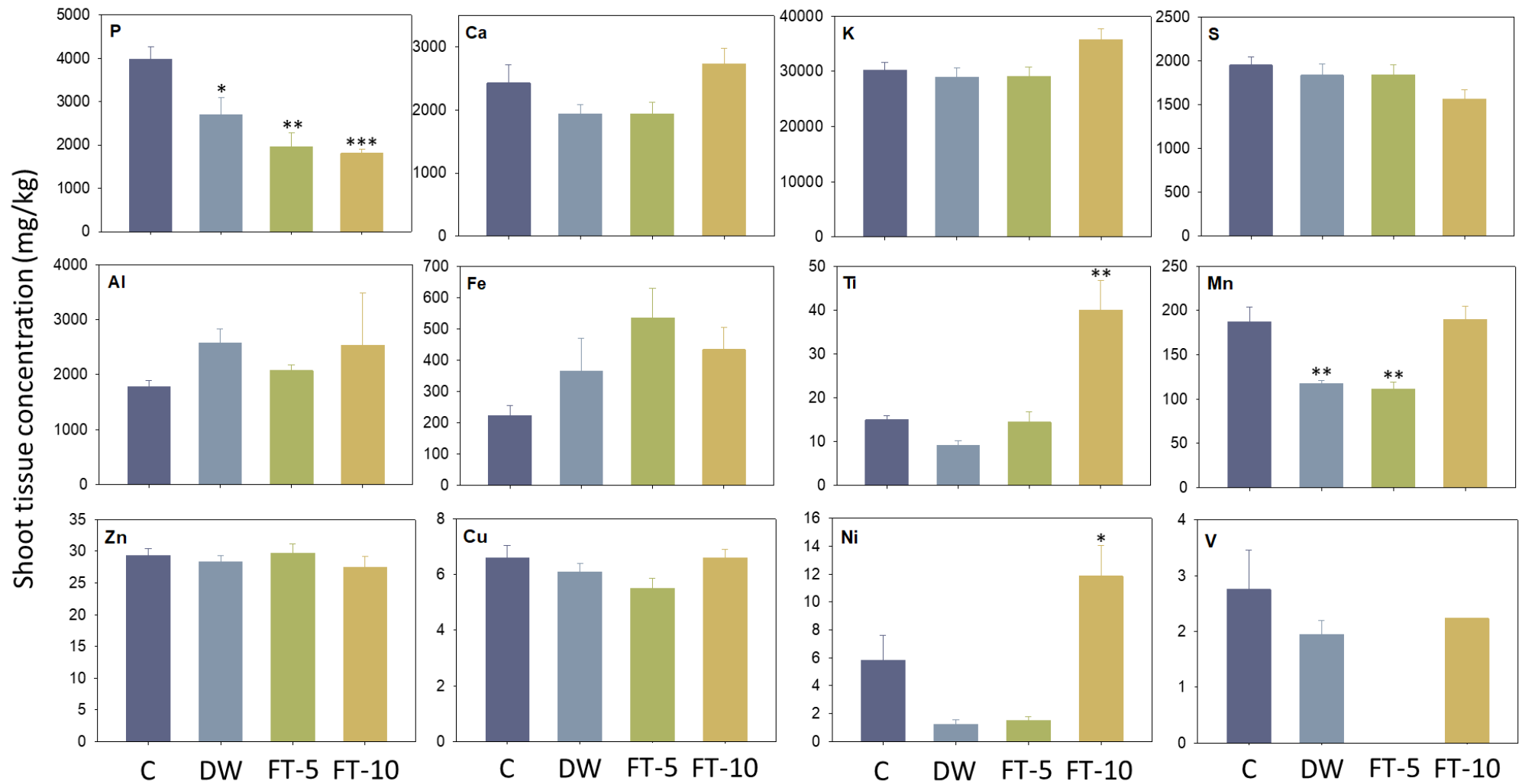


Fig. S8. Macronutrient and micronutrient concentration in shoots at the end of the experiment after applying a single freeze-thaw (-5°C or -10°C) or dry-wet treatment. Stars above the plots denote significant differences (*, ** and *** indicate $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively) when compared with the control treatment. Values represent means \pm SEM ($n = 4$). PC = Control with plants (+10°C), PDW = Dry-wet with plants, PFT (-5) = Freeze-thaw (-5°C/+10°C) with plants, PFT (-10) = Freeze-thaw (-10°C/+10°C) with plants.

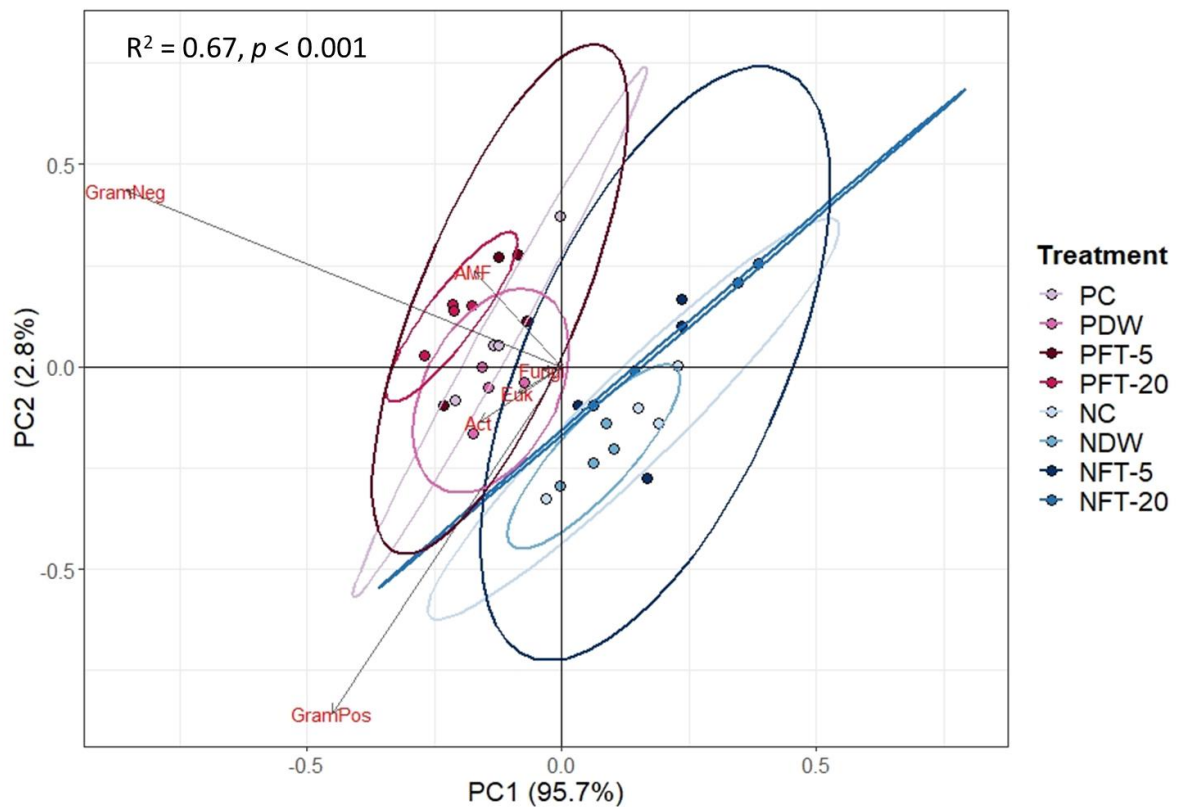


Fig. S9. Principal component analysis of abundance of different soil microbial taxonomic groups (PLFAs) at the end of the experiments after applying a single freeze-thaw (-5°C or -10°C) or dry-wet treatment in either planted or unplanted soil. Red: planted soil and Blue: unplanted soil. Ellipses delineate a 95% confidence interval. Values represent means \pm SEM ($n = 4$). PC = Control with plants ($+10^{\circ}\text{C}$), PDW = Dry-wet with plants, PFT (-5) = Freeze-thaw ($-5^{\circ}\text{C}/+10^{\circ}\text{C}$) with plants, PFT (-10) = Freeze-thaw ($-10^{\circ}\text{C}/+10^{\circ}\text{C}$) with plants, NC = Control without plants ($+10^{\circ}\text{C}$), NDW = Dry-wet without plants ($+10^{\circ}\text{C}$), NFT (-5) = Freeze-thaw ($-5^{\circ}\text{C}/+10^{\circ}\text{C}$) without plants, NFT (-10) = Freeze-thaw ($-10^{\circ}\text{C}/+10^{\circ}\text{C}$) without plants. GramNeg = Gram-negative bacteria, GramPos = Gram-positive bacteria, Act = Actinomycetes, Euk = Eukaryotes, Fungi = Saprophytic Fungi, AMF = arbuscular mycorrhizal fungi.

Table S1

Properties of the soil used in the experiments. Values represent means \pm SEM ($n = 4$).

Measurements	Values
pH	5.47 \pm 0.02
EC ($\mu\text{S cm}^{-1}$)	121 \pm 9
Moisture content (%)	36.4 \pm 0.10
Organic matter content (g kg DW^{-1})	65.3 \pm 0.2
Dissolved organic C (mg kg DW^{-1})	52.5 \pm 2.96
Total organic N (mg kg DW^{-1})	32.0 \pm 3.20
Extractable NH_4^+ (mg kg DW^{-1})	0.02 \pm 0.01
Extractable NO_3^- (mg kg DW^{-1})	26.1 \pm 1.40
Extractable Ca (mg kg DW^{-1})	12.7 \pm 1.06
Extractable K (mg kg DW^{-1})	12.5 \pm 0.09
Extractable Mg (mg kg DW^{-1})	2.26 \pm 0.20
Extractable Na (mg kg DW^{-1})	19.0 \pm 1.46
Extractable P (mg kg DW^{-1})	1.06 \pm 0.07

EC, electrical conductivity.

Table. S2. CO₂ flux (mg CO₂ m⁻² h⁻¹) from soil expressed as daytime (8 h light condition) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, ($p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	0.24 \pm 3.07	-5.85 \pm 2.34	0.39 \pm 4.79	6.61 \pm 3.89	-0.59 \pm 3.04	13.8 \pm 12.3	2.96 \pm 3.06	-11.3 \pm 3.39	ns								
Day 11	38.5 \pm 2.00	33.9 \pm 9.13	48.2 \pm 9.40	46.0 \pm 22.8	30.5 \pm 2.08	28.3 \pm 10.2	16.6 \pm 3.72	40.9 \pm 13.3	ns								
Day 19	-31.1 \pm 10.6	-17.2 \pm 15.2	-16.6 \pm 6.05	-9.33 \pm 8.10	20.6 \pm 4.34	12.6 \pm 8.37	-0.96 \pm 15.3	11.1 \pm 9.16	***								
Day 26	-21.1 \pm 2.89	-23.6 \pm 4.11	-32.8 \pm 4.76	-64.6 \pm 12.8	15.2 \pm 5.28	19.3 \pm 7.00	14.7 \pm 3.71	15.2 \pm 12.3	***								
Day 32	-31.1 \pm 6.08	-21.1 \pm 5.77	-31.7 \pm 5.65	-55.3 \pm 9.48	23.2 \pm 4.76	20.6 \pm 1.76	18.6 \pm 1.57	17.7 \pm 2.68	***								
Day 39	-13.6 \pm 7.64	-24.1 \pm 6.00	-21.8 \pm 4.72	-28.6 \pm 4.09	39.1 \pm 3.14	31.6 \pm 2.24	42.6 \pm 8.04	24.7 \pm 5.21	***								
Day 46	-24.2 \pm 8.50	-49.6 \pm 8.67	-11.6 \pm 8.58	-8.76 \pm 3.51	18.1 \pm 3.54	0.03 \pm 4.76	12.6 \pm 13.3	17.7 \pm 18.9	***								
Day 54	-26.5 \pm 10.2	-23.3 \pm 0.84	-24.2 \pm 4.01	-46.7 \pm 10.8	13.7 \pm 2.41	8.82 \pm 4.31	10.7 \pm 0.53	11.8 \pm 0.92	***								
Day 64	-9.81 \pm 6.26	-16.4 \pm 8.74	-24.2 \pm 4.04	-23.2 \pm 1.76	-4.71 \pm 8.16	-1.20 \pm 7.58	20.5 \pm 6.58	7.53 \pm 4.16	***								
Day 65	-40.5 \pm 4.97	6.77 \pm 12.5 **	-19.1 \pm 8.17	44.2 \pm 5.48 ***	-3.43 \pm 5.60	4.47 \pm 1.63	-6.45 \pm 2.77	14.0 \pm 4.88	ns								
Day 66	-12.4 \pm 7.12	22.5 \pm 12.4	76.4 \pm 20.3 *	178 \pm 23.9 ***	-14.2 \pm 9.59	14.8 \pm 4.30	28.7 \pm 13.7 *	66.7 \pm 7.91 ***	***								
Day 67	-34.7 \pm 15.6	13.6 \pm 11.7	-17.6 \pm 10.9	49.4 \pm 4.32 **	13.5 \pm 7.14	13.0 \pm 13.1	20.1 \pm 8.29	12.6 \pm 9.11	ns								
Day 68	-45.9 \pm 7.00	-27.0 \pm 7.22	-14.4 \pm 11.9	37.0 \pm 4.94 ***	-6.78 \pm 17.0	23.5 \pm 19.6	-2.01 \pm 5.76	27.6 \pm 17.8	*								
Day 69	9.20 \pm 3.39	7.12 \pm 2.45	10.6 \pm 5.08	53.5 \pm 4.92 **	22.0 \pm 2.13	25.0 \pm 3.26	20.8 \pm 0.75	30.0 \pm 0.30	ns								
Day 70	-10.4 \pm 11.2	-16.0 \pm 10.6	7.17 \pm 15.9	23.19 \pm 6.57	31.1 \pm 2.55	34.3 \pm 6.75	22.1 \pm 2.35	37.0 \pm 3.90	***								
Day 71	-8.14 \pm 4.86	-5.67 \pm 3.15	11.0 \pm 8.51	46.1 \pm 9.23 ***	26.1 \pm 14.8	11.1 \pm 15.3	40.8 \pm 14.6	47.3 \pm 6.78	*								
Day 75	-44.8 \pm 8.35	-14.4 \pm 8.33	-13.9 \pm 8.57	12.0 \pm 15.5 **	9.45 \pm 15.6	-17.1 \pm 17.6	-3.69 \pm 2.73	-0.97 \pm 5.68	ns								
Day 82	-18.7 \pm 8.49	-32.4 \pm 25.4	-0.28 \pm 8.77	31.4 \pm 18.0	14.6 \pm 13.6	5.86 \pm 6.46	33.8 \pm 10.4	6.45 \pm 9.40	ns								
Day 89	-1.06 \pm 15.0	-8.82 \pm 9.60	-5.24 \pm 7.21	21.7 \pm 10.2	-3.80 \pm 5.73	4.22 \pm 5.44	-5.60 \pm 9.43	16.0 \pm 14.7	ns								
Day 96	-17.0 \pm 10.0	-12.2 \pm 17.1	4.18 \pm 15.7	14.0 \pm 6.58	8.41 \pm 19.8	9.04 \pm 3.84	3.47 \pm 12.4	-15.3 \pm 11.5	ns								
Day 103	-9.15 \pm 4.90	-6.84 \pm 2.98	-1.12 \pm 3.65	16.0 \pm 3.25 **	25.1 \pm 3.02	21.2 \pm 2.25	19.1 \pm 1.50	24.6 \pm 2.31	***								
Day 110	3.67 \pm 3.65	-14.1 \pm 7.03	-13.4 \pm 8.26	1.55 \pm 8.26	43.1 \pm 8.92	58.3 \pm 12.6	41.5 \pm 5.10	42.0 \pm 1.64	***								
Day 124	-33.9 \pm 4.86	-33.4 \pm 12.9	-40.6 \pm 7.18	7.20 \pm 4.72	58.6 \pm 3.34	45.9 \pm 25.0	54.8 \pm 11.4	50.2 \pm 12.6	***								
Day 138	-21.7 \pm 9.22	-27.4 \pm 19.6	-39.8 \pm 8.54	-12.2 \pm 7.92	5.26 \pm 13.5	-4.61 \pm 2.39	1.30 \pm 4.13	-8.87 \pm 5.58	***								

Stars next to mean values represent significant difference of the values compared to control

Table. S3. CO₂ flux (mg CO₂ m⁻² h⁻¹) from soil expressed as night-time (16 h light condition) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	12.4 \pm 6.69	-4.77 \pm 2.69	65.6 \pm 7.36	72.5 \pm 11.2	-12.6 \pm 7.99	-19.9 \pm 7.87	-6.15 \pm 15.7	-9.87 \pm 3.28	-6.57 \pm 7.05	-9.10 \pm 2.15	ns						
Day 11	68.3 \pm 11.4	71.0 \pm 3.27	74.8 \pm 9.37	61.4 \pm 8.63	28.7 \pm 19.4	41.6 \pm 6.06	41.9 \pm 12.2	37.2 \pm 9.23	***								
Day 19	72.1 \pm 10.6	67.1 \pm 3.86	72.2 \pm 0.48	73.4 \pm 1.49	25.7 \pm 1.09	16.3 \pm 8.88	24.2 \pm 4.80	28.0 \pm 5.15	***								
Day 26	81.6 \pm 1.20	99.0 \pm 7.21	101 \pm 1.81	100 \pm 3.82	38.3 \pm 4.21	33.3 \pm 1.69	35.0 \pm 1.48	29.7 \pm 4.99	***								
Day 32	114 \pm 4.69	94.7 \pm 4.59	109 \pm 3.60	103 \pm 1.49	44.5 \pm 1.47	38.9 \pm 4.11	43.8 \pm 1.88	53.9 \pm 8.83	***								
Day 39	125 \pm 2.54	54.9 \pm 2.34 ***	84.0 \pm 3.22	76.8 \pm 4.75	19.2 \pm 2.36	12.2 \pm 1.17	19.6 \pm 2.26	13.9 \pm 5.09	***								
Day 46	80.6 \pm 2.87	33.4 \pm 2.59 **	54.4 \pm 3.19	62.9 \pm 5.41	20.8 \pm 0.61	16.3 \pm 3.79	24.2 \pm 7.57	18.8 \pm 1.04	***								
Day 54	57.7 \pm 2.23	21.9 \pm 2.18 ***	69.2 \pm 5.73	73.2 \pm 2.97	19.7 \pm 0.89	20.0 \pm 4.89	15.8 \pm 1.37	17.5 \pm 2.02	***								
Day 64	68.4 \pm 4.56	29.8 \pm 5.51 **	-9.85 \pm 4.55 **	35.0 \pm 10.6 ***	-2.17 \pm 2.82	-6.13 \pm 3.43	4.70 \pm 29.2	36.1 \pm 4.69	**								
Day 65	82.2 \pm 9.94	108.6 \pm 14.6	197 \pm 11.9 **	201 \pm 13.8 ***	31.9 \pm 7.41	19.4 \pm 9.78	44.3 \pm 2.41	61.1 \pm 4.50 *	***								
Day 66	103 \pm 3.04	62.1 \pm 2.37	82.9 \pm 8.56	69.2 \pm 1.54	18.9 \pm 1.66	18.6 \pm 1.48	21.5 \pm 3.27	34.4 \pm 7.43	***								
Day 67	58.4 \pm 10.4	54.8 \pm 3.56	55.4 \pm 7.47	40.9 \pm 2.06	17.6 \pm 1.67	18.1 \pm 2.77	19.2 \pm 2.46	28.1 \pm 2.88	***								
Day 68	59.2 \pm 3.27	88.8 \pm 6.44	85.0 \pm 3.91	64.4 \pm 0.62 **	31.0 \pm 9.80	30.6 \pm 1.39	39.4 \pm 5.21	24.0 \pm 11.1	***								
Day 69	94.4 \pm 4.33	42.0 \pm 18.6	56.0 \pm 6.62	56.5 \pm 12.78	43.7 \pm 16.3	26.2 \pm 5.23	34.8 \pm 7.26	24.1 \pm 7.13	*								
Day 70	58.8 \pm 12.1	75.7 \pm 12.9	90.5 \pm 16.7	68.8 \pm 15.5 *	51.4 \pm 2.73	45.5 \pm 4.21	32.0 \pm 13.7	52.1 \pm 7.83	**								
Day 71	37.6 \pm 7.14	73.1 \pm 4.42	61.9 \pm 1.76 **	38.0 \pm 2.29 ***	5.65 \pm 3.89	18.8 \pm 9.74	13.0 \pm 1.37	13.6 \pm 3.81	***								
Day 75	82.7 \pm 3.32	72.8 \pm 11.2	49.2 \pm 0.94	36.9 \pm 6.27	32.0 \pm 5.15	15.0 \pm 15.5	13.5 \pm 2.04	17.5 \pm 2.76	***								
Day 82	75.5 \pm 6.70	57.8 \pm 14.3	55.8 \pm 2.30	14.7 \pm 9.95 **	14.7 \pm 4.24	21.3 \pm 0.55	15.9 \pm 7.28	21.4 \pm 1.73	***								
Day 89	80.9 \pm 4.51	75.9 \pm 7.18	60.8 \pm 1.56	31.4 \pm 11.3 **	25.4 \pm 4.25	26.2 \pm 3.03	24.6 \pm 1.17	26.6 \pm 11.5	***								
Day 96	83.8 \pm 6.89	74.1 \pm 12.6	53.7 \pm 3.95	36.6 \pm 1.68 *	27.3 \pm 2.98	33.9 \pm 6.16	26.3 \pm 1.36	27.0 \pm 0.78	***								
Day 103	75.1 \pm 4.78	54.9 \pm 4.30	50.7 \pm 4.01 **	20.8 \pm 2.60 ***	42.7 \pm 1.63	27.8 \pm 12.3	38.9 \pm 5.36	42.1 \pm 9.44	*								
Day 110	74.3 \pm 2.77	100.8 \pm 7.44	73.8 \pm 11.6 **	67.2 \pm 2.40 **	67.0 \pm 2.17	59.6 \pm 0.25	63.6 \pm 3.88	62.6 \pm 1.88	***								
Day 124	119 \pm 1.72	44.9 \pm 5.37	28.0 \pm 12.6	-15.1 \pm 14.6 **	1.88 \pm 14.4	2.66 \pm 7.55	-16.3 \pm 11.6	-3.15 \pm 6.18	***								
Day 138	55.0 \pm 3.70																

Stars next to mean values represent significant difference of the values compared to control

Table. S4. CO₂ flux (mg CO₂ m⁻² h⁻¹) from soil expressed as total (24 h light condition) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	12.6 \pm 5.91	-10.6 \pm 3.71	-12.2 \pm 10.7	-13.3 \pm 5.94	-6.75 \pm 18.0	3.97 \pm 11.7	-3.61 \pm 8.49	-20.4 \pm 4.88	ns								
Day 11	107 \pm 13.2	99.5 \pm 14.5	120.72 \pm 16.7	116 \pm 23.0	45.5 \pm 12.7	46.2 \pm 10.8	35.3 \pm 15.0	74.3 \pm 12.2	***								
Day 19	40.9 \pm 7.33	53.9 \pm 14.4	58.2 \pm 6.09	52.1 \pm 14.7	49.3 \pm 18.8	54.2 \pm 9.31	41.0 \pm 22.7	48.3 \pm 14.3	ns								
Day 26	60.5 \pm 3.01	43.5 \pm 6.41	39.4 \pm 4.39	8.75 \pm 11.4	40.9 \pm 6.13	35.6 \pm 15.4	38.9 \pm 6.70	43.2 \pm 12.6	ns								
Day 32	83.0 \pm 9.17	78.0 \pm 7.40	69.4 \pm 6.85	44.7 \pm 11.4	61.5 \pm 8.71	53.9 \pm 2.25	53.7 \pm 2.90	47.4 \pm 5.84	*								
Day 39	112 \pm 9.39	70.5 \pm 8.73 **	87.5 \pm 5.18	74.2 \pm 5.53	83.7 \pm 3.86	70.5 \pm 3.18	86.4 \pm 7.11	78.7 \pm 9.00	ns								
Day 46	56.4 \pm 8.31	5.24 \pm 10.3 **	72.4 \pm 7.94	68.0 \pm 7.28	37.4 \pm 5.22	12.3 \pm 4.72	32.2 \pm 15.0	31.6 \pm 19.6	**								
Day 54	31.3 \pm 12.3	10.1 \pm 3.17	30.2 \pm 5.20	16.2 \pm 15.9	34.5 \pm 2.81	25.1 \pm 7.08	34.9 \pm 7.62	30.6 \pm 1.88	ns								
Day 64	58.6 \pm 8.93	5.54 \pm 8.59 **	45.0 \pm 8.62	49.9 \pm 3.92	15.0 \pm 8.42	18.8 \pm 10.2	36.3 \pm 6.66	25.0 \pm 5.49	**								
Day 65	41.7 \pm 8.46	36.6 \pm 17.6	-29.0 \pm 4.16 **	79.2 \pm 13.2	-5.60 \pm 7.78	-1.66 \pm 1.93	-1.75 \pm 27.5	50.1 \pm 7.90	*								
Day 66	90.9 \pm 6.32	131 \pm 8.40	274 \pm 31.5 ***	379 \pm 11.1 ***	17.8 \pm 16.4	34.2 \pm 13.3	73.1 \pm 12.9 *	128 \pm 5.53 ***	***								
Day 67	23.7 \pm 5.51	75.7 \pm 9.45 *	65.3 \pm 15.8	119 \pm 4.07 ***	32.4 \pm 7.29	31.5 \pm 14.6	41.6 \pm 10.6	47.0 \pm 13.0	***								
Day 68	13.3 \pm 4.89	27.9 \pm 8.57	41.0 \pm 14.6	77.9 \pm 6.10 ***	10.8 \pm 18.5	41.7 \pm 17.4	17.2 \pm 6.92	55.7 \pm 15.2	ns								
Day 69	104 \pm 7.11	95.9 \pm 7.65	95.6 \pm 6.53	118 \pm 4.50	53.0 \pm 9.51	55.7 \pm 2.40	60.2 \pm 5.38	54.1 \pm 11.4	***								
Day 70	48.4 \pm 14.3	26.0 \pm 29.2	63.2 \pm 16.6	79.7 \pm 17.7	74.8 \pm 16.2	60.5 \pm 6.61	56.9 \pm 5.96	61.1 \pm 7.31	ns								
Day 71	29.4 \pm 11.5	70.0 \pm 10.7	101 \pm 16.4 *	115 \pm 20.3 **	77.5 \pm 15.7	56.6 \pm 17.6	72.8 \pm 22.1	99.3 \pm 11.1	ns								
Day 75	37.9 \pm 5.33	58.7 \pm 8.81	48.0 \pm 9.32	50.1 \pm 17.4	15.1 \pm 14.3	1.75 \pm 21.5	9.33 \pm 2.04	12.6 \pm 5.32	***								
Day 82	56.8 \pm 14.9	40.4 \pm 29.8	48.9 \pm 9.07	68.4 \pm 15.8	46.7 \pm 13.2	20.9 \pm 19.0	47.2 \pm 10.9	24.0 \pm 11.6	ns								
Day 89	79.8 \pm 19.1	49.0 \pm 5.51	50.5 \pm 6.02	36.4 \pm 13.4	10.9 \pm 8.43	25.5 \pm 4.95	10.3 \pm 6.34	37.4 \pm 15.9	***								
Day 96	66.9 \pm 11.8	63.7 \pm 16.3	65.0 \pm 16.8	45.4 \pm 13.0	33.8 \pm 16.8	35.3 \pm 5.22	28.0 \pm 11.4	11.4 \pm 21.1	**								
Day 103	66.0 \pm 5.69	67.3 \pm 13.0	52.6 \pm 5.00	52.6 \pm 3.87	52.4 \pm 1.30	55.1 \pm 6.00	45.4 \pm 1.11	51.7 \pm 2.62	ns								
Day 110	77.9 \pm 6.29	40.7 \pm 10.2 *	37.3 \pm 4.60 *	22.3 \pm 10.0 **	85.8 \pm 8.66	86.2 \pm 17.8	80.4 \pm 7.95	84.1 \pm 10.8	***								
Day 124	85.1 \pm 5.27	67.4 \pm 15.7	33.2 \pm 9.98 *	74.4 \pm 4.09	126 \pm 4.18	105 \pm 24.9	118 \pm 10.9	113 \pm 13.8	***								
Day 138	33.3 \pm 11.1	17.6 \pm 20.0	-11.8 \pm 13.2	-27.3 \pm 22.5	7.14 \pm 25.0	-1.95 \pm 6.54	-15.0 \pm 13.2	-12.0 \pm 3.23	ns								

Stars next to mean values represent significant difference of the values compared to control

Table. S5. Cumulative CO₂ flux (mg CO₂ m⁻² h⁻¹) from soil expressed as daytime (8 h light condition), night-time (16 h dark condition), and total (24 h combined) from soil expressed as total (24 h light condition) at the end of the experiment. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day	-17.0 \pm	1.50	-18.8 \pm	4.2	-15.3 \pm	1.8	-0.92 \pm	3.16 **	22.1 \pm	3.21	18.0 \pm	2.45	20.6 \pm	1.16	19.5 \pm	1.92	***
Night	178 \pm	4.87	143 \pm	6.3 **	144 \pm	6.6 **	115 \pm	4.19 ***	60.2 \pm	5.61	55.5 \pm	2.05	54.9 \pm	6.84	62.1 \pm	3.91	***
Total	161 \pm	5.46	125 \pm	7.7 *	129 \pm	7.5 *	114 \pm	6.92 **	82.4 \pm	7.75	73.4 \pm	2.75	75.5 \pm	6.88	81.9 \pm	2.01	***

Stars next to mean values represent significant difference of the values compared to control

Table. S6. CH₄ flux (ng CH₄ m⁻² s⁻¹) from soil chemistry before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	-38.4 \pm 0.52	-44.1 \pm 5.17	-45.6 \pm 8.14	-45.5 \pm 3.61	-38.9 \pm 5.45	-43.3 \pm 6.94	-27.6 \pm 5.50	-46.6 \pm 3.96	ns								
Day 11	-2.78 \pm 9.93	-17.1 \pm 6.16	-6.63 \pm 4.21	-6.98 \pm 4.25	-2.78 \pm 6.25	1.82 \pm 9.73	7.39 \pm 5.44	*									
Day 19	-9.57 \pm 2.93	-5.58 \pm 3.12	-16.1 \pm 8.90	-11.8 \pm 2.22	3.75 \pm 8.38	12.0 \pm 11.0	4.18 \pm 7.96	*									
Day 26	-29.3 \pm 3.06	-16.2 \pm 4.90	-22.7 \pm 2.33	-20.4 \pm 6.90	-39.6 \pm 9.88	-27.1 \pm 8.92	-21.4 \pm 3.93	ns									
Day 32	-8.51 \pm 3.15	-10.1 \pm 4.16	-11.2 \pm 1.60	-3.66 \pm 8.94	-17.4 \pm 2.70	-20.6 \pm 5.81	-17.3 \pm 2.78	ns									
Day 39	13.4 \pm 7.82	9.41 \pm 5.27	3.20 \pm 4.46	-0.14 \pm 4.35	10.2 \pm 1.40	4.46 \pm 6.15	5.09 \pm 14.9	ns									
Day 46	2.99 \pm 1.13	9.44 \pm 4.04	15.7 \pm 2.04	18.9 \pm 2.58	19.2 \pm 0.42	22.5 \pm 4.54	16.6 \pm 2.95	***									
Day 54	-15.0 \pm 5.10	-6.83 \pm 6.07	10.1 \pm 3.07	19.2 \pm 2.54	14.5 \pm 7.14	14.0 \pm 2.79	18.2 \pm 1.97	***									
Day 64	2.62 \pm 5.14	-1.65 \pm 1.89	-11.3 \pm 2.86	-5.70 \pm 5.31	6.10 \pm 7.06	5.43 \pm 2.84	1.58 \pm 5.34	*									
Day 65	-42.3 \pm 9.38	-34.8 \pm 8.89	-34.3 \pm 2.27	-36.6 \pm 7.56	-49.8 \pm 7.58	-44.8 \pm 4.92	-60.4 \pm 7.55	ns									
Day 66	-8.71 \pm 3.38	16.8 \pm 8.61	-4.16 \pm 9.14	8.45 \pm 4.52	6.11 \pm 7.80	2.25 \pm 1.99	7.38 \pm 4.50	ns									
Day 67	-4.20 \pm 8.65	0.17 \pm 3.15	3.38 \pm 2.13	15.5 \pm 5.29	9.55 \pm 1.97	6.65 \pm 3.68	2.95 \pm 6.41	**									
Day 68	-25.7 \pm 5.24	-32.3 \pm 5.21	-31.2 \pm 4.82	-8.60 \pm 6.27	-10.0 \pm 3.46	-8.51 \pm 7.38	8.89 \pm 4.26	***									
Day 69	18.7 \pm 2.83	21.2 \pm 3.75	26.8 \pm 3.90	26.6 \pm 3.24	25.0 \pm 2.39	32.6 \pm 6.66	31.8 \pm 2.09	*									
Day 70	7.64 \pm 10.3	-4.84 \pm 4.61	-3.70 \pm 3.93	-7.35 \pm 3.69	-4.62 \pm 6.74	8.24 \pm 5.33	3.41 \pm 5.13	ns									
Day 71	-0.06 \pm 5.44	-5.12 \pm 3.59	-2.41 \pm 4.75	5.86 \pm 1.34	-29.3 \pm 13.3 *	-2.95 \pm 4.63	1.26 \pm 8.09	ns									
Day 75	-5.74 \pm 2.90	-6.05 \pm 3.98	-9.81 \pm 5.54	-14.7 \pm 5.52	-7.85 \pm 2.14	3.97 \pm 4.74	-5.91 \pm 12.1	ns									
Day 82	-6.10 \pm 5.46	-12.7 \pm 3.95	15.8 \pm 24.9	-21.5 \pm 37.9	-7.80 \pm 18.7	-2.20 \pm 3.91	0.52 \pm 5.22	ns									
Day 89	4.56 \pm 7.83	0.45 \pm 3.59	-20.3 \pm 12.7	-10.3 \pm 5.43	-2.11 \pm 5.25	-9.61 \pm 7.59	1.18 \pm 7.17	ns									
Day 96	-5.33 \pm 11.8	-4.66 \pm 2.91	-11.1 \pm 18.7	-8.45 \pm 7.64	-4.71 \pm 4.56	-21.8 \pm 18.0	5.73 \pm 16.1	ns									
Day 103	-4.52 \pm 5.75	-6.82 \pm 5.99	-8.91 \pm 2.36	-16.4 \pm 4.92	2.18 \pm 11.5	-12.5 \pm 2.50	-7.22 \pm 3.47	ns									
Day 110	-12.6 \pm 3.98	-4.51 \pm 3.97	-1.86 \pm 2.60	-15.1 \pm 11.8	4.44 \pm 4.44	-8.80 \pm 6.09		*									
Day 124	-17.3 \pm 2.90	-15.4 \pm 3.17	-7.29 \pm 1.80	5.76 \pm 5.36 **	11.5 \pm 3.23	16.0 \pm 2.23	14.0 \pm 1.76	15.5 \pm 3.01	**								
Day 138	-186 \pm 15.6	-224 \pm 28.8	-176 \pm 18.8	-163 \pm 42.0	-107 \pm 47.8	-122 \pm 40.6	-45.1 \pm 27.8	-35.9 \pm 31.4	***								

Stars next to mean values represent significant difference of the values compared to control

Table. S7. N₂O flux ($\mu\text{g N}_2\text{O m}^{-2} \text{h}^{-1}$) from soil chemistry before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	-6.69 \pm 7.54	-3.79 \pm 1.46	2.06 \pm 5.24	-1.44 \pm 2.45	10.4 \pm 1.86	8.90 \pm 2.99	9.12 \pm 4.74	0.28 \pm 3.53	**								
Day 11	9.06 \pm 2.87	-8.67 \pm 8.12	0.02 \pm 0.81	1.83 \pm 2.29	-2.75 \pm 2.05	1.62 \pm 2.31	-20.4 \pm 16.7	4.33 \pm 3.32	ns								
Day 19	5.66 \pm 1.51	6.52 \pm 1.54	6.40 \pm 3.88	10.1 \pm 1.00	4.81 \pm 12.7	3.24 \pm 5.05	9.80 \pm 9.08	3.88 \pm 6.49	ns								
Day 26	29.1 \pm 0.66	26.0 \pm 2.52	27.3 \pm 1.90	26.8 \pm 0.67	26.4 \pm 2.30	17.3 \pm 4.60	29.7 \pm 4.45	35.8 \pm 2.31	ns								
Day 32	-1.83 \pm 1.57	-2.07 \pm 1.06	-14.6 \pm 1.76	-9.44 \pm 2.46	35.3 \pm 3.82	33.4 \pm 1.53	31.1 \pm 1.99	23.9 \pm 3.69	***								
Day 39	-1.95 \pm 1.47	-0.08 \pm 5.52	-2.09 \pm 2.44	-2.29 \pm 1.72	-6.03 \pm 1.76	-1.10 \pm 1.43	-1.64 \pm 2.36	5.44 \pm 6.72	ns								
Day 46	-9.91 \pm 0.88	-9.10 \pm 2.38	-13.3 \pm 2.04	-21.2 \pm 2.21	-24.4 \pm 2.50	-29.2 \pm 1.91	-25.6 \pm 3.71	-16.7 \pm 2.26	***								
Day 54	-9.16 \pm 2.35	-11.8 \pm 1.54	-18.3 \pm 2.88	-31.0 \pm 2.53	-24.1 \pm 2.08	-25.2 \pm 3.82	-21.6 \pm 2.45	-2.65 \pm 12.9	ns								
Day 64	1.58 \pm 3.78	-8.31 \pm 7.93	-2.81 \pm 2.58	-21.6 \pm 7.37	-11.0 \pm 2.52	-4.64 \pm 3.54	-10.6 \pm 5.33	39.7 \pm 46.8	ns								
Day 65	-16.1 \pm 2.50	-20.8 \pm 2.26	-12.1 \pm 2.30	-14.2 \pm 0.82	-16.2 \pm 1.10	-15.9 \pm 1.12	-14.2 \pm 0.89	-17.4 \pm 4.79	ns								
Day 66	13.3 \pm 6.17	-2.05 \pm 3.68	-5.91 \pm 3.15	-15.8 \pm 9.65 *	3.25 \pm 2.50	-3.76 \pm 5.78	0.91 \pm 2.29	46.7 \pm 33.8	ns								
Day 67	-8.60 \pm 6.54	-4.25 \pm 3.48	3.25 \pm 1.72	9.85 \pm 2.33 *	2.46 \pm 1.75	0.64 \pm 2.22	20.0 \pm 4.42	342 \pm 144 *	*								
Day 68	-11.2 \pm 2.37	-7.65 \pm 1.17	-2.99 \pm 3.08	7.14 \pm 1.52 ***	8.83 \pm 2.42	0.78 \pm 2.71	2.00 \pm 1.55	389 \pm 236	ns								
Day 69	18.3 \pm 1.06	22.4 \pm 1.04	24.3 \pm 1.88	31.1 \pm 3.44 **	23.9 \pm 1.71	29.9 \pm 1.05	31.3 \pm 3.51	290 \pm 178	ns								
Day 70	-4.47 \pm 6.15	-23.2 \pm 10.37	-7.22 \pm 5.83	11.0 \pm 7.47	17.2 \pm 1.99	21.0 \pm 1.52	19.9 \pm 1.19	248 \pm 203	ns								
Day 71	-14.7 \pm 19.7	25.1 \pm 1.30	8.33 \pm 5.75	9.43 \pm 11.99	-5.01 \pm 24.5	26.5 \pm 2.04	16.0 \pm 2.43	195 \pm 138	ns								
Day 75	-9.28 \pm 2.78	-10.7 \pm 4.42	-12.5 \pm 3.42	-9.70 \pm 1.99	-14.5 \pm 2.54	-0.91 \pm 9.48	-2.61 \pm 1.01	46.6 \pm 24.8 *	*								
Day 82	12.6 \pm 1.01	24.6 \pm 9.19	10.9 \pm 2.21	2.40 \pm 2.82	-5.58 \pm 1.87	-8.92 \pm 13.29	-16.7 \pm 4.14	5.28 \pm 21.4	*								
Day 89	1.58 \pm 3.78	-8.31 \pm 7.93	-2.81 \pm 2.58	-4.18 \pm 8.36	-7.82 \pm 3.19	-7.30 \pm 3.42	-18.2 \pm 4.40	32.2 \pm 45.5	ns								
Day 96	-26.2 \pm 11.0	-1.51 \pm 3.41	-6.58 \pm 1.59	-19.7 \pm 6.08	-36.9 \pm 4.36	-30.6 \pm 3.21	-41.6 \pm 7.24	-21.8 \pm 9.92	***								
Day 103	0.14 \pm 2.33	5.37 \pm 1.78	2.87 \pm 0.68	-13.4 \pm 2.02 ***	-17.6 \pm 1.87	-5.65 \pm 7.13	-26.2 \pm 12.8	-11.7 \pm 2.20	**								
Day 110	-25.1 \pm 1.16	-29.2 \pm 2.62	-32.4 \pm 2.81	-38.1 \pm 0.77 **	-17.3 \pm 1.26	-25.7 \pm 5.20	-23.7 \pm 2.13	-21.7 \pm 5.05	***								
Day 124	6.28 \pm 1.52	4.21 \pm 1.82	2.93 \pm 2.06	-4.95 \pm 2.62 *	1.25 \pm 1.49	-0.79 \pm 1.35	-4.16 \pm 0.68	-3.74 \pm 1.78	**								
Day 138	7.70 \pm 1.53	-1.37 \pm 2.39 *	-4.36 \pm 1.80	2.53 \pm 2.56	9.65 \pm 8.46	16.0 \pm 1.59	22.9 \pm 10.1	30.1 \pm 20.5	**								

Stars next to mean values represent significant difference of the values compared to control

Table. S8. DOC in soil solution (mg kg DW⁻¹) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	52.5 \pm 2.96	46.5 \pm 1.64	50.9 \pm 0.95	53.3 \pm 3.54	55.8 \pm 1.45	56.8 \pm 1.82	55.1 \pm 3.03	49.1 \pm 4.32	ns								
Day 11	62.7 \pm 1.93	59.0 \pm 1.55	64.2 \pm 2.62	62.5 \pm 3.33	63.4 \pm 3.77	61.5 \pm 2.24	61.2 \pm 1.68	63.3 \pm 1.72	ns								
Day 19	63.3 \pm 2.87	83.2 \pm 8.06	65.5 \pm 1.26	68.4 \pm 0.86	52.5 \pm 2.48	54.4 \pm 4.49	64.0 \pm 3.89	64.3 \pm 3.79	***								
Day 26	97.6 \pm 2.69	94.0 \pm 2.18	104 \pm 6.49	108 \pm 2.52	116 \pm 25.1	122 \pm 8.51	86.2 \pm 4.63	105 \pm 6.63	ns								
Day 32	93.2 \pm 3.31	109 \pm 6.26	107 \pm 13.7	104 \pm 6.74	74.6 \pm 2.78	83.7 \pm 7.21	140 \pm 33.3	125 \pm 39.7	ns								
Day 39	87.4 \pm 5.15	110 \pm 5.90	81.1 \pm 4.08	93.4 \pm 6.88	84.4 \pm 6.56	86.2 \pm 2.38	80.5 \pm 4.40	92.0 \pm 3.63	ns								
Day 46	129 \pm 24.3	98.8 \pm 7.17	96.3 \pm 6.44	93.7 \pm 6.14	67.2 \pm 3.65	82.2 \pm 12.5	82.9 \pm 15.6	65.1 \pm 6.00	**								
Day 54	59.3 \pm 3.26	76.5 \pm 6.47	70.5 \pm 4.16	76.8 \pm 2.86	53.2 \pm 0.73	54.2 \pm 1.57	49.7 \pm 1.01	50.7 \pm 2.24	***								
Day 64	101 \pm 8.28	127 \pm 12.2	123 \pm 7.98	127 \pm 8.48	70.8 \pm 5.01	111 \pm 24.6	87.0 \pm 10.2	85.9 \pm 15.6	**								
Day 66	95.3 \pm 12.6	120 \pm 2.79	113 \pm 8.24	124 \pm 8.09	79.1 \pm 6.35	73.6 \pm 3.57	68.6 \pm 6.17	70.5 \pm 4.51	***								
Day 67	86.1 \pm 4.87	81.4 \pm 5.43	77.7 \pm 8.79	103 \pm 12.1	43.2 \pm 3.14	75.2 \pm 5.87 **	57.1 \pm 3.49	74.3 \pm 7.85 **	***								
Day 68	80.9 \pm 5.48	87.0 \pm 10.9	81.0 \pm 8.55	77.8 \pm 1.97	57.4 \pm 3.80	74.3 \pm 3.68 *	53.9 \pm 4.45	55.9 \pm 4.67	***								
Day 69	71.5 \pm 4.27	71.9 \pm 3.69	68.2 \pm 2.50	72.2 \pm 1.95	50.7 \pm 5.20	67.1 \pm 14.1	51.2 \pm 3.30	55.1 \pm 3.12	**								
Day 70	80.3 \pm 6.48	63.2 \pm 4.25	65.5 \pm 3.22	64.7 \pm 1.73	48.5 \pm 4.85	51.1 \pm 4.60	42.5 \pm 2.21	51.7 \pm 2.08	***								
Day 71	104 \pm 10.8	113 \pm 10.3	123 \pm 12.7	116 \pm 16.1	61.8 \pm 16.1	72.0 \pm 4.78	75.4 \pm 8.21	71.1 \pm 3.77	***								
Day 75	59.1 \pm 2.21	67.7 \pm 5.61	62.3 \pm 5.09	49.7 \pm 4.25	35.9 \pm 0.82	40.9 \pm 2.75	43.8 \pm 2.04	44.6 \pm 3.19	***								
Day 82	55.9 \pm 0.43	54.8 \pm 1.89	67.3 \pm 4.72	53.6 \pm 2.08	44.0 \pm 1.86	44.3 \pm 5.00	43.5 \pm 1.23	46.3 \pm 1.55	***								
Day 89	78.7 \pm 8.33	71.2 \pm 4.35	78.4 \pm 1.83	65.8 \pm 3.32	55.3 \pm 1.93	68.3 \pm 2.20	57.7 \pm 4.23	79.0 \pm 6.67 **	*								
Day 96	60.3 \pm 2.55	66.0 \pm 5.86	63.8 \pm 2.26	45.1 \pm 1.49	29.2 \pm 1.33	36.7 \pm 2.39	36.6 \pm 3.88	37.2 \pm 5.29	***								
Day 103	90.2 \pm 22.7	51.9 \pm 3.32	51.3 \pm 2.22	54.2 \pm 4.45	43.7 \pm 4.16	36.8 \pm 5.00	38.6 \pm 1.46	46.9 \pm 4.62	**								
Day 110	64.0 \pm 5.96	61.8 \pm 2.75	55.3 \pm 13.6	50.3 \pm 12.7	38.3 \pm 1.38	39.7 \pm 2.24	44.7 \pm 0.50	42.0 \pm 2.54	**								
Day 124	80.5 \pm 11.5	76.8 \pm 7.19	121 \pm 6.61 *	78.8 \pm 10.7	41.5 \pm 4.45	63.2 \pm 1.76 *	59.6 \pm 7.26	52.1 \pm 3.58	**								
Day 138	116 \pm 5.33	112 \pm 9.08	148 \pm 14.5	94.0 \pm 6.97	81.9 \pm 2.38	27.1 \pm 14.9 *	118 \pm 17.0	81.8 \pm 4.52	***								

Stars next to mean values represent significant difference of the values compared to control

Table. S9. TDN in soil solution (mg kg DW⁻¹) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA	
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect	
Day 1	32.0 \pm 3.20	31.5 \pm 2.95	35.1 \pm 5.00	42.6 \pm 5.23	37.5 \pm 2.04	37.6 \pm 1.40	33.0 \pm 1.98	40.3 \pm 4.80									ns	
Day 11	68.4 \pm 4.83	68.7 \pm 12.6	56.4 \pm 8.72	61.1 \pm 4.56	83.9 \pm 7.18	78.3 \pm 6.65	93.0 \pm 4.39	90.1 \pm 9.11										***
Day 19	48.9 \pm 19.2	65.7 \pm 22.2	84.7 \pm 20.4	79.0 \pm 16.7	91.8 \pm 7.58	122 \pm 19.6	157 \pm 17.9	169 \pm 13.3										***
Day 26	61.4 \pm 8.75	39.7 \pm 3.78	53.9 \pm 4.19	54.9 \pm 5.42	149 \pm 20.2	144 \pm 21.3	132 \pm 6.27	149 \pm 32.9										***
Day 32	39.4 \pm 4.54	46.4 \pm 6.51	44.6 \pm 6.35	52.9 \pm 6.06	135 \pm 9.31	136 \pm 18.9	154 \pm 5.34	190 \pm 16.0										***
Day 39	34.7 \pm 4.56	43.9 \pm 5.12	31.6 \pm 6.42	37.1 \pm 4.07	142 \pm 16.2	170 \pm 22.5	137 \pm 7.86	150 \pm 12.3										***
Day 46	44.1 \pm 10.6	53.9 \pm 4.95	38.0 \pm 1.06	36.6 \pm 5.15	192 \pm 22.9	218 \pm 20.6	207 \pm 15.9	199 \pm 14.8										***
Day 54	30.7 \pm 4.47	34.1 \pm 3.47	19.1 \pm 3.78	23.0 \pm 4.24	181 \pm 21.6	182 \pm 22.5	177 \pm 19.5	172 \pm 13.1										***
Day 64	37.5 \pm 6.08	50.3 \pm 8.15	42.2 \pm 5.76	40.7 \pm 1.59	206 \pm 33.6	206 \pm 30.8	200 \pm 16.7	191 \pm 26.8										***
Day 66	29.8 \pm 4.59	59.8 \pm 2.15 *	36.7 \pm 5.13	45.1 \pm 4.62	195 \pm 24.2	177 \pm 13.4	241 \pm 24.8	172 \pm 15.4										***
Day 67	50.0 \pm 4.72	81.3 \pm 14.1	58.4 \pm 8.98	87.7 \pm 23.2	276 \pm 24.4	250 \pm 52.7	284 \pm 13.0	312 \pm 16.3										***
Day 68	32.1 \pm 6.03	52.2 \pm 11.6	35.2 \pm 4.24	50.6 \pm 1.98	270 \pm 20.8	250 \pm 20.7	233 \pm 31.8	202 \pm 34.8										***
Day 69	20.1 \pm 5.60	41.2 \pm 4.56 *	37.2 \pm 3.31	59.7 \pm 4.46 ***	306 \pm 37.9	292 \pm 28.5	310 \pm 18.9	294 \pm 31.4										***
Day 70	31.0 \pm 10.7	43.1 \pm 8.59	37.2 \pm 7.66	68.4 \pm 4.04 *	204 \pm 27.4	272 \pm 10.7	184 \pm 25.2	255 \pm 23.1										***
Day 71	29.5 \pm 3.27	71.0 \pm 8.07 *	63.8 \pm 5.80	126 \pm 16.4 ***	341 \pm 97.5	378 \pm 28.6	432 \pm 64.2	264 \pm 31.6										***
Day 75	26.0 \pm 7.53	54.8 \pm 20.4	32.3 \pm 8.41	63.8 \pm 5.34	296 \pm 65.8	214 \pm 17.7	301 \pm 20.0	269 \pm 27.3										***
Day 82	21.5 \pm 1.62	32.9 \pm 8.98	25.0 \pm 5.02	114 \pm 16.6 ***	322 \pm 61.1	306 \pm 19.0	311 \pm 51.6	365 \pm 15.0										***
Day 89	32.9 \pm 13.2	34.8 \pm 7.66	32.4 \pm 4.46	121 \pm 17.2 ***	420 \pm 29.6	302 \pm 77.4	467 \pm 23.9	430 \pm 85.1										***
Day 96	21.0 \pm 6.73	23.3 \pm 8.55	20.2 \pm 2.43	112 \pm 12.5 ***	251 \pm 34.2	283 \pm 43.2	335 \pm 48.2	317 \pm 54.8										***
Day 103	35.7 \pm 11.7	36.1 \pm 13.7	27.5 \pm 7.07	143 \pm 34.3 *	356 \pm 26.4	402 \pm 51.5	293 \pm 35.8	316 \pm 54.4										***
Day 110	23.6 \pm 5.09	21.2 \pm 2.93	19.9 \pm 6.35	106 \pm 15.8 ***	195 \pm 22.4	300 \pm 40.4	280 \pm 47.6	284 \pm 46.9										***
Day 124	42.9 \pm 10.7	28.0 \pm 10.5	53.3 \pm 8.03	167 \pm 26.8 ***	220 \pm 42.7	340 \pm 64.3	265 \pm 5.66	324 \pm 69.5										***
Day 138	47.2 \pm 8.26	36.5 \pm 3.76	64.6 \pm 7.40	117 \pm 15.6 **	251 \pm 12.4	217 \pm 0.00	377 \pm 101	353 \pm 40.1										***

Stars next to mean values represent significant difference of the values compared to control

Table. S10. NH_4^+ in soil solution (mg kg DW^{-1}) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	0.03 \pm 0.01	0.04 \pm 0.03	0.02 \pm 0.02	0.04 \pm 0.03	0.01 \pm 0.00	0.03 \pm 0.03	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	0.00	0.03 \pm 0.03	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	ns	
Day 11	0.57 \pm 0.18	0.16 \pm 0.08	0.46 \pm 0.19	0.15 \pm 0.07	0.25 \pm 0.21	0.18 \pm 0.10	0.04 \pm 0.03	0.05 \pm 0.05	0.05 \pm 0.03	0.03	0.12 \pm 0.08	0.01 \pm 0.00	0.03 \pm 0.02	0.03 \pm 0.02	0.03 \pm 0.02	*	
Day 19	0.06 \pm 0.03	0.34 \pm 0.20	0.08 \pm 0.07	0.20 \pm 0.16	0.32 \pm 0.18	0.12 \pm 0.08	0.01 \pm 0.00	0.03 \pm 0.02	0.01 \pm 0.00	0.00	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	ns	
Day 26	0.25 \pm 0.09	0.07 \pm 0.01	0.04 \pm 0.02	0.10 \pm 0.07	0.02 \pm 0.01	0.14 \pm 0.05	0.15 \pm 0.06	0.09 \pm 0.01	0.02 \pm 0.01	0.01	0.14 \pm 0.05	0.15 \pm 0.06	0.09 \pm 0.01	0.09 \pm 0.01	0.09 \pm 0.01	ns	
Day 32	0.02 \pm 0.02	0.02 \pm 0.02	0.05 \pm 0.02	0.02 \pm 0.02	0.04 \pm 0.03	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	0.04 \pm 0.03	0.03	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	ns	
Day 39	0.01 \pm 0.00	0.04 \pm 0.02	0.13 \pm 0.12	0.05 \pm 0.04	0.05 \pm 0.03	0.15 \pm 0.05	0.03 \pm 0.02	0.02 \pm 0.01	0.05 \pm 0.03	0.03	0.15 \pm 0.05	0.03 \pm 0.02	0.02 \pm 0.01	0.02 \pm 0.01	0.02 \pm 0.01	ns	
Day 46	0.30 \pm 0.14	0.19 \pm 0.06	0.11 \pm 0.04	0.09 \pm 0.03	0.19 \pm 0.12	0.12 \pm 0.08	0.01 \pm 0.00	0.06 \pm 0.06	0.19 \pm 0.12	0.12	0.12 \pm 0.08	0.01 \pm 0.00	0.06 \pm 0.06	0.06 \pm 0.06	0.06 \pm 0.06	ns	
Day 54	0.07 \pm 0.05	0.59 \pm 0.20	0.40 \pm 0.24	0.48 \pm 0.23	0.12 \pm 0.06	0.35 \pm 0.06	0.14 \pm 0.09	0.09 \pm 0.05	0.12 \pm 0.06	0.06	0.35 \pm 0.06	0.14 \pm 0.09	0.09 \pm 0.05	0.09 \pm 0.05	0.09 \pm 0.05	ns	
Day 64	0.27 \pm 0.08	0.26 \pm 0.11	0.14 \pm 0.14	0.15 \pm 0.08	0.10 \pm 0.06	0.71 \pm 0.32	0.03 \pm 0.02	0.08 \pm 0.05	0.10 \pm 0.06	0.06	0.71 \pm 0.32	0.03 \pm 0.02	0.08 \pm 0.05	0.08 \pm 0.05	0.08 \pm 0.05	ns	
Day 66	0.04 \pm 0.02	1.05 \pm 0.35 *	0.15 \pm 0.10	0.15 \pm 0.11	0.17 \pm 0.07	1.71 \pm 0.17 ***	0.37 \pm 0.12	0.57 \pm 0.25	0.17 \pm 0.07	0.17 ***	0.37 \pm 0.12	0.37 \pm 0.12	0.57 \pm 0.25	0.57 \pm 0.25	0.57 \pm 0.25	**	
Day 67	0.12 \pm 0.01	0.49 \pm 0.14	0.40 \pm 0.11	0.57 \pm 0.11	0.05 \pm 0.04	1.63 \pm 0.44 **	0.36 \pm 0.06	1.15 \pm 0.32	0.05 \pm 0.04	0.44 **	0.36 \pm 0.06	0.36 \pm 0.06	1.15 \pm 0.32	1.15 \pm 0.32	1.15 \pm 0.32	*	
Day 68	0.16 \pm 0.10	0.12 \pm 0.04	0.08 \pm 0.03	0.07 \pm 0.04	0.15 \pm 0.10	2.31 \pm 0.98 *	0.06 \pm 0.03	0.37 \pm 0.08	0.15 \pm 0.10	0.98 *	0.06 \pm 0.03	0.06 \pm 0.03	0.37 \pm 0.08	0.37 \pm 0.08	0.37 \pm 0.08	**	
Day 69	0.07 \pm 0.07	0.08 \pm 0.08	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	0.80 \pm 0.16 **	0.23 \pm 0.00	0.17 \pm 0.03	0.01 \pm 0.00	0.16 **	0.23 \pm 0.00	0.23 \pm 0.00	0.17 \pm 0.03	0.17 \pm 0.03	0.17 \pm 0.03	***	
Day 70	0.51 \pm 0.27	0.32 \pm 0.11	0.05 \pm 0.03	0.07 \pm 0.04	0.14 \pm 0.08	2.64 \pm 1.03 *	0.16 \pm 0.06	0.19 \pm 0.02	0.14 \pm 0.08	1.03 *	0.16 \pm 0.06	0.16 \pm 0.06	0.19 \pm 0.02	0.19 \pm 0.02	0.19 \pm 0.02	ns	
Day 71	0.02 \pm 0.02	0.22 \pm 0.07 *	0.03 \pm 0.02	0.14 \pm 0.02	0.16 \pm 0.06	3.03 \pm 1.36	0.46 \pm 0.14	0.94 \pm 0.35	0.16 \pm 0.06	0.06	3.03 \pm 1.36	0.46 \pm 0.14	0.94 \pm 0.35	0.94 \pm 0.35	0.94 \pm 0.35	**	
Day 75	0.11 \pm 0.05	0.39 \pm 0.06 *	0.13 \pm 0.08	0.06 \pm 0.04	0.01 \pm 0.00	0.62 \pm 0.24	0.26 \pm 0.15	0.83 \pm 0.45	0.01 \pm 0.00	0.00	0.62 \pm 0.24	0.26 \pm 0.15	0.83 \pm 0.45	0.83 \pm 0.45	0.83 \pm 0.45	ns	
Day 82	0.35 \pm 0.17	0.12 \pm 0.07	0.33 \pm 0.09	0.04 \pm 0.04	0.06 \pm 0.02	1.40 \pm 0.53	0.23 \pm 0.13	0.82 \pm 0.62	0.06 \pm 0.02	0.02	1.40 \pm 0.53	0.23 \pm 0.13	0.82 \pm 0.62	0.82 \pm 0.62	0.82 \pm 0.62	ns	
Day 89	0.06 \pm 0.05	0.14 \pm 0.11	0.03 \pm 0.02	0.01 \pm 0.00	0.01 \pm 0.00	0.36 \pm 0.22	0.17 \pm 0.07	0.34 \pm 0.21	0.01 \pm 0.00	0.00	0.36 \pm 0.22	0.17 \pm 0.07	0.34 \pm 0.21	0.34 \pm 0.21	0.34 \pm 0.21	ns	
Day 96	0.06 \pm 0.03	0.01 \pm 0.00	0.01 \pm 0.00	0.08 \pm 0.07	0.01 \pm 0.00	0.30 \pm 0.13	0.60 \pm 0.59	0.30 \pm 0.07	0.01 \pm 0.00	0.00	0.30 \pm 0.13	0.60 \pm 0.59	0.30 \pm 0.07	0.30 \pm 0.07	0.30 \pm 0.07	ns	
Day 103	0.07 \pm 0.07	0.03 \pm 0.02	0.01 \pm 0.00	0.16 \pm 0.15	0.10 \pm 0.06	0.18 \pm 0.10	0.13 \pm 0.12	0.01 \pm 0.00	0.10 \pm 0.06	0.06	0.18 \pm 0.10	0.13 \pm 0.12	0.01 \pm 0.00	0.01 \pm 0.00	0.01 \pm 0.00	ns	
Day 110	0.04 \pm 0.02	0.19 \pm 0.11	0.01 \pm 0.00	0.02 \pm 0.01	0.12 \pm 0.07	0.19 \pm 0.11	0.10 \pm 0.05	0.14 \pm 0.13	0.12 \pm 0.07	0.07	0.19 \pm 0.11	0.10 \pm 0.05	0.14 \pm 0.13	0.14 \pm 0.13	0.14 \pm 0.13	ns	
Day 124	0.01 \pm 0.00	0.04 \pm 0.04	0.05 \pm 0.05	0.03 \pm 0.02	0.01 \pm 0.00	0.61 \pm 0.43	0.15 \pm 0.09	1.88 \pm 0.71 *	0.01 \pm 0.00	0.00	0.61 \pm 0.43	0.15 \pm 0.09	1.88 \pm 0.71 *	0.71 *	1.88 \pm 0.71 *	**	
Day 138	0.57 \pm 0.29	0.27 \pm 0.12	0.39 \pm 0.10	0.13 \pm 0.10	0.38 \pm 0.21	1.26 \pm 0.90	2.26 \pm 0.38	2.93 \pm 0.52	0.38 \pm 0.21	0.21	1.26 \pm 0.90	2.26 \pm 0.38	2.93 \pm 0.52	2.93 \pm 0.52	2.93 \pm 0.52	***	

Stars next to mean values represent significant difference of the values compared to control

Table. S11. NO₃⁻ in soil solution (mg kg DW⁻¹) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	26.1 \pm 1.40		24.1 \pm 1.83		25.4 \pm 0.82		27.6 \pm 4.31		28.3 \pm 2.48		24.8 \pm 0.26		23.7 \pm 0.80		23.9 \pm 0.75	ns	
Day 11	42.6 \pm 5.30		41.5 \pm 11.2		29.5 \pm 8.04		41.2 \pm 6.63		55.4 \pm 1.71		56.2 \pm 4.26		64.4 \pm 4.79		68.0 \pm 7.10	***	
Day 19	41.2 \pm 15.2		26.6 \pm 12.5		63.6 \pm 17.9		59.1 \pm 10.3		80.8 \pm 7.69		100 \pm 13.0		123 \pm 10.1		124 \pm 8.33	***	
Day 26	25.5 \pm 3.94		10.6 \pm 1.76		10.3 \pm 2.72		20.4 \pm 3.77		87.2 \pm 2.01		112 \pm 18.1		71.5 \pm 21.2		118 \pm 9.73	***	
Day 32	8.04 \pm 1.13		3.84 \pm 1.34		3.85 \pm 1.35		17.0 \pm 5.54		74.2 \pm 21.6		81.8 \pm 6.69		111 \pm 12.9		114 \pm 15.8	***	
Day 39	3.43 \pm 1.07		3.18 \pm 0.48		1.89 \pm 0.65		4.50 \pm 2.47		105 \pm 10.7		135 \pm 18.5		107 \pm 3.96		122 \pm 9.70	***	
Day 46	6.19 \pm 1.49		11.5 \pm 0.82 *		3.19 \pm 0.22		4.93 \pm 1.40		131 \pm 19.3		153 \pm 18.2		145 \pm 13.4		134 \pm 11.1	***	
Day 54	6.12 \pm 5.23		7.51 \pm 1.24		0.57 \pm 0.06		0.79 \pm 0.47		143 \pm 15.8		145 \pm 17.6		141 \pm 15.7		135 \pm 9.38	***	
Day 64	1.51 \pm 0.34		16.7 \pm 6.00 *		2.08 \pm 0.35		1.52 \pm 0.28		190 \pm 35.7		172 \pm 15.5		168 \pm 20.1		170 \pm 23.6	***	
Day 66	4.72 \pm 0.40		12.5 \pm 0.29		5.21 \pm 0.65		10.3 \pm 4.57		178 \pm 21.6		161 \pm 11.4		217 \pm 19.5		170 \pm 5.98	***	
Day 67	3.39 \pm 0.60		14.8 \pm 3.58 **		8.89 \pm 1.44		17.2 \pm 0.55 **		206 \pm 15.6		182 \pm 30.8		211 \pm 8.68		200 \pm 12.4	***	
Day 68	3.97 \pm 1.46		19.4 \pm 4.47 *		10.7 \pm 0.91		26.3 \pm 1.44 ***		227 \pm 16.2		203 \pm 19.4		202 \pm 12.8		196 \pm 19.3	***	
Day 69	1.66 \pm 0.30		18.1 \pm 2.64		21.8 \pm 12.6		31.1 \pm 2.61 *		248 \pm 29.0		229 \pm 18.6		245 \pm 15.9		233 \pm 22.9	***	
Day 70	6.08 \pm 2.81		17.4 \pm 5.23		10.5 \pm 4.10		35.8 \pm 2.74 ***		161 \pm 22.4		214 \pm 14.7		148 \pm 21.1		204 \pm 19.7	***	
Day 71	4.27 \pm 1.05		28.0 \pm 3.77 **		13.9 \pm 3.50		59.5 \pm 4.58 ***		288 \pm 58.5		257 \pm 18.8		272 \pm 37.9		258 \pm 61.7	***	
Day 75	3.57 \pm 1.38		18.9 \pm 6.67		9.23 \pm 1.03		49.6 \pm 3.96 ***		262 \pm 46.3		197 \pm 24.0		241 \pm 18.3		238 \pm 18.8	***	
Day 82	8.23 \pm 2.65		13.6 \pm 5.12		9.04 \pm 4.68		85.7 \pm 11.5 ***		256 \pm 47.5		235 \pm 11.4		293 \pm 59.6		355 \pm 87.7	***	
Day 89	2.75 \pm 0.19		7.8 \pm 2.13		5.23 \pm 1.10		83.7 \pm 14.0 ***		326 \pm 26.4		285 \pm 73.4		376 \pm 10.0		360 \pm 59.2	***	
Day 96	3.07 \pm 0.17		0.53 \pm 0.46		ND		81.3 \pm 8.93 *		246 \pm 5.67		304 \pm 22.8		343 \pm 51.2		317 \pm 15.5	***	
Day 103	ND		7.09 \pm 4.94		ND		101 \pm 30.2		305 \pm 59.0		296 \pm 39.6		310 \pm 93.7		235 \pm 39.3	***	
Day 110	2.56 \pm 0.60		ND		ND		68.7 \pm 15.5		151 \pm 17.6		234 \pm 30.7		217 \pm 35.8		221 \pm 34.4	***	
Day 124	ND		9.51		7.37		8.88		6.72		110 \pm 17.2		165 \pm 33.7		269 \pm 55.7	***	
Day 138	2.98 \pm 0.86		ND		ND		79.8 \pm 12.5 ***		187 \pm 13.0		288 \pm 73.4		239 \pm 18.7		344 \pm 104	***	

Stars next to mean values represent significant difference of the values compared to control

ND=not detected

Table. S12. PO₄³⁻ in soil solution (mg kg DW⁻¹) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	1.06 \pm 0.08		1.00 \pm 0.02		0.95 \pm 0.05		0.92 \pm 0.05		1.09 \pm 0.09		1.04 \pm 0.11		0.85 \pm 0.05		0.89 \pm 0.07		ns
Day 11	0.79 \pm 0.03		0.76 \pm 0.09		0.79 \pm 0.05		0.73 \pm 0.08		0.92 \pm 0.24		0.66 \pm 0.07		0.59 \pm 0.03		0.56 \pm 0.07		ns
Day 19	0.50 \pm 0.10		0.56 \pm 0.05		0.47 \pm 0.06		0.37 \pm 0.04		0.44 \pm 0.03		0.37 \pm 0.06		0.29 \pm 0.01		0.30 \pm 0.02		**
Day 26	0.63 \pm 0.03		0.83 \pm 0.11		0.98 \pm 0.18		1.17 \pm 0.38		0.41 \pm 0.03		0.38 \pm 0.05		0.36 \pm 0.02		0.39 \pm 0.01		***
Day 32	0.61 \pm 0.21		0.79 \pm 0.04		0.73 \pm 0.02		0.66 \pm 0.05		0.42 \pm 0.04		0.41 \pm 0.03		0.36 \pm 0.02		0.36 \pm 0.01		***
Day 39	0.91 \pm 0.06		0.91 \pm 0.09		0.87 \pm 0.06		0.71 \pm 0.06		0.42 \pm 0.03		0.38 \pm 0.01		0.35 \pm 0.03		0.47 \pm 0.12		***
Day 46	0.86 \pm 0.03		0.97 \pm 0.22		0.99 \pm 0.05		0.99 \pm 0.08		0.20 \pm 0.06		0.12 \pm 0.05		0.09 \pm 0.03		0.11 \pm 0.04		***
Day 54	0.84 \pm 0.02		1.02 \pm 0.14		1.11 \pm 0.07		0.94 \pm 0.03		0.18 \pm 0.02		0.13 \pm 0.04		0.13 \pm 0.03		0.07 \pm 0.01		***
Day 64	1.26 \pm 0.27		1.17 \pm 0.20		0.99 \pm 0.08		0.83 \pm 0.05		0.22 \pm 0.02		0.25 \pm 0.00		0.28 \pm 0.03		0.32 \pm 0.03		***
Day 66	0.74 \pm 0.03		1.38 \pm 0.16 **		0.97 \pm 0.12		1.21 \pm 0.03 *		0.24 \pm 0.01		0.24 \pm 0.02		0.23 \pm 0.03		0.28 \pm 0.02		***
Day 67	1.44 \pm 0.09		1.45 \pm 0.11		1.24 \pm 0.05		1.48 \pm 0.03		0.30 \pm 0.04		0.52 \pm 0.13		0.28 \pm 0.04		0.30 \pm 0.08		***
Day 68	1.17 \pm 0.13		1.23 \pm 0.22		0.92 \pm 0.08		0.74 \pm 0.03		0.20 \pm 0.03		0.18 \pm 0.09		0.20 \pm 0.03		ND		***
Day 69	0.75 \pm 0.10		0.71 \pm 0.09		0.99 \pm 0.46		0.55 \pm 0.05		0.09 \pm 0.02		0.14 \pm 0.01		0.09 \pm 0.02		0.12 \pm 0.01		***
Day 70	0.59 \pm 0.14		0.51 \pm 0.17		0.57 \pm 0.11		0.51 \pm 0.03		0.10 \pm 0.02		0.12 \pm 0.05		0.11 \pm 0.02		0.12 \pm		***
Day 71	1.38 \pm 0.12		1.21 \pm 0.06		1.32 \pm 0.08		1.26 \pm 0.32		1.32 \pm 1.01		0.67 \pm 0.34		0.32 \pm 0.05		0.43 \pm 0.05		*
Day 75	0.60 \pm 0.19		0.66 \pm 0.09		0.36 \pm 0.17		0.56 \pm 0.05		0.08 \pm 0.00		ND		0.08 \pm 0.02		0.08 \pm 0.01		***
Day 82	1.25 \pm 0.69		0.68 \pm 0.10		0.54 \pm 0.08		0.26 \pm 0.03		0.09 \pm 0.03		0.13 \pm 0.02		0.08 \pm 0.03		0.08 \pm 0.05		*
Day 89	0.25 \pm 0.13		0.40 \pm 0.13		0.38 \pm 0.08		0.16 \pm 0.10		ND		ND		ND		ND		ns
Day 96	0.44 \pm 0.21		0.16 \pm 0.09		0.25 \pm 0.11		0.21 \pm 0.00		ND		0.09 \pm 0.03		0.11 \pm 0.09		0.22 \pm 0.12		ns
Day 103	0.50 \pm 0.16		0.73 \pm 0.07		0.27 \pm 0.13		ND		ND		0.09 \pm 0.03		ND		ND		***
Day 110	0.60 \pm 0.24		0.47 \pm 0.15		0.23 \pm 0.11		ND		ND		ND		ND		0.22 \pm		ns
Day 124	0.39 \pm 0.04		0.56 \pm 0.06		0.22 \pm 0.08		0.08 \pm 0.02		0.06 \pm 0.03		0.04 \pm 0.01		0.04 \pm 0.01		0.09 \pm 0.05		***
Day 138	0.78 \pm 0.18		0.70 \pm 0.06		0.59 \pm 0.09		0.37 \pm 0.07		0.31 \pm 0.04		0.22 \pm 0.08		0.17 \pm 0.08		ND		***

Stars next to mean values represent significant difference of the values compared to control

ND=not detected

Table. S13. Ca²⁺ in soil solution (mg kg DW⁻¹) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	12.7 \pm 1.07	17.1 \pm 1.79	17.4 \pm 1.38	22.6 \pm 2.14	26.9 \pm 0.92	26.8 \pm 1.90	25.4 \pm 0.49	26.0 \pm 1.78	***								
Day 11	52.1 \pm 1.92	44.6 \pm 2.40	38.8 \pm 3.18	40.2 \pm 2.16	44.7 \pm 2.94	43.3 \pm 1.17	44.6 \pm 1.83	52.0 \pm 7.28	ns								
Day 19	69.2 \pm 11.5	56.2 \pm 6.70	66.8 \pm 8.83	69.5 \pm 4.91	71.7 \pm 4.10	79.2 \pm 4.66	87.0 \pm 3.73	87.9 \pm 2.91	**								
Day 26	28.3 \pm 3.03	19.5 \pm 0.88	18.3 \pm 1.78	25.3 \pm 2.45	39.2 \pm 2.14	51.7 \pm 4.73	48.9 \pm 1.23	56.6 \pm 2.83	***								
Day 32	13.2 \pm 1.24	9.98 \pm 1.50	14.5 \pm 3.97	16.8 \pm 1.04	34.7 \pm 2.04	47.0 \pm 3.96	46.4 \pm 1.52	52.4 \pm 3.61	***								
Day 39	5.57 \pm 1.08	9.22 \pm 0.68	7.39 \pm 0.94	11.2 \pm 2.27	42.0 \pm 4.51	54.9 \pm 3.70	49.3 \pm 1.49	52.2 \pm 2.74	***								
Day 46	5.75 \pm 1.29	16.1 \pm 1.07 *	11.6 \pm 0.26	12.0 \pm 0.88	45.5 \pm 6.59	58.2 \pm 3.44	56.9 \pm 3.21	54.2 \pm 2.62	***								
Day 54	3.64 \pm 0.65	8.12 \pm 1.20 **	5.83 \pm 0.39	6.44 \pm 0.26	42.5 \pm 4.03	47.1 \pm 3.44	46.7 \pm 3.37	46.3 \pm 2.07	***								
Day 64	3.36 \pm 0.73	14.5 \pm 3.48 **	8.03 \pm 0.77	8.89 \pm 0.90	64.8 \pm 5.91	69.7 \pm 2.13	65.9 \pm 4.23	65.4 \pm 4.87	***								
Day 66	7.26 \pm 1.38	19.8 \pm 0.16	15.4 \pm 0.89	31.1 \pm 11.2	62.0 \pm 6.92	60.4 \pm 2.66	72.8 \pm 4.44	65.2 \pm 1.87	***								
Day 67	6.63 \pm 0.53	14.2 \pm 2.05 **	11.9 \pm 0.24 *	16.7 \pm 0.31 ***	61.2 \pm 4.43	46.7 \pm 3.31 *	65.1 \pm 0.92	67.4 \pm 1.96	***								
Day 68	5.03 \pm 1.05	17.9 \pm 2.64 ***	15.7 \pm 1.21 **	20.5 \pm 1.41 ***	72.0 \pm 3.98	92.0 \pm 19.1	73.6 \pm 3.13	71.4 \pm 3.82	***								
Day 69	7.88 \pm 0.85	18.1 \pm 1.15 ***	14.9 \pm 1.13 **	18.3 \pm 1.56 ***	73.1 \pm 5.22	79.2 \pm 5.79	83.4 \pm 4.33	80.0 \pm 4.54	***								
Day 70	13.0 \pm 3.20	22.8 \pm 5.50	19.6 \pm 2.42	23.3 \pm 0.93	51.5 \pm 3.62	63.9 \pm 1.32	51.7 \pm 3.81	61.7 \pm 2.74	***								
Day 71	3.51 \pm 0.78	18.3 \pm 2.73 *	13.9 \pm 1.32	29.2 \pm 4.64 ***	83.2 \pm 14.8	59.6 \pm 8.22	78.9 \pm 7.46	79.9 \pm 12.7	***								
Day 75	11.2 \pm 2.38	19.7 \pm 2.20	25.4 \pm 9.47	27.4 \pm 1.54	68.9 \pm 8.33	61.4 \pm 4.68	71.7 \pm 3.45	66.1 \pm 4.09	***								
Day 82	17.8 \pm 8.85	14.9 \pm 2.65	13.0 \pm 1.79	32.7 \pm 2.17	61.9 \pm 5.66	61.7 \pm 1.60	71.8 \pm 8.76	80.9 \pm 12.7	***								
Day 89	10.4 \pm 0.63	16.4 \pm 0.94	16.9 \pm 0.66	43.6 \pm 4.11 ***	89.1 \pm 4.01	84.5 \pm 13.3	112 \pm 9.50	101 \pm 9.67	***								
Day 96	6.93 \pm 0.53	9.69 \pm 1.18	8.18 \pm 0.45	32.5 \pm 2.06 ***	64.2 \pm 2.49	76.4 \pm 3.94	90.4 \pm 9.35 *	78.4 \pm 2.73	***								
Day 103	10.6 \pm 1.24	11.7 \pm 1.59	9.76 \pm 0.25	42.7 \pm 6.86 ***	84.7 \pm 11.1	86.0 \pm 6.13	85.1 \pm 13.7	76.6 \pm 7.52	***								
Day 110	13.0 \pm 1.70	11.6 \pm 0.88	11.1 \pm 0.82	36.5 \pm 4.35 ***	51.0 \pm 1.53	65.7 \pm 4.37	61.9 \pm 5.08	64.3 \pm 5.45	***								
Day 124	8.16 \pm 0.83	12.7 \pm 2.24	16.9 \pm 4.12	47.4 \pm 3.94 ***	61.1 \pm 8.05	88.4 \pm 10.3	81.4 \pm 3.13	89.7 \pm 9.65	***								
Day 138	14.2 \pm 1.09	15.0 \pm 1.90	17.2 \pm 3.67	39.2 \pm 3.24 ***	56.6 \pm 1.29 ***	75.3 \pm 10.3	67.3 \pm 3.39	80.3 \pm 14.4	***								

Stars next to mean values represent significant difference of the values compared to control

Table. S14. K⁺ in soil solution (mg kg DW⁻¹) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	12.5 \pm 0.09	13.4 \pm 0.80	12.8 \pm 0.53	14.3 \pm 1.22	15.5 \pm 1.56	14.8 \pm 0.83	13.6 \pm 1.13	13.9 \pm 0.94	ns								
Day 11	15.5 \pm 1.07	13.9 \pm 1.55	15.3 \pm 1.52	15.0 \pm 0.62	20.3 \pm 3.00	25.0 \pm 5.62	18.4 \pm 1.09	27.5 \pm 8.18	**								
Day 19	16.8 \pm 2.64	20.5 \pm 7.00	18.8 \pm 0.82	19.7 \pm 1.21	20.9 \pm 1.29	22.4 \pm 0.30	22.3 \pm 0.58	24.0 \pm 0.58	ns								
Day 26	16.9 \pm 1.69	18.6 \pm 4.11	18.1 \pm 2.32	15.9 \pm 0.51	20.2 \pm 0.46	21.5 \pm 1.30	20.5 \pm 0.19	22.8 \pm 1.63	**								
Day 32	18.4 \pm 5.45	12.6 \pm 0.78	12.5 \pm 0.39	15.1 \pm 0.79	19.6 \pm 0.28	22.2 \pm 1.04	20.1 \pm 0.38	22.1 \pm 1.03	***								
Day 39	12.7 \pm 0.62	13.5 \pm 1.20	14.3 \pm 0.47	17.1 \pm 2.35	20.8 \pm 0.92	24.6 \pm 1.71	20.3 \pm 0.31	22.7 \pm 1.92	***								
Day 46	6.96 \pm 0.86	10.8 \pm 0.76	10.3 \pm 0.36	12.4 \pm 0.34	20.8 \pm 1.78	22.8 \pm 1.35	21.0 \pm 0.49	21.1 \pm 0.85	***								
Day 54	7.42 \pm 0.61	11.7 \pm 0.55	8.86 \pm 0.62	10.4 \pm 0.54	25.3 \pm 2.28	24.8 \pm 1.48	23.8 \pm 1.59	23.7 \pm 0.99	***								
Day 64	9.57 \pm 0.96	17.3 \pm 2.53	15.6 \pm 2.57	10.2 \pm 0.62	27.8 \pm 1.87	31.3 \pm 1.45	26.0 \pm 1.43	27.3 \pm 1.83	***								
Day 66	11.3 \pm 1.09	19.3 \pm 0.85	14.5 \pm 1.15	14.6 \pm 1.90	27.5 \pm 2.37	29.5 \pm 1.46	28.5 \pm 1.57	27.9 \pm 0.81	***								
Day 67	9.17 \pm 1.03	14.7 \pm 1.36 **	11.6 \pm 0.71	14.0 \pm 0.39 *	25.5 \pm 0.92	25.8 \pm 1.73	25.6 \pm 0.36	29.2 \pm 0.20	***								
Day 68	11.7 \pm 1.32	12.9 \pm 1.17	10.3 \pm 0.65	11.9 \pm 0.88	27.4 \pm 1.14	32.3 \pm 3.29	25.9 \pm 0.94	27.4 \pm 1.30	***								
Day 69	6.30 \pm 0.57	13.0 \pm 0.80 ***	8.77 \pm 0.71	11.0 \pm 0.89 **	26.0 \pm 1.18	30.8 \pm 2.36	26.7 \pm 1.28	27.4 \pm 1.53	***								
Day 70	14.9 \pm 4.53	18.6 \pm 4.79	18.1 \pm 3.69	13.4 \pm 0.64	27.0 \pm 1.68	29.8 \pm 0.45	22.8 \pm 1.45	28.3 \pm 1.49	***								
Day 71	11.5 \pm 0.96	14.9 \pm 0.92	12.5 \pm 0.70	13.3 \pm 2.19	29.4 \pm 3.13	29.6 \pm 2.00	28.2 \pm 1.50	28.5 \pm 3.06	***								
Day 75	9.91 \pm 1.70	13.8 \pm 0.78	21.4 \pm 10.9	12.5 \pm 0.70	32.4 \pm 2.02	30.4 \pm 1.95	30.1 \pm 1.82	31.3 \pm 3.47	***								
Day 82	18.6 \pm 10.68	11.6 \pm 2.06	17.7 \pm 5.80	14.4 \pm 1.01	30.1 \pm 2.89	29.1 \pm 0.92	30.9 \pm 3.24	36.5 \pm 5.69	***								
Day 89	7.68 \pm 0.63	12.5 \pm 3.04	8.45 \pm 0.36	13.4 \pm 2.74	27.5 \pm 0.91	27.2 \pm 3.98	34.1 \pm 4.10	30.6 \pm 2.75	***								
Day 96	11.0 \pm 1.44	12.1 \pm 1.09	11.9 \pm 0.78	14.0 \pm 0.72	26.8 \pm 0.38	30.4 \pm 1.27	34.5 \pm 3.84	33.1 \pm 1.16	***								
Day 103	6.34 \pm 0.92	8.77 \pm 0.66	8.53 \pm 0.69	15.2 \pm 2.94 *	31.4 \pm 2.52	31.8 \pm 1.74	31.8 \pm 4.43	29.1 \pm 2.45	***								
Day 110	10.7 \pm 2.36	15.9 \pm 2.63	13.6 \pm 1.35	16.9 \pm 2.24	24.5 \pm 0.76	30.4 \pm 2.07	28.2 \pm 1.83	29.1 \pm 2.15	***								
Day 124	7.38 \pm 0.98	8.12 \pm 1.74	9.09 \pm 1.75	19.2 \pm 1.68 ***	28.7 \pm 2.90	35.1 \pm 4.90	31.9 \pm 1.42	38.1 \pm 4.67	***								
Day 138	7.87 \pm 1.27	9.72 \pm 0.44	9.77 \pm 0.38	15.6 \pm 0.89 ***	27.2 \pm 0.67	32.7 \pm 4.54	31.6 \pm 1.28	35.7 \pm 5.01	***								

Stars next to mean values represent significant difference of the values compared to control

Table. S15. Mg²⁺ in soil solution (mg kg DW⁻¹) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	2.26 \pm 0.21	2.78 \pm 0.33	2.79 \pm 0.15	3.36 \pm 0.31	3.85 \pm 0.16	4.11 \pm 0.39	3.73 \pm 0.10	3.67 \pm 0.20	***								
Day 11	15.0 \pm 0.46	11.5 \pm 0.80	8.48 \pm 0.58	8.45 \pm 0.39	9.26 \pm 0.50	8.94 \pm 0.15	9.42 \pm 0.33	10.6 \pm 1.26	***								
Day 19	19.6 \pm 1.73	14.2 \pm 1.34	15.8 \pm 1.36	16.4 \pm 0.70	16.5 \pm 0.60	17.8 \pm 0.70	19.3 \pm 0.84	19.3 \pm 0.54	*								
Day 26	8.12 \pm 0.74	5.28 \pm 0.12	4.83 \pm 0.37	6.34 \pm 0.60	8.88 \pm 0.38	10.8 \pm 0.75	10.5 \pm 0.15	11.6 \pm 0.52	***								
Day 32	4.77 \pm 0.74	3.08 \pm 0.51	3.95 \pm 0.87	4.48 \pm 0.31	8.59 \pm 0.48	10.3 \pm 0.62	10.4 \pm 0.44	11.1 \pm 0.58	***								
Day 39	2.08 \pm 0.22	3.08 \pm 0.20	2.55 \pm 0.21	3.23 \pm 0.64	9.67 \pm 0.83	12.0 \pm 0.63	11.0 \pm 0.22	11.4 \pm 0.50	***								
Day 46	1.71 \pm 0.25	5.19 \pm 0.35 ***	3.75 \pm 0.17	3.85 \pm 0.28	13.4 \pm 1.55	16.4 \pm 0.89	16.1 \pm 0.69	15.2 \pm 0.63	***								
Day 54	1.46 \pm 0.25	2.98 \pm 0.38	2.05 \pm 0.22	2.61 \pm 0.70	12.6 \pm 1.06	13.7 \pm 0.78	13.5 \pm 0.80	13.6 \pm 0.42	***								
Day 64	0.98 \pm 0.15	4.47 \pm 1.04	1.88 \pm 0.39	2.26 \pm 0.12	14.3 \pm 1.51	14.9 \pm 0.32	14.0 \pm 0.84	13.9 \pm 1.01	***								
Day 66	2.39 \pm 0.37	5.52 \pm 0.22 ***	4.13 \pm 0.31 **	5.51 \pm 0.33 ***	13.7 \pm 1.11	13.4 \pm 0.69	16.1 \pm 0.91	14.1 \pm 0.30	***								
Day 67	2.24 \pm 0.11	4.46 \pm 0.62 **	3.41 \pm 0.09	4.75 \pm 0.14 ***	13.9 \pm 0.65	11.1 \pm 0.59 **	14.6 \pm 0.24	15.1 \pm 0.42	***								
Day 68	1.81 \pm 0.37	5.51 \pm 0.55 ***	4.39 \pm 0.34 **	5.93 \pm 0.26 ***	15.8 \pm 0.69	18.7 \pm 2.92	15.7 \pm 0.69	15.0 \pm 0.75	***								
Day 69	2.74 \pm 0.17	5.28 \pm 0.33 ***	4.43 \pm 0.33 *	4.90 \pm 0.39 **	16.6 \pm 1.22	17.3 \pm 1.31	18.0 \pm 1.05	17.1 \pm 1.01	***								
Day 70	4.66 \pm 1.46	7.84 \pm 1.50	6.98 \pm 0.66	8.05 \pm 0.24	14.8 \pm 0.90	18.1 \pm 0.49	15.3 \pm 1.54	17.3 \pm 0.79	***								
Day 71	1.58 \pm 0.21	5.83 \pm 0.63 ***	4.28 \pm 0.36 **	7.16 \pm 0.49 ***	17.6 \pm 3.24	13.9 \pm 2.01	17.4 \pm 1.75	17.9 \pm 3.06	***								
Day 75	3.68 \pm 0.91	6.69 \pm 0.69	8.78 \pm 3.48	8.97 \pm 0.58	19.9 \pm 3.13	17.2 \pm 1.02	20.8 \pm 1.05	18.5 \pm 0.90	***								
Day 82	5.96 \pm 2.95	5.87 \pm 0.58	4.56 \pm 0.71	10.5 \pm 0.57	18.3 \pm 1.93	18.0 \pm 0.57	21.1 \pm 3.04	24.2 \pm 4.37	***								
Day 89	3.14 \pm 0.29	4.87 \pm 0.49	5.12 \pm 0.23	12.5 \pm 0.89 ***	24.6 \pm 1.38	23.3 \pm 3.64	30.8 \pm 3.07	27.0 \pm 2.91	***								
Day 96	2.44 \pm 0.26	3.51 \pm 0.37	2.84 \pm 0.17	10.6 \pm 0.63 ***	18.4 \pm 0.38	21.7 \pm 1.29	26.7 \pm 3.54	22.0 \pm 0.92	***								
Day 103	3.14 \pm 0.41	3.30 \pm 0.46	2.79 \pm 0.20	12.8 \pm 1.11 ***	23.7 \pm 3.34	23.5 \pm 1.61	23.4 \pm 4.36	20.6 \pm 2.06	***								
Day 110	3.57 \pm 0.45	3.77 \pm 0.40	3.46 \pm 0.21	11.7 \pm 1.05 ***	15.2 \pm 0.43	19.0 \pm 1.30	18.1 \pm 1.71	18.5 \pm 1.59	***								
Day 124	2.64 \pm 0.33	3.63 \pm 0.59	4.95 \pm 1.12	13.2 \pm 0.94 ***	16.5 \pm 1.86	24.0 \pm 2.99	21.8 \pm 0.70	23.7 \pm 2.71	***								
Day 138	5.28 \pm 0.65	5.07 \pm 0.65	5.73 \pm 1.25	11.8 \pm 0.71 ***	15.8 \pm 0.37	21.6 \pm 3.57	18.8 \pm 1.04	23.9 \pm 5.30	***								

Stars next to mean values represent significant difference of the values compared to control

Table. S16. Na⁺ in soil solution (mg kg DW⁻¹) before and after a single freeze-thaw (-5°C or -10°C) or dry-wet event. Stars above the plots denote significant differences from the control, where *, ** and *** denote $p \leq 0.05$, $p \leq 0.01$, and $p \leq 0.001$, respectively, while ns indicates non-significant, $p > 0.05$) when compared with the control treatment. Values represent means \pm SEM ($n = 4$).

	With plant								Without plant								Two-way ANOVA
	PControl		PDW		PFT -5		PFT -10		NControl		NDW		NFT -5		NFT -10		Plant effect
Day 1	19.0 \pm 1.47	17.7 \pm 1.13	17.3 \pm 1.20	16.4 \pm 0.17	16.5 \pm 0.63	16.9 \pm 0.22	16.4 \pm 0.53	15.7 \pm 0.26	ns								
Day 11	18.7 \pm 0.59	19.1 \pm 1.82	17.5 \pm 1.53	19.3 \pm 1.09	20.4 \pm 0.64	20.4 \pm 1.10	21.4 \pm 0.62	22.6 \pm 2.08	*								
Day 19	44.3 \pm 4.09	37.8 \pm 2.09	46.5 \pm 3.40	50.0 \pm 3.28	39.5 \pm 1.08	44.0 \pm 1.87	49.2 \pm 2.87	48.1 \pm 2.37	ns								
Day 26	23.3 \pm 1.30	20.6 \pm 0.45	20.0 \pm 0.29	22.3 \pm 0.76	21.3 \pm 0.85	26.0 \pm 2.90	23.3 \pm 0.99	25.6 \pm 2.05	*								
Day 32	20.1 \pm 1.09	19.1 \pm 0.07	20.8 \pm 0.94	21.3 \pm 0.48	21.1 \pm 1.15	22.5 \pm 1.52	21.6 \pm 0.48	23.8 \pm 1.63	*								
Day 39	21.9 \pm 0.82	23.4 \pm 1.03	20.0 \pm 0.95	21.9 \pm 0.75	22.0 \pm 1.08	26.7 \pm 2.16	23.3 \pm 0.86	24.2 \pm 1.32	*								
Day 46	29.6 \pm 2.65	28.7 \pm 1.33	21.5 \pm 0.64	23.7 \pm 0.67	28.7 \pm 1.65	32.1 \pm 2.28	30.1 \pm 1.97	28.2 \pm 1.57	**								
Day 54	20.3 \pm 1.74	24.6 \pm 1.58	21.7 \pm 1.67	21.3 \pm 1.05	25.5 \pm 2.14	26.3 \pm 1.56	25.5 \pm 1.83	24.5 \pm 0.85	**								
Day 64	25.4 \pm 1.12	27.9 \pm 0.92	24.6 \pm 1.88	25.2 \pm 0.68	27.8 \pm 3.34	28.6 \pm 0.88	25.9 \pm 1.73	25.9 \pm 2.03	ns								
Day 66	23.3 \pm 1.03	23.4 \pm 0.25	26.2 \pm 0.90	24.1 \pm 2.54	27.5 \pm 2.21	26.7 \pm 1.26	29.4 \pm 1.98	24.7 \pm 1.02	*								
Day 67	23.7 \pm 1.88	22.1 \pm 0.12	22.7 \pm 0.77	24.1 \pm 0.57	27.3 \pm 1.29	25.3 \pm 3.20	27.1 \pm 1.09	30.3 \pm 2.54	**								
Day 68	26.1 \pm 1.93	21.2 \pm 1.48	20.9 \pm 0.83	21.2 \pm 1.07	29.8 \pm 1.51	28.6 \pm 2.45	26.9 \pm 1.12	25.8 \pm 1.69	***								
Day 69	18.0 \pm 0.26	19.4 \pm 0.92	19.1 \pm 0.90	19.8 \pm 0.93	29.8 \pm 2.69	30.3 \pm 2.38	29.4 \pm 1.49	28.4 \pm 1.96	***								
Day 70	30.3 \pm 6.10	21.8 \pm 0.86	21.2 \pm 0.91	22.9 \pm 0.66	25.3 \pm 1.86	30.2 \pm 1.25	23.1 \pm 1.85	28.0 \pm 1.79	ns								
Day 71	25.4 \pm 0.79	22.4 \pm 0.66 *	23.5 \pm 0.21	21.7 \pm 0.70 **	35.4 \pm 4.60	32.3 \pm 1.18	33.5 \pm 3.44	30.1 \pm 5.51	***								
Day 75	23.7 \pm 0.15	23.4 \pm 1.09	24.3 \pm 0.83	20.0 \pm 0.76	35.9 \pm 3.60	28.3 \pm 2.26	33.5 \pm 2.03	29.7 \pm 1.46	***								
Day 82	22.1 \pm 0.47	21.1 \pm 0.81	22.7 \pm 1.17	25.0 \pm 1.83	32.9 \pm 4.15	30.0 \pm 1.31	34.9 \pm 5.91	39.8 \pm 8.75	***								
Day 89	23.2 \pm 0.53	22.9 \pm 0.69	24.8 \pm 1.55	28.3 \pm 2.51	42.6 \pm 2.29	38.4 \pm 5.95	47.6 \pm 0.83	42.3 \pm 4.98	***								
Day 96	22.4 \pm 1.44	24.4 \pm 0.84	24.1 \pm 0.42	24.9 \pm 1.39	31.2 \pm 0.33	34.4 \pm 1.55	44.0 \pm 6.22	35.1 \pm 1.57	***								
Day 103	21.5 \pm 0.47	21.3 \pm 0.82	22.7 \pm 0.91	29.7 \pm 4.18	39.3 \pm 3.89	37.8 \pm 3.37	32.3 \pm 2.60	32.3 \pm 4.12	***								
Day 110	20.0 \pm 3.10	23.9 \pm 1.31	25.3 \pm 0.85	21.9 \pm 1.25	22.8 \pm 1.34	28.5 \pm 2.35	27.6 \pm 3.07	26.0 \pm 2.54	*								
Day 124	20.5 \pm 0.91	24.9 \pm 2.41	27.1 \pm 2.22	30.2 \pm 2.15 *	27.6 \pm 2.95	35.0 \pm 4.82	31.5 \pm 1.96	35.2 \pm 5.41	**								
Day 138	20.9 \pm 0.58	24.4 \pm 0.26	23.2 \pm 0.87	20.9 \pm 1.48	22.8 \pm 0.72	29.6 \pm 5.24	26.6 \pm 1.83	31.7 \pm 9.24	*								

Stars next to mean values represent significant difference of the values compared to control

