

## Supplementary Material

### **Acclimation of leaf dark respiration to nocturnal and diurnal warming in a semiarid temperate steppe**

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**Table S1. Leaf gas exchange parameters, CO<sub>2</sub> diffusive limitations to photosynthesis, and biochemical limitations to photosynthesis at leaf temperature of 25°C in the control, nocturnal-warming, diurnal-warming and diel-warming plots**

Warming effects on these parameters were analyzed using one-way ANOVA followed by LSD multiple-range tests. Different lowercases represent significant differences among treatments ( $P < 0.05$ ). Values are means ( $n = 3$ ,  $\pm$  s.e.).  $A_n$  ( $\mu\text{mol m}^{-2} \text{s}^{-1}$ ), light-saturated net CO<sub>2</sub> assimilation rate;  $T_r$  ( $\text{mmol m}^{-2} \text{s}^{-1}$ ), transpiration rate;  $g_s$  ( $\text{mol m}^{-2} \text{s}^{-1}$ ), stomatal conductance;  $C_i$  ( $\mu\text{mol mol}^{-1}$ ), intercellular CO<sub>2</sub> concentrations;  $V_{\text{cmax}}$  ( $\mu\text{mol m}^{-2} \text{s}^{-1}$ ), maximum rate of Rubisco carboxylation;  $J_{\text{max}}$  ( $\mu\text{mol m}^{-2} \text{s}^{-1}$ ), maximum rate of photosynthetic electron transport;  $J_{\text{max}}/V_{\text{cmax}}$ ,  $J_{\text{max}}/V_{\text{cmax}}$  ratio; TPU ( $\mu\text{mol m}^{-2} \text{s}^{-1}$ ), the rate of triose phosphate utilization

Treatment	Leaf gas exchange parameters		CO <sub>2</sub> diffusive limitations to photosynthesis		Biochemical limitations to photosynthesis			
	$A_n$	$T_r$	$g_s$	$C_i$	$V_{\text{cmax}}$	$J_{\text{max}}$	$J_{\text{max}}/V_{\text{cmax}}$	TPU
Control	23.17 $\pm$ 3.65 <sup>a</sup>	6.25 $\pm$ 0.77 <sup>a</sup>	0.39 $\pm$ 0.08 <sup>a</sup>	268.67 $\pm$ 5.69 <sup>a</sup>	100.84 $\pm$ 14.14 <sup>a</sup>	218.01 $\pm$ 25.07 <sup>a</sup>	2.18 $\pm$ 0.07 <sup>a</sup>	16.74 $\pm$ 2.08 <sup>a</sup>
Nocturnal warming	25.60 $\pm$ 0.73 <sup>a</sup>	7.86 $\pm$ 0.79 <sup>a</sup>	0.45 $\pm$ 0.05 <sup>a</sup>	271.33 $\pm$ 7.82 <sup>a</sup>	110.07 $\pm$ 2.12 <sup>a</sup>	244.94 $\pm$ 6.51 <sup>a</sup>	2.22 $\pm$ 0.03 <sup>a</sup>	18.30 $\pm$ 0.52 <sup>a</sup>
Diurnal warming	21.84 $\pm$ 0.71 <sup>a</sup>	5.02 $\pm$ 0.30 <sup>a</sup>	0.33 $\pm$ 0.02 <sup>a</sup>	259.33 $\pm$ 5.01 <sup>a</sup>	97.01 $\pm$ 4.59 <sup>a</sup>	213.86 $\pm$ 16.88 <sup>a</sup>	2.20 $\pm$ 0.09 <sup>a</sup>	15.92 $\pm$ 0.87 <sup>a</sup>
Diel warming	26.92 $\pm$ 0.72 <sup>a</sup>	5.84 $\pm$ 1.05 <sup>a</sup>	0.40 $\pm$ 0.02 <sup>a</sup>	258.67 $\pm$ 4.04 <sup>a</sup>	118.81 $\pm$ 2.74 <sup>a</sup>	261.09 $\pm$ 8.99 <sup>a</sup>	2.20 $\pm$ 0.11 <sup>a</sup>	19.43 $\pm$ 0.40 <sup>a</sup>

**Table S2. Leaf and soil chemical characteristics in the control, nocturnal-warming, diurnal-warming and diel-warming plots**

Warming effects on these parameters were analyzed using one-way ANOVA followed by LSD multiple-range tests. Different lowercases represent significant differences among treatments ( $P < 0.05$ ). Values are means ( $n = 3$ ,  $\pm$  s.e.). TN ( $\text{g kg}^{-1}$ ), total nitrogen concentration; TC ( $\text{g kg}^{-1}$ ), total carbon concentration; C/N ( $\text{g g}^{-1}$ ), C/N ratio; SLA ( $\text{m}^2 \text{kg}^{-1}$ ), specific leaf area

Treatment	Leaf				Soil				
	TN	TC	C/N	SL A	TN	TC	C/N	pH	
Control				22.9	5.8	1.4	16.8	11.2	7.4
	20.01	$\pm$ 458.59	$\pm$ 2	$\pm$ 7	$\pm$ 9	$\pm$ 4	$\pm$ 9	$\pm$ 0	$\pm$ 0
	0.13 <sup>a</sup>	6.21 <sup>a</sup>	0.46	0.0	0.0	1.23	0.44	0.0	0.0
Nocturnal warming				23.2	5.9	1.5	17.0	11.3	7.5
	19.71	$\pm$ 455.71	$\pm$ 9	$\pm$ 5	$\pm$ 0	$\pm$ 5	$\pm$ 9	$\pm$ 0	$\pm$ 0
	1.12 <sup>a</sup>	7.50 <sup>a</sup>	0.97	0.3	0.0	0.97	0.41	0.1	0.1
Diurnal warming				22.7	6.3	1.4	16.1	11.4	7.4
	20.39	$\pm$ 460.34	$\pm$ 7	$\pm$ 7	$\pm$ 0	$\pm$ 1	$\pm$ 9	$\pm$ 6	$\pm$ 6
	1.09 <sup>a</sup>	6.00 <sup>a</sup>	1.18	0.3	0.0	0.65	0.30	0.0	0.0
Diel warming				21.6	5.7	1.4	15.7	10.9	7.5
	21.11	$\pm$ 456.47	$\pm$ 4	$\pm$ 8	$\pm$ 4	$\pm$ 1	$\pm$ 0	$\pm$ 0	$\pm$ 0
	0.40 <sup>a</sup>	4.92 <sup>a</sup>	0.28	0.1	0.0	1.04	0.33	0.0	0.0
				a	7 <sup>a</sup>	7 <sup>a</sup>	a	a	8 <sup>a</sup>