

Supporting Information

Table S1. Regression parameters for growth analysis data over time. P values indicate whether the slope is significantly different from zero. DM: dry mass; LAR: leaf area ratio; LMR: leaf mass ratio; RMR: root mass ratio; StMR: stem mass ratio; ND: newly-developed leaves; PE: pre-existing leaves.

Growth temperature	Parameter	r ²	P	intercept	slope
5°C	Total DM	0.827	0.000	-1.478	0.033
	Total DM (d0-14)	0.469	0.202	-1.417	0.020
	Total DM (d17-38)	0.499	0.076	-1.387	0.030
	Root DM	0.723	0.000	-3.563	0.032
	Root DM (d0-14)	0.011	0.868	-3.395	0.005
	Root DM (d17-38)	0.572	0.049	-3.684	0.036
	Stem DM	0.746	0.000	-2.846	0.031
	Stem DM (d0-14)	0.594	0.127	-2.807	0.020
	Stem DM (d17-38)	0.294	0.209	-2.646	0.024
	PE Leaf DM	0.810	0.000	-1.918	0.027
	ND Leaf DM	0.920	0.001	-6.499	0.115
	RMR	0.017	0.683	0.0127	0.000
	RMR (d0-14)	0.274	0.365	0.142	-0.002
	RMR (d17-38)	0.629	0.033	0.098	0.001
	StMR	0.476	0.013	0.277	-0.001
	StMR (d0-14)	0.304	0.335	0.278	-0.002
	StMR (d17-38)	0.242	0.262	0.284	-0.002

This is the peer reviewed version of the following article: Atkinson, L. J., Sherlock, D. J. and Atkin, O. K. (2015), Source of nitrogen associated with recovery of relative growth rate in *Arabidopsis thaliana* acclimated to sustained cold treatment. *Plant Cell Environ*, 38: 1023–1034, which has been published in final form at doi:10.1111/pce.12460. This article may be used for non-commercial purposes in accordance With Wiley Terms and Conditions for self-archiving.

	Total LMR	0.465	0.015	0.596	0.001
	PE LMR (d0-14)	0.475	0.013	0.619	-0.002
	ND LMR (d17-38)	0.806	0.006	-0.061	0.005
	Total LAR	0.755	0.000	29.278	-0.421
	PE LAR (d0-14)	0.839	0.000	29.833	-0.515
	PE LAR (d17-38)	0.741	0.013	-1.298	0.121
23°C	Total DM	0.837	0.004	-1.528	0.075
	Root DM	0.756	0.011	-3.502	0.080
	Stem DM	0.864	0.002	-2.823	0.064
	PE LDM	0.747	0.012	-2.029	0.058
	ND LDM	0.970	0.002	-6.499	0.316
	RMR	0.105	0.823	0.142	0.000
	StMR	0.461	0.094	0.302	-0.006
	Total LMR	0.668	0.025	0.556	0.005
	PE LMR	0.639	0.031	0.575	-0.006
	ND LMR	0.931	0.008	-0.041	0.014
	Total LAR	0.133	0.421	31.568	-0.249
	PE LAR	0.702	0.019	32.597	-0.853
	ND LAR	0.943	0.006	-2.439	0.742

Table S2. Analysis of covariance for growth analysis data. Values represent the coefficient of determination (r^2), significance levels for the Levene test for the homogeneity of variance, and P values for (a) the relationship between the covariate (x); time or total plant DM and the dependent variable (y), (b) the effect of the fixed factor and (c) the interaction between the covariate and the fixed factor where the fixed factor is:

(A) growth temperature: comparison of 23°C-grown (n=5) and 5°C-shifted plants with pre-existing (PE) leaves only (n=5) or of 23°C-grown (n=5) and 5°C-shifted plants (n=7) with newly-developed (ND) leaves,

or

(B) leaf type: comparison of 5°C-shifted plants before (PE; n=5) and after (ND; n=7) the emergence of new leaves.

Fixed factor (A) Growth temperature				P values			
x-axis		y-axis	r^2	Levene	a	b	c
				test			
Time (days)	DM (g)	Log _e total DM	0.832	0.211	0.002	0.526	0.026
		Log _e shoot DM	0.846	0.113	0.001	0.498	0.025
		Log _e root DM	0.724	0.648	0.029	0.696	0.045
		Log _e stem DM	0.872	0.369	0.001	0.901	0.022
		Log _e total leaves DM	0.819	0.098	0.001	0.410	0.033
		Log _e PE leaves DM	0.743	0.048	0.004	0.472	0.103
Time (days)	Mass ratio (g g plant ⁻¹)	RMR	0.333	0.163	0.440	0.998	0.310
		StMR	0.446	0.311	0.067	0.409	0.280
		Total LMR	0.681	0.982	0.005	0.262	0.627
		PE LMR	0.816	0.602	0.314	0.760	0.015
		ND LMR	0.871	0.727	0.000	0.621	0.013

Total DM (g)	Mass ratio	RMR	0.230	0.482	0.587	0.535	0.689
	(g g plant ⁻¹)	StMR	0.408	0.060	0.212	0.800	0.679
		Total LMR	0.397	0.833	0.363	0.812	0.911
		PE LMR	0.768	0.802	0.608	0.990	0.538
		ND LMR	0.511	0.543	0.021	0.723	0.595
Time (days)	LAR	Total LAR	0.801	0.902	0.029	0.427	0.547
	(m ² kg ⁻¹)	PE LAR	0.852	0.876	0.000	0.301	0.206
		ND LAR	0.931	0.390	0.000	0.425	0.000
Total DM (g)	LAR	Total LAR	0.659	0.662	0.059	0.944	0.144
	(m ² kg ⁻¹)	PE LAR	0.646	0.821	0.003	0.730	0.539
		ND LAR	0.733	0.031	0.008	0.643	0.092

Fixed factor (B) Leaf type

			P values				
			Levene				
x-axis		y-axis	r ²	test	a	b	c
Time (days)	DM	Log _e total DM	0.838	0.021	0.057	0.939	0.672
	(g)	Log _e shoot DM	0.846	0.008	0.047	0.837	0.773
		Log _e root DM	0.764	0.918	0.184	0.549	0.292
		Log _e stem DM	0.763	0.003	0.138	0.726	0.875
		Log _e total leaves DM	0.872	0.021	0.027	0.909	0.722
		Log _e PE leaves DM	0.822	0.005	0.060	0.645	1.000
Time (days)	Mass ratio	RMR	0.340	0.000	0.385	0.136	0.086
	(g g plant ⁻¹)	StMR	0.483	0.404	0.176	0.869	0.965
		Total LMR	0.585	0.943	0.065	0.308	0.168
Total DM (g)	Mass ratio	RMR	0.119	0.084	0.475	0.876	0.668
	(g g plant ⁻¹)	StMR	0.414	0.340	0.261	0.192	0.274
		Total LMR	0.373	0.599	0.638	0.308	0.518

Table S3. Mean values for leaf fresh mass per unit leaf area (LFMA; g FM m⁻²) and leaf dry matter content (DMC; g DM g FM⁻¹) for each temperature and leaf type at each harvest date ± SE (n=4). PE: pre-existing leaves; ND: newly-developed leaves

LFMC (g FM m⁻²)						
Growth temperature						
23°C			5°C			
Days	PE	ND	Days	PE	ND	
0	198.4 ± 18.8		0	198.4 ± 18.8		
2	235.3 ± 14.3		3	210.9 ± 10.6		
4	232.8 ± 7.8	183.7 ± 16.6	7	198.0 ± 6.6		
7	218.0 ± 5.5	166.6 ± 7.4	10	214.4 ± 8.4		
9	226.8 ± 14.3	175.1 ± 1.7	14	208.5 ± 11.6		
11	235.5 ± 15.0	175.3 ± 4.5	17	217.7 ± 7.0	207.0 ± 34.2	
14	259.0 ± 5.9	188.4 ± 5.5	21	203.4 ± 11.6	178.6 ± 2.2	
			24	213.7 ± 7.2	208.5 ± 2.8	
			29	223.4 ± 9.0	221.5 ± 4.2	
			31	221.5 ± 8.4	207.8 ± 4.5	
			35	224.1 ± 5.7	225.9 ± 8.3	
			38	228.2 ± 2.9	258.3 ± 13.9	
Leaf DMC (g DM g FM⁻¹)						
Days	PE	ND	Days	PE	ND	
0	0.08 ± 0.00		0	0.08 ± 0.00		
2	0.09 ± 0.00		3	0.11 ± 0.00		
4	0.09 ± 0.00	0.12 ± 0.01	7	0.12 ± 0.01		
7	0.09 ± 0.00	0.11 ± 0.00	10	0.14 ± 0.00		
9	0.10 ± 0.00	0.12 ± 0.00	14	0.14 ± 0.01		
11	0.09 ± 0.00	0.10 ± 0.00	17	0.13 ± 0.00	0.16 ± 0.01	
14	0.09 ± 0.00	0.10 ± 0.00	21	0.16 ± 0.00	0.20 ± 0.00	
			24	0.17 ± 0.01	0.18 ± 0.00	

29	0.17 ± 0.01	0.18 ± 0.01
31	0.18 ± 0.01	0.19 ± 0.00
35	0.18 ± 0.01	0.16 ± 0.01
38	0.17 ± 0.00	0.16 ± 0.01

Table S4. Total and organic N content of tissues from plants grown at 23 and 5°C plus organic N expressed as a proportion of total N content for plants grown at 23 and 5°C

5°C grown		N concentration (mg g⁻¹ DM)										
Days	Root			Stem			PE leaves			ND leaves		
	Total N	Organic N	Organic: total N	Total N	Organic N	Organic: total N	Total N	Organic N	Organic: total N	Total N	Organic N	Organic: total N
0	39.6	34.6	0.87	60.2	38.8	0.64	65.1	46.3	0.71			
3	43.8	39.7	0.91	48.4	32.6	0.67	52.5	39.7	0.76			
7	44.6	40.8	0.92	50.0	35.3	0.71	48.8	38.0	0.78			
10	41.9	38.6	0.92	47.5	34.6	0.73	45.9	36.5	0.79			
14	39.9	37.2	0.93	53.1	40.4	0.76	46.5	38.0	0.82	56.6	54.9	0.97
17	41.0	38.5	0.94	51.9	40.8	0.79	47.9	39.9	0.83	54.4	52.8	0.97
21	42.4	40.2	0.95	51.8	42.4	0.82	45.1	38.6	0.86	54.4	52.8	0.97

24	45.0	42.9	0.95	53.9	45.4	0.84	44.8	39.1	0.87	53.3	51.7	0.97
29	44.9	43.4	0.97	55.0	48.5	0.88	44.1	39.7	0.90	53.3	51.7	0.97
31	46.9	45.5	0.97	55.1	49.5	0.90	42.3	38.5	0.91	53.1	51.5	0.97
35	46.7	45.7	0.98	59.1	55.0	0.93	46.6	43.5	0.93	56.0	54.4	0.97
38	46.9	46.3	0.99	56.7	54.1	0.95	44.4	42.2	0.95	55.3	53.7	0.97

23°C grown

0	39.6	34.6	0.87	60.2	38.8	0.64	65.1	46.3	0.71			
2	42.9	37.5	0.87	48.1	31.0	0.64	61.1	43.5	0.71			
4	42.3	37.0	0.87	52.2	33.6	0.64	58.4	41.6	0.71	63.6	54.4	0.86
7	42.9	37.5	0.87	50.0	32.2	0.64	60.5	43.1	0.71	62.2	53.2	0.86
9	45.6	39.8	0.87	50.2	32.4	0.64	58.8	41.8	0.71	61.8	52.9	0.86
11	42.5	37.1	0.87	51.4	33.1	0.64	59.3	42.2	0.71	65.1	55.7	0.86
14	46.1	40.3	0.87	52.0	33.5	0.64	57.7	41.1	0.71	60.0	51.3	0.86
