Thermotolerant cyclamen with reduced acrolein and methyl vinyl ketone

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Supplementary Material

Table S1. Thermotolerance of cyclamen cultivars, WT and transgenic lines. After initial growth for 6 months at 20˚C under 16 h light (70 µmol m^{-2} s^{-1}), seedlings with 4-5 leaves were exposed to 38˚C for 7 days under constant light (70 µmol m^{-2} s^{-1}). Leaves with wilting or browning parts were counted as injured, and seedlings with at least two injured leaves were scored as damaged. Values are means ± SD (n=3).

Cultivar	Breeder	Time (days)							
		0	1	2	3	4	5	6	7
‘Halios Pure White Early’	MOREL DIFFUSION S.A.S.	0.0±0.0	0.0±0.0	25.0±12.5	79.2±7.2	95.8±7.2	100±0.0	100±0.0	100±0.0
‘Metis Victoria Deco Mix’	MOREL DIFFUSION S.A.S.	0.0±0.0	0.0±0.0	45.8±7.2	83.3±7.2	91.7±7.2	100±0.0	100±0.0	100±0.0
‘Metis Scarlet Compact’	MOREL DIFFUSION S.A.S.	0.0±0.0	0.0±0.0	4.2±7.2	41.7±7.2	91.7±7.2	100±0.0	100±0.0	100±0.0
‘Latinia Light Pink with Eye’	MOREL DIFFUSION S.A.S.	0.0±0.0	16.7±14.4	58.3±19.1	91.7±7.2	100±0.0	100±0.0	100±0.0	100±0.0
‘Miracle Scarlet’	Goldsmith	0.0±0.0	0.0±0.0	45.8±7.2	62.5±12.5	95.8±7.2	100±0.0	100±0.0	100±0.0
‘Laser Salmon’	Goldsmith	0.0±0.0	0.0±0.0	20.8±7.2	79.2±7.2	100±0.0	100±0.0	100±0.0	100±0.0
‘Midori White with Eye’	Goldsmith	0.0±0.0	0.0±0.0	45.8±7.2	83.3±7.2	91.7±7.2	100±0.0	100±0.0	100±0.0
‘Maxora Red’	VARINOVA	0.0±0.0	0.0±0.0	45.8±7.2	54.2±7.2	91.7±7.2	100±0.0	100±0.0	100±0.0
‘Concerto Rose Pink’	Syngenta seeds	0.0±0.0	0.0±0.0	29.2±7.2	58.3±7.2	91.7±7.2	100±0.0	100±0.0	100±0.0
‘Concerto White with Eye Iris’	Syngenta seeds	0.0±0.0	4.2±7.2	33.3±7.2	41.7±7.2	58.3±19.1	87.5±12.5	100±0.0	100±0.0
‘Libretto Violet’	Syngenta seeds	0.0±0.0	0.0±0.0	16.7±7.2	50.0±12.5	95.8±7.2	100±0.0	100±0.0	100±0.0
‘Super Compact White with Eye’	Schoneveld Twello b.v.	0.0±0.0	8.3±7.2	58.3±14.4	95.8±7.2	95.8±7.2	100±0.0	100±0.0	100±0.0
‘Super Compact Violet flamed’	Schoneveld Twello b.v.	0.0±0.0	12.5±12.5	79.2±7.2	100±0.0	100±0.0	100±0.0	100±0.0	100±0.0
‘Super Micro Red’	Schoneveld Twello b.v.	0.0±0.0	0.0±0.0	16.7±7.2	33.3±7.2	79.2±7.2	87.5±12.5	100±0.0	100±0.0
‘Super Original Red’	Schoneveld Twello b.v.	0.0±0.0	0.0±0.0	41.7±7.2	58.3±7.2	95.8±7.2	100±0.0	100±0.0	100±0.0
WT		0.0±0.0	4.2±7.2	16.7±7.2	66.7±7.2	95.8±7.2	100±0.0	100±0.0	100±0.0
T15		0.0±0.0	0.0±0.0	4.2±7.2	4.2±7.2	20.8±14.4	45.8±7.2	54.2±7.2	79.2±7.2
T31		0.0±0.0	0.0±0.0	0.0±0.0	12.5±12.5	12.5±12.5	37.5±12.5	45.8±7.2	66.7±7.2

Table S2. Compositions of fatty acids in leaf tissues of various cyclamen cultivars. Plants were grown on 1/2 MS medium to the 4-5 leaf stage at 20˚C under 16 h light (70 μmol m^{-2} s^{-1}). Detached leaves (4.0 x 4.0 cm) were analyzed for their fatty acid composition by gas chromatography. Values are means ± SD (n=3).

Cultivar	Fatty acid (mol%)				
	16:0	18:0	18:1	18:2	18:3
‘Halios Pure White Early’	20.4±0.7	5.4±3.2	4.5±0.4	15.5±1.1	54.2±2.2
‘Metis Victoria Deco Mix’	21.5±0.4	2.7±0.0	6.6±0.2	16.2±0.8	53.0±1.0
‘Metis Scarlet Compact’	18.7±0.7	3.4±0.2	3.3±0.2	15.1±1.2	59.5±2.2
‘Latinia Light Pink with Eye’	20.9±4.1	3.0±0.1	19.4±4.1	10.9±1.3	45.9±7.2
‘Miracle Scarlet’	17.3±0.5	3.7±0.3	4.7±0.2	14.6±1.5	59.7±1.4
‘Laser Salmon’	19.4±1.0	3.0±0.3	5.0±0.3	13.2±0.2	59.3±0.6
‘Midori White with Eye’	21.3±0.7	3.5±1.0	6.3±0.0	12.0±0.9	56.9±0.7
‘Maxora Red’	18.9±0.5	3.6±0.1	4.5±0.5	17.2±1.6	55.8±1.1
‘Concerto Rose Pink’	18.7±0.4	3.5±0.1	5.3±1.0	14.1±1.2	58.4±1.6
‘Concerto White with Eye Iris’	19.8±0.7	3.1±0.3	7.1±0.9	18.6±0.5	51.4±1.4
‘Libretto Violet’	20.4±0.4	2.1±0.2	5.2±0.6	13.0±0.9	59.3±0.9
‘Super Compact White with Eye’	19.7±1.5	3.6±0.3	9.4±0.1	13.1±1.0	54.3±0.3
‘Super Compact Violet flamed’	18.4±0.7	3.1±0.1	4.6±0.3	18.2±0.4	55.7±0.8
‘Super Micro Red’	19.0±0.8	1.9±0.1	9.8±1.7	16.3±1.0	53.0±0.7
‘Super Original Red’	19.3±0.4	2.6±0.0	9.7±0.8	14.0±0.4	54.4±0.8

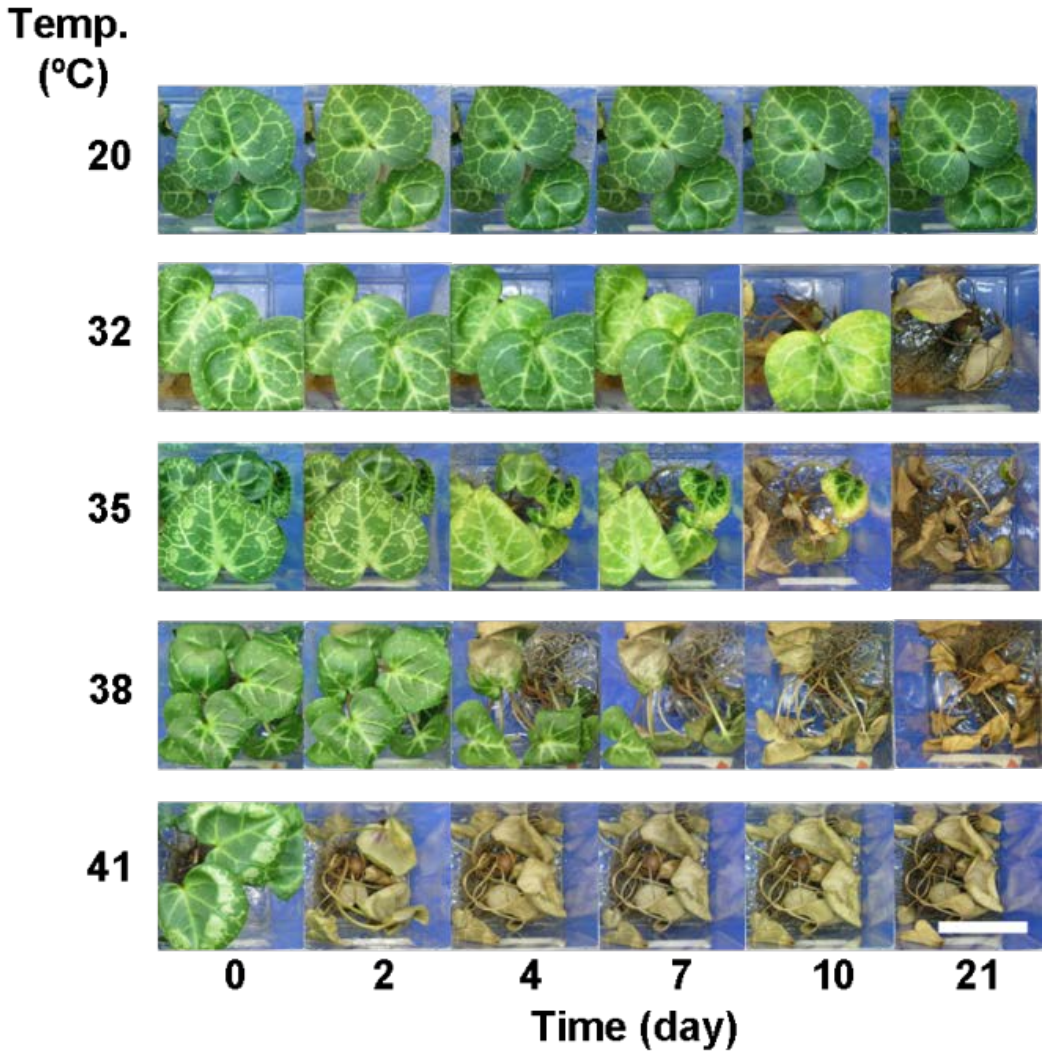

Figure S1. Establishment of suitable conditions for the evaluation of thermotolerance in cyclamen. WT plants were grown for 6 months (to the 4-5 leaf stage) on 1/2 MS medium at 20˚C under 16 h light conditions (70 µmol m^{-2} s^{-1}), then exposed to temperatures of 20, 32, 35, 38, or 41ºC under constant light (70 µmol m^{-2} s^{-1}). At temperatures of 35ºC or less, the heat damage symptoms developed slowly and damaged areas were difficult to distinguish from undamaged areas. At 41ºC, the leaf damage appeared too rapidly. Therefore, we selected 38ºC as a moderate condition for evaluating heat damage in cyclamen seedlings grown on 1/2 MS medium. The bar indicates 5 cm.