

Supplementary Table 2. Basic parameter values determined by long day (12L12D) and cold entrainment and parameter comparison between tomato model with Arabidopsis model (H2025).

Parameter	Description	Value in tomato model	Value in Arabidopsis model (H2025)
v_1	synthesis of <i>SIHY5</i> mRNA	1.7 nM h ⁻¹	NA
v_2	synthesis of <i>SIMYB15</i> mRNA	10.6 nM h ⁻¹	NA
v_3	synthesis of <i>SICAMTA</i> mRNA	5 nM h ⁻¹	NA
v_4	synthesis of <i>SICBF1</i> mRNA	15.5 nM h ⁻¹	34 nM h ⁻¹
v_{5a}	basic synthesis of <i>SIZAT12</i> mRNA	2.23 nM h ⁻¹	NA
v_5	synthesis of <i>SIZAT12</i> mRNA	1.25 nM h ⁻¹	9.5 nM h ⁻¹
v_6	synthesis of <i>SICOR413</i> mRNA	2.2 nM h ⁻¹	1 nM h ⁻¹
v_{P1}	Maximum rate of phosphorylation of SIMYB15 protein	0.18 nM h ⁻¹	NA
v_{P2}	Maximum rate of dephosphorylation of SIMYB15 protein	0.45 nM h ⁻¹	4 nM h ⁻¹
v_{P3}	Maximum rate of phosphorylation of SIICE1 protein	1.2 nM h ⁻¹	NA
v_{P4}	Maximum rate of dephosphorylation of SIICE1 protein	0.9 nM h ⁻¹	1.2 nM h ⁻¹
v_{P5}	Maximum rate of phosphorylation of SICBF1 protein	3 nM h ⁻¹	2 nM h ⁻¹
v_{P6}	Maximum rate of dephosphorylation of SICBF1 protein	1 nM h ⁻¹	2 nM h ⁻¹
p_0	Apparent first-order rate constant for synthesis of SICOP1 protein	1.5 nM h ⁻¹	NA
p_{0D}	Apparent first-order rate constant for synthesis of SICOP1 protein induced by dark	0.1 nM h ⁻¹	NA
p	Apparent first-order rate constant for synthesis of SIICE1 protein	2 nM h ⁻¹	0.18 nM h ⁻¹
p_{PIF}	Apparent first-order rate constant for synthesis of SIPIF4 protein	5.5 nM h ⁻¹	NA
p_{GAI}	Apparent first-order rate constant for synthesis of SIGAI4 protein	2.13 nM h ⁻¹	NA
p_1	Apparent first-order rate constant for translation of SIHY5 protein	0.3 h ⁻¹	NA
p_2	Apparent first-order rate constant for translation of SIMYB15 protein	0.4 h ⁻¹	NA
p_3	Apparent first-order rate constant for translation of SICAMTA protein	0.8 h ⁻¹	NA
p_4	Apparent first-order rate constant for translation of SICBF1 protein	5.5 h ⁻¹	0.25 h ⁻¹
p_5	Apparent first-order rate constant for translation of SIZAT12 protein	0.66 h ⁻¹	2.23 h ⁻¹
p_6	Apparent first-order rate constant for translation of SICOR413 protein	1 h ⁻¹	1.2 h ⁻¹
k_1	Maximum rate of enzymatic degradation of <i>SIHY5</i> mRNA	1.595 h ⁻¹	NA
k_2	Maximum rate of enzymatic degradation of <i>SIMYB15</i> mRNA	0.3 h ⁻¹	NA
k_3	Maximum rate of enzymatic degradation of <i>SICAMTA</i> mRNA	2 h ⁻¹	NA
k_4	Maximum rate of enzymatic degradation of <i>SICBF1</i> mRNA	1.8 h ⁻¹	0.55 (cold)/
		(linear degradation)	5.5 (warm) nM h ⁻¹
			(nonlinear degradation)

k_5	Maximum rate of enzymatic degradation of <i>SIZAT12</i> mRNA	1.5 h ⁻¹ (linear degradation)	0.1 nM h ⁻¹ (nonlinear degradation)
k_6	Maximum rate of enzymatic degradation of <i>SICOR413</i> mRNA	1.3 h ⁻¹ (linear degradation)	1.25 nM h ⁻¹ (nonlinear degradation)
k_A	Apparent first-order rate constant for activation of PHYA by calmodulin	2.5 h ⁻¹	NA
k_B	Apparent first-order rate constant for activation of PHYB by calmodulin	1 h ⁻¹	NA
k_{BA}	Apparent first-order rate constant for inhibition of PHYA by PHYB	0.4 h ⁻¹	NA
d	First-order rate constant for degradation of SLICE1 protein	3.8 h ⁻¹ (linear degradation)	0.1 nM h ⁻¹ (nonlinear degradation)
d_0	First-order rate constant for degradation of SICOP1 protein	1.2 h ⁻¹	NA
d_{0L}	First-order rate constant for degradation of SICOP1 protein induced by light	0.5 h ⁻¹	NA
d_1	First-order rate constant for degradation of SIHY5 protein	0.8 h ⁻¹	NA
d_{1L}	First-order rate constant for degradation of SIHY5 protein induced by light	0.62 h ⁻¹	NA
d_2	First-order rate constant for degradation of SIMYB15 protein	1 h ⁻¹ (linear degradation)	4.92 nM h ⁻¹ (nonlinear degradation)
d_3	First-order rate constant for degradation of SICAMTA protein	0.2 h ⁻¹	NA
d_4	First-order rate constant for degradation of SICBF1 protein	0.001 h ⁻¹ (linear degradation)	1.2 nM h ⁻¹ (nonlinear degradation)
d_5	First-order rate constant for degradation of SIZAT12 protein	0.38 h ⁻¹ (linear degradation)	1.3 nM h ⁻¹ (nonlinear degradation)
d_6	First-order rate constant for degradation of SICOR413 protein	0.2 h ⁻¹ (linear degradation)	0.3 nM h ⁻¹ (nonlinear degradation)
d_A	First-order rate constant for degradation of SIPHYA protein	0.534 h ⁻¹	NA
d_B	First-order rate constant for degradation of SIPHYB protein	0.954 h ⁻¹	NA
d_{PIF}	First-order rate constant for degradation of SIPIF4 protein	1 h ⁻¹	NA
d_{GAI}	First-order rate constant for degradation of SIGAI4 protein	0.5 h ⁻¹	NA
d_{P2}	First-order rate constant for degradation of phosphorylated SIMYB15 protein	1 h ⁻¹	NA
d_{P3}	First-order rate constant for degradation of phosphorylated SLICE1 protein	0.5 h ⁻¹	NA
d_{P4}	First-order rate constant for degradation of phosphorylated SICBF1 protein	0.5 h ⁻¹ (linear degradation)	1.2 nM h ⁻¹ (nonlinear degradation)
K_1	Threshold constant for inhibition by SICOP1 of <i>SIHY5</i> expression	0.65 nM	NA
K_2	Threshold constant for activation by SIHY5 of <i>SIMYB15</i> expression	3.5 nM	NA
K_3	Threshold constant for activation by SLICE1 of <i>SICBF1</i> expression	0.1 nM	0.21
K_4	Threshold constant for activation by SIMYB15 of <i>SICBF1</i> expression	0.8 nM	0.8 nM

K_5	Threshold constant for activation by SIHY5 of <i>SICBF1</i> expression	0.01 nM	NA
K_6	Threshold constant for activation by SIPIF4 of <i>SICBF1</i> expression	0.6 nM	NA
K_7	Threshold constant for activation by SICAMTA of <i>SICBF1</i> expression	0.3 nM	NA
K_8	Threshold constant for inhibition by SIZAT12 of <i>SICBF1</i> expression	0.52 nM	0.3 nM
K_9	Threshold constant for activation by SICBF1 of <i>SIZAT12</i> expression	50 nM	0.28 nM
K_{10}	Threshold constant for activation by SICBF1 of <i>SICOR413</i> expression	80 nM	0.1 nM
K_{11}	Threshold constant for activation by SIZAT12 of <i>SICOR413</i> expression	3.6 nM	0.2 nM
K_{P1}	Michaelis constant for phosphorylation of SIMYB15 protein	0.6 nM	0.5 nM
K_{P2}	Michaelis constant for dephosphorylation of SIMYB15 protein	0.5 nM	0.5 nM
K_{P3}	Michaelis constant for phosphorylation of SIICE1 protein	0.05 nM	0.45 nM
K_{P4}	Michaelis constant for dephosphorylation of SIICE1 protein	1.2 nM	0.8 nM
K_{P5}	Michaelis constant for phosphorylation of SICBF1 protein	0.6 nM	0.6 nM
K_{P6}	Michaelis constant for dephosphorylation of SICBF1 protein	0.58 nM	0.58 nM
K_{CaM1}	Michaelis constant for phosphorylation of SIMYB15 protein induced by calmodulin	3 nM	0.5 nM
K_{CaM2}	Michaelis constant for phosphorylation of SIICE1 protein induced by calmodulin	0.45 nM	0.45 nM
K_{CaM3}	Threshold constant for activation of <i>SICAMTA</i> expression induced by calmodulin	1.5 nM	NA
K_A	Michaelis constant for phosphorylation of SIPHYA protein induced by calmodulin	1 nM	NA
K_B	Michaelis constant for phosphorylation of SIPHYB protein induced by calmodulin	0.1 nM	NA
K_{AB}	Threshold constant for inhibition of SIPHYA expression by SIPHYB	1.5 nM	NA
K_{BA}	Threshold constant for inhibition of SIPHYB expression by SIPHYA	0.23 nM	NA
K_{phyA}	Threshold constant for inhibition of SIPIF4 expression by SIPHYA	1 nM	NA
K_{phyB}	Threshold constant for inhibition of SIPIF4 expression by SIPHYB	0.6 nM	NA
K_{PIF}	Threshold constant for activation of SIGAI4 expression by SIPIF4	0.5 nM	NA
K_{GAI}	Threshold constant for inhibition of SIPIF4 expression by SIGAI4	0.2 nM	NA
α_{FR}	Michaelis constant for degradation of PHYA under low R:FR	0.2 nM	NA
α_R	Michaelis constant for degradation of PHYB under high R:FR	0.4 nM	NA

Note: The degradation rate units differ between the two models because linear degradation is applied in the Tomato model, whereas nonlinear degradation is used in H2025.