Table 1S. The measured apparent quantum yield ($\Phi_{PPFD\leq200}$, $\Phi_{PPFD\leq160}$, $\Phi_{PPFD\leq120}$), light saturation point (LSP), light-saturated net photosynthetic rate (P_{Nmax}), light compensation point (LCP), dark respiration rate (R_D) and their fitted values using the four models for *Prunus sibirica* under different relative soil water contents (RWC). Each value is the mean of 27 replications or the mean ± SE of the fitted parameters at 0.05 significant level. The coefficient of determination (R^2), the mean square error (MSE) and the mean absolute error (MAE) are listed for each model. $\Phi_{PPFD\leq200}$, $\Phi_{PPFD\leq160}$, $\Phi_{PPFD\leq120}$ are the apparent quantum yield when the upper limits of photosynthetic photon flux density (PPFD) are 200, 160, and 120 μmol m^{-2} s^{-1}, respectively; Φ_0 and Φ_c are the quantum yield at the light compensation point and at zero irradiance, respectively; Φ_{c0} is the absolute value of the slope of the photosynthetic rate-light response curve between zero irradiance and LCP.

Model	Parameter	RWC = 94.9%	RWC = 80.9%	RWC = 68.2%	RWC = 56.3%	RWC = 44.7%	RWC = 36.4%	RWC = 28.3%	RWC = 25.1%
Measured data	$\Phi_{PPFD\leq200}$	0.0242	0.029	0.0412	0.0351	0.0317	0.0259	0.0235	0.0207
	$\Phi_{PPFD\leq160}$	0.0286	0.0311	0.0451	0.0375	0.036	0.0285	0.0281	0.0215
	$\Phi_{PPFD\leq120}$	0.0301	0.0417	0.046	0.0383	0.0438	0.0291	0.0291	0.026
	LSP [μmol m^{-2} s^{-1}]	597	1000	1520	1183	610	570	523	423
	P_{Nmax} [μmol m^{-2} s^{-1}]	5.32	6.71	10.91	8.93	6.08	5.58	4.63	4.24
	LCP [μmol m^{-2} s^{-1}]	15.62	48.13	43.53	45.6	45.47	30.8	19.76	23.85
	R_D [μmol m^{-2} s^{-1}]	0.37	1.75	3.07	1.31	1.38	0.86	0.49	0.48
Rectangular hyperbola Model	Φ_0	126.244 ± 0.932	0.0757 ± 0.002	0.0779 ± 0.006	0.0782 ± 0.001	115.874 ± 4.237	162.42 ± 5.305	633.946 ± 11.156	56.678 ± 0.928
	Φ_c	0.1014	0.0494	0.0555	0.0492	0.3407	0.7824	0.0321	0.0156
	Φ_{c0}	3.5776	0.0612	0.0657	0.0620	6.2828	11.273	4.5138	0.9395
	LSP [μmol m^{-2} s^{-1}]	129	52	103	96	163	150	173	169
	P_{Nmax} [μmol m^{-2} s^{-1}]	172.94 ± 5.95	22.84 ± 1.06	25.48 ± 1.14	20.58 ± 1.58	197.12 ± 9.01	199.77 ± 7.83	291.99 ± 8.26	109.74 ± 8.12
	LCP [μmol m^{-2} s^{-1}]	46.97	67.79	60.55	68.70	29.67	16.49	64.23	114.87
	R_D [μmol m^{-2} s^{-1}]	168.04 ± 2.11	4.19 ± 0.95	3.98 ± 0.25	4.26 ± 0.69	186.43 ± 4.15	185.9 ± 5.35	289.91 ± 7.18	107.92 ± 3.15
	R^2	0.693	0.983	0.997	0.99	0.798	0.604	0.302	0.603
	MSE	0.447	0.066	0.025	0.076	0.509	0.722	0.77	0.527
	MAE	0.584	0.227	0.124	0.229	0.604	0.759	0.779	0.566
Non-rectangular hyperbola Model	Φ_0	0.0283 ± 0.015	0.0383 ± 0.001	0.0985 ± 0.004	0.0492 ± 0.007	0.036 ± 0.005	0.0274 ± 0.016	-	-
	Φ_c	0.0225	0.0336	0.0645	0.0226	0.0257	0.0213	-	-
	Φ_{c0}	0.0248	0.0340	0.0863	0.0282	0.0368	0.0229	-	-
	LSP [μmol m^{-2} s^{-1}]	224	273	197	280	253	238	-	-
	P_{Nmax} [μmol m^{-2} s^{-1}]	5.41 ± 0.34	13.03 ± 0.28	15.4 ± 0.69	15.94 ± 0.32	7.12 ± 0.13	5.51 ± 0.81	-	-
	LCP [μmol m^{-2} s^{-1}]	64.12	50.04	44.39	44.81	73.1	37.24	-	-
	R_D [μmol m^{-2} s^{-1}]	1.59 ± 0.21	1.70 ± 0.35	3.83 ± 0.42	1.26 ± 0.49	2.69 ± 0.56	3.28 ± 0.67	-	-
	R^2	0.794	0.995	0.998	0.997	0.869	0.723	-	-
	MSE	0.300	0.020	0.018	0.019	0.329	0.505	-	-
	MAE	0.426	0.120	0.107	0.120	0.470	0.568	-	-
Exponential model	Φ_0	0.1243 ± 0.096	0.0743 ± 0.006	0.0793 ± 0.010	0.0778 ± 0.011	0.1533 ± 0.085	0.1313 ± 0.125	-	-

	Φ_c	0.0485	0.0486	0.0549	0.0546	0.0620	0.0400	-	-
	Φ_{c0}	0.6240	0.0555	0.0616	0.0702	0.0906	0.0569	-	-
	LSP [μmol m^{-2} s^{-1}]	210	310	363	329	310	286	-	-
	P_{Nmax} [μmol m^{-2} s^{-1}]	8.99 ± 3.78	9.92 ± 0.37	12.91 ± 0.75	11.57 ± 0.41	11.63 ± 1.36	9.45 ± 2.11	-	-
	LCP [μmol m^{-2} s^{-1}]	68.19	56.71	59.76	52.73	68.67	85.51	-	-
	R_D [μmol m^{-2} s^{-1}]	4.25 ± 3.83	3.15 ± 0.76	3.68 ± 1.02	3.70 ± 0.82	6.22 ± 0.45	4.79 ± 1.01	-	-
	R^2	0.788	0.997	0.990	0.996	0.872	0.707	0.481	0.462
	MSE	0.309	0.013	0.096	0.026	0.323	0.534	0.572	0.408
	MAE	0.455	0.094	0.271	0.127	0.452	0.626	0.641	0.487
Modified	Φ_0	0.0513	0.0537	0.0884	0.0612	0.0594	0.0178	0.0129	0.0148
rectangular	Φ_c	0.0101	0.0315	0.0839	0.0485	0.0572	0.0429	0.0395	0.0430
hyperbola	Φ_{c0}	0.0503 ± 0.006	0.0530 ± 0.003	0.0775 ± 0.005	0.0603 ± 0.009	0.0570 ± 0.004	0.0451 ± 0.007	0.0416 ± 0.009	0.0444 ± 0.003
model	LSP [μmol m^{-2} s^{-1}]	585	1060	1584	1229	617	581	457	614
	P_{Nmax} [μmol m^{-2} s^{-1}]	5.38	6.71	11.0	8.95	6.11	5.51	4.56	4.17
	LCP [μmol m^{-2} s^{-1}]	46.04 ± 0.52	56.23 ± 0.54	48.47 ± 0.92	51.98 ± 0.63	59.64 ± 0.73	50.83 ± 0.54	50.44 ± 0.83	51.20 ± 0.72
	R_D [μmol m^{-2} s^{-1}]	0.47	1.86	4.13	2.61	2.27	0.98	0.79	0.78
	R^2	0.997	0.999	0.999	0.998	0.999	0.991	0.986	0.995
	MSE	0.008	0.010	0.022	0.024	0.005	0.033	0.030	0.014
	MAE	0.070	0.066	0.117	0.094	0.051	0.144	0.137	0.091