Table S1. Measures of goodness of fit for models used in each experiment.

Experiment	Model[a]	Species	Factor / treatment	RMSE[b]	ME[c]
Dose response	Equation 1	Palmer amaranth	Shoot dry weight	7	0.94
			Lethality	8	0.93
		Waterhemp	Shoot dry weight	6	0.95
			Lethality	17	0.78
		Giant ragweed	Shoot dry weight	17	0.72
			Lethality	19	0.75
		Horseweed	Shoot dry weight	14	0.81
			Lethality	13	0.83
		Purple deadnettle	Shoot dry weight	18	0.65
			Lethality	22	0.62
Dose response injury progression	Equation 2	Palmer amaranth	8.8 g ai ha^{-1}	11	0.82
			17.5 g ai ha^{-1}	14	0.81
			35 g ai ha^{-1}	3	0.96
		Waterhemp	8.8 g ai ha^{-1}	12	0.75
			17.5 g ai ha^{-1}	11	0.80
			35 g ai ha^{-1}	11	0.86
		Giant ragweed	8.8 g ai ha^{-1}	17	0.67
			17.5 g ai ha^{-1}	17	0.74
			35 g ai ha^{-1}	20	0.63
		Horseweed	8.8 g ai ha^{-1}	—	—
			17.5 g ai ha^{-1}	31	0.78
			35 g ai ha^{-1}	5	0.95
		Purple deadnettle	8.8 g ai ha^{-1}	19	0.72
			17.5 g ai ha^{-1}	18	0.59
			35 g ai ha^{-1}	16	0.74
Application time of day	Equation 3	Palmer amaranth	1 h after sunrise	2	0.94
			Solar noon	12	0.68
			1 h before sunset	11	0.75
		Waterhemp	1 h after sunrise	7	0.82
			Solar noon	18	0.66
			1 h before sunset	4	0.89
		Giant ragweed	1 h after sunrise	14	0.70
			Solar noon	17	0.69
			1 h before sunset	15	0.74
		Horseweed	1 h after sunrise	3	0.91
			Solar noon	7	0.80
			1 h before sunset	11	0.70
		Purple deadnettle	1 h after sunrise	16	0.71
			Solar noon	24	0.59
			1 h before sunset	21	0.64
Light intensity	Equation 3	Palmer amaranth	1,000 µmol m^{-2} s^{-1}	15	0.74
			600 µmol m^{-2} s^{-1}	15	0.69
			200 µmol m^{-2} s^{-1}	10	0.90

		Waterhemp	1,000 µmol m^{-2} s^{-1}	6	0.86
			600 µmol m^{-2} s^{-1}	9	0.88
			200 µmol m^{-2} s^{-1}	5	0.85
		Giant ragweed	1,000 µmol m^{-2} s^{-1}	9	0.85
			600 µmol m^{-2} s^{-1}	5	0.89
			200 µmol m^{-2} s^{-1}	6	0.84
		Horseweed	1,000 µmol m^{-2} s^{-1}	13	0.74
			600 µmol m^{-2} s^{-1}	19	0.63
			200 µmol m^{-2} s^{-1}	16	0.78
		Purple deadnettle	1,000 µmol m^{-2} s^{-1}	5	0.90
			600 µmol m^{-2} s^{-1}	14	0.75
			200 µmol m^{-2} s^{-1}	10	0.64
Temperature	Equation 3	Palmer amaranth	27 / 16 C	15	0.66
			18 / 13 C	18	0.69
		Waterhemp	27 / 16 C	12	0.75
			18 / 13 C	13	0.69
		Giant ragweed	27 / 16 C	12	0.75
			18 / 13 C	20	0.59
		Horseweed	27 / 16 C	8	0.81
			18 / 13 C	13	0.74
		Purple deadnettle	27 / 16 C	17	0.62
			18 / 13 C	8	0.77
Adjuvant	Equation 3	Palmer amaranth	COC	18	0.55
			NIS	18	0.67
			None	15	0.69
		Waterhemp	COC	22	0.51
			NIS	10	0.84
			None	15	0.77
		Giant ragweed	COC	12	0.80
			NIS	8	0.85
			None	9	0.86
		Horseweed	COC	11	0.73
			NIS	16	0.68
			None	7	0.86
		Purple deadnettle	COC	36	0.46
			NIS	24	0.54
			None	23	0.66

[a] Equation 1 (four-parameter log-logistic): $f(x) = C + \frac{D-C}{1+\exp(b[\log x - \log e])}$; Equation 2 (four-parameter Weibull): $f(t) = M(1 - \exp[-(k[t-l])^c])$; Equation 3 (two-parameter exponential rise to maximum): $f(t) = M(1 - \exp[-kt])$

[b] Root mean square error

[c] Model efficiency coefficient