Supplementary material

Supplementary material 1. Dose-response assays

1.1. Minimal adequate model

The model, including random and fixed effects.

Nonlinear mixed-effects model fit by REML

Model: fw ~ fwc/(1 + exp(b * (log(dose) - e)))

AIC	BIC	logLik
299.4771	403.7701	-123.7386

Random effects:

Formula: e ~ 1 | pot

	e.(Intercept)	Residual
StdDev:	0.3198972	0.2279922

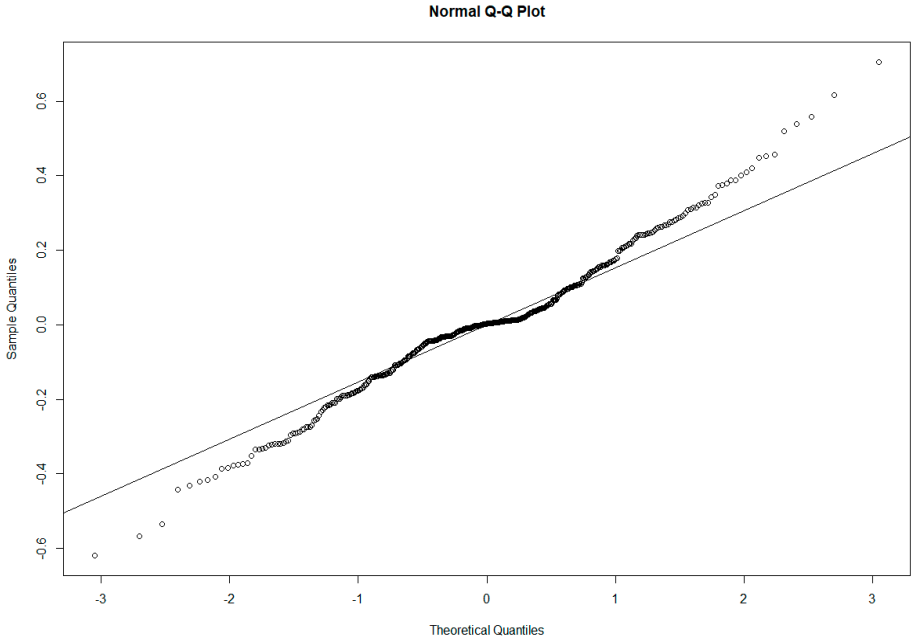
Fixed effects:

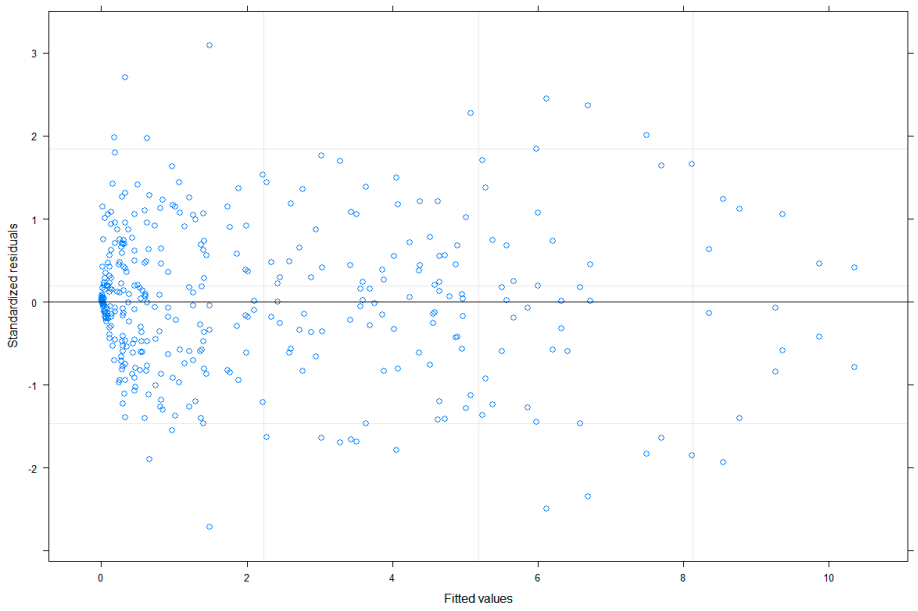
Fixed effects: c(b ~ pop * adjuv2, e ~ pop * glypho * adjuv2)

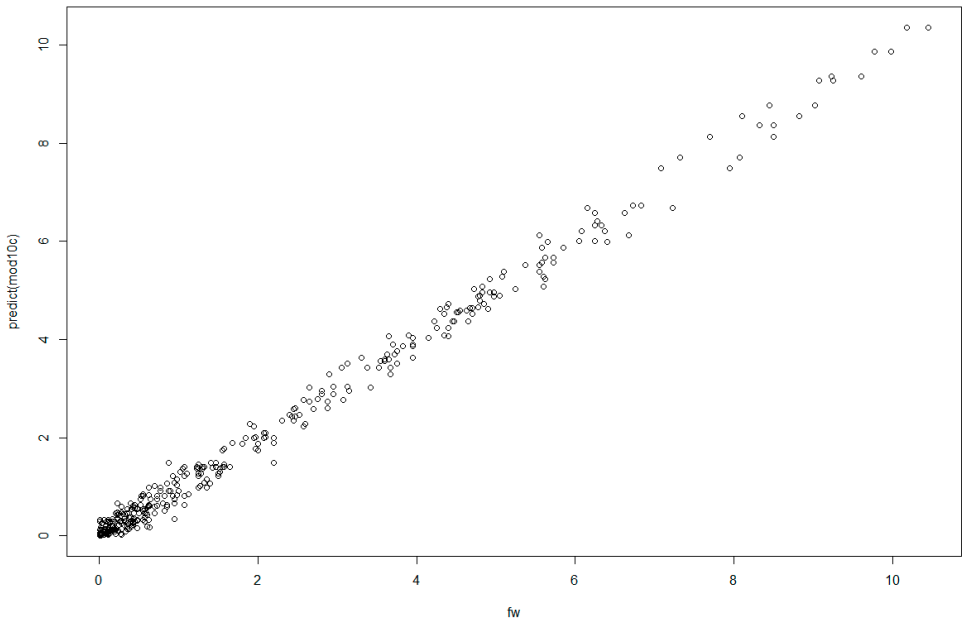
parameter and term (1)	**estimate**	**Std.Error**	**DF**	**t-value**	***p*-value**
b.(Intercept)	1.249237	0.2184183	195	5.719467	<0.0001
b.popf1	0.154987	0.2339749	195	0.66241	0.5085
b.popf2	0.119917	0.2304608	195	0.520337	0.6034
b.adjuv2ad	0.093276	0.278096	195	0.335409	0.7377
b.popf1:adjuv2ad	-0.482225	0.2933759	195	-1.643709	0.1018
b.popf2:adjuv2ad	-0.083562	0.2997114	195	-0.278808	0.7807
e.(Intercept)	3.492766	0.2470166	195	14.139799	<0.0001
e.popf1	2.926281	0.2832222	195	10.332101	<0.0001
e.popf2	1.997001	0.275908	195	7.237923	<0.0001
e.glyphoglypho2	-0.220132	0.293217	195	-0.750746	0.4537
e.glyphoglypho3	-0.933886	0.3529433	195	-2.645996	0.0088
e.adjuv2ad	-0.967603	0.3493033	195	-2.770096	0.0061
e.popf1:glyphoglypho2	-0.119611	0.3513688	214	-0.340414	0.7339
e.popf2:glyphoglypho2	0.568654	0.3433864	195	1.656019	0.0993
e.popf1:glyphoglypho3	-0.04896	0.4014095	195	-0.12197	0.903
e.popf2:glyphoglypho3	0.61883	0.3945662	195	1.568379	0.1184
e.popf1:adjuv2ad	0.158164	0.3877999	195	0.40785	0.6838
e.popf2:adjuv2ad	0.273756	0.3843682	195	0.712223	0.4772
e.glyphoglypho2:adjuv2ad	0.217214	0.3648335	195	0.595379	0.5523
e.glyphoglypho3:adjuv2ad	0.928846	0.4136287	195	2.245602	0.0259
e.popf1:glyphoglypho2:adjuv2ad	0.015212	0.4345772	214	0.035004	0.9721
e.popf2:glyphoglypho2:adjuv2ad	-1.028349	0.4326213	195	-2.37702	0.0184
e.popf1:glyphoglypho3:adjuv2ad	-0.294593	0.475498	195	-0.619546	0.5363
e.popf2:glyphoglypho3:adjuv2ad	-1.488492	0.4768306	195	-3.121637	0.0021

Reference classes: population S, no adjuvant added, glyphosate1

1.2. Model checking







Normal quantile-quantile plot, plot of residuals against fitted values and plot of predicted against observed values of fresh weight.

Supplementary material 2. ANOVA tables of foliar retention of spraying solution

2.1. Anova tables

ANOVA table for the initial, complete model testing the effect of *C. sumatrensis* population, glyphosate formulation and adjuvant treatment on leaf retention of spraying solution.

effect	**df**	**Sum of squares**	**Mean square**	**F**	***p*-value**
population	2	117	58	0.112	0.894
formulation	2	165055	82528	158.384	<0.001***
adjuvant	2	98520	49260	94.539	<0.001***
pop:frm	4	459	115	0.220	0.927
pop:adj	4	31	8	0.015	1.000
form:adj	4	77232	19308	37.055	<0.001***
pop:frm:adj	8	582	73	0.140	0.997
Residuals	108	56274	521		

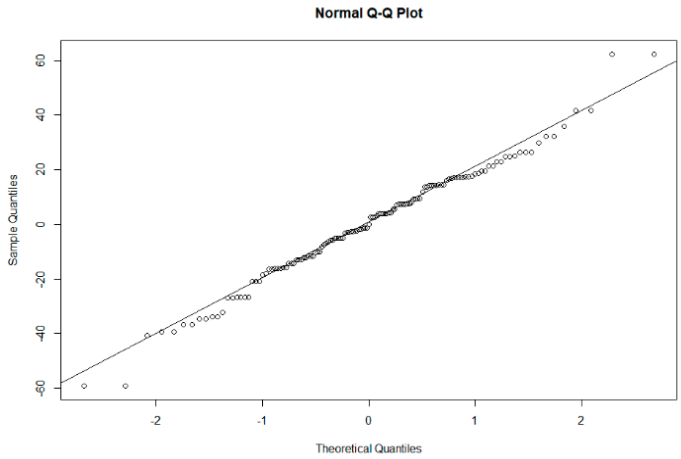
***: $p < 0.001$

ANOVA table for the final, minimal adequate model testing the effect of *C. sumatrensis* population, glyphosate formulation and adjuvant treatment (adj2) on leaf retention of spraying solution.

effect	**df**	**Sum of squares**	**Mean square**	**F**	***p*-value**
formulation	2	165055	82528	178.73	<0.001***
adj2	1	98335	98335	212.96	<0.001***
frm:adj2	2	75316	37658	81.56	<0.001***
Residuals	129	59565	462		

***: $p < 0.001$

2.2. Model checking



Quantile-quantile plot and Shapiro-Wilk normality test

Shapiro-Wilk normality test. W = 0.96694, *p*-value = 0.2235

Supplementary material 3. Glyphosate uptake

3.1. Anova Tables

ANOVA table for the initial, complete model testing the effect of time after treatment (hat), *C. sumatrensis* population, glyphosate formulation and adjuvant type on leaf uptake of ^{14}C-glyphosate.

effect	**df**	**Sum of squares**	**Mean square**	**F**	***p*-value**
log(hat)	1	19.464	19.464	14610.153	<0.001***

population	2	2.192	1.096	822.766	<0.001***
formulation	2	0.323	0.161	121.199	<0.001***
adjuvant	2	0.102	0.051	38.153	<0.001***
log(hat):pop	2	0.740	0.370	277.906	<0.001***
log(hat):frm	2	0.033	0.016	12.256	<0.001***
pop:frm	4	0.018	0.005	3.442	0.009**
log(hat):adj	2	0.008	0.004	2.869	0.058
pop:adj	4	0.001	<0.001	0.281	0.890
form:adj	4	0.010	0.002	1.822	0.125
log(hat):pop:frm	4	0.002	<0.001	0.363	0.835
log(hat):pop:adj	4	0.003	0.001	0.484	0.748
log(hat):frm:adj	4	0.001	<0.001	0.166	0.955
pop:frm:adj	8	0.001	<0.001	0.077	0.999
log(hat):pop:frm:adj	8	0.001	<0.001	0.137	0.998
Residuals	270	0.360	0.001		

**: $p < 0.01$; ***: $p < 0.001$

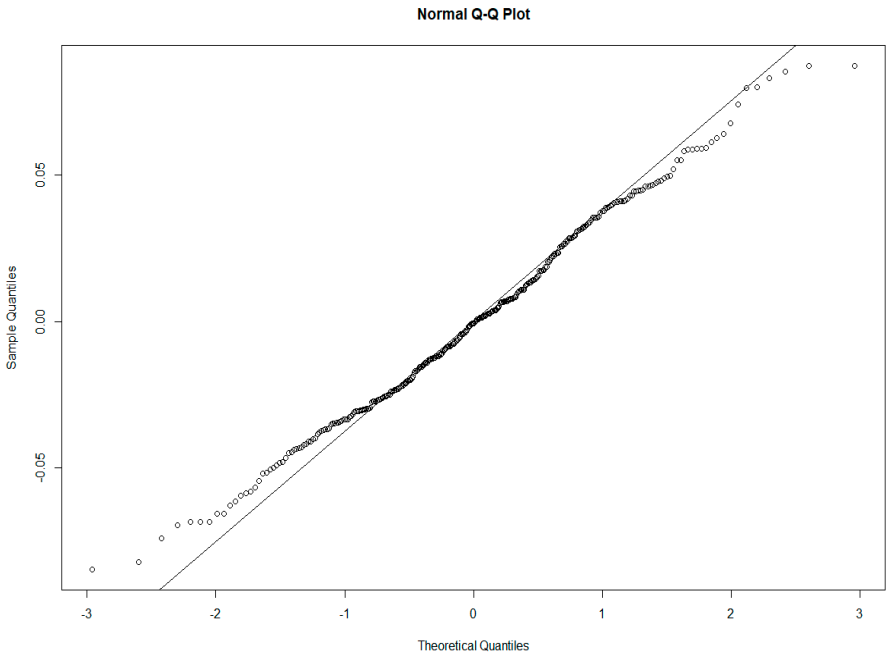
ANOVA table for the final, minimal adequate model testing the effect of time after treatment (hat), *C. sumatrensis* population, glyphosate formulation, adjuvant type on leaf uptake of ^{14}C-glyphosate.

effect	**df**	**Sum of squares**	**Mean square**	**F**	***p*-value**
log(hat)	1	19.464	19.464	16121.629	<0.001
population	2	2.192	1.096	907.884	<0.001
formulation	2	0.323	0.161	133.738	<0.001
adjuvant[1]	1	0.102	0.102	84.184	<0.001
log(hat):pop	2	0.74	0.37	306.657	<0.001
log(hat):formulation	2	0.033	0.016	13.524	<0.001
pop:formulation	4	0.018	0.005	3.798	0.005
log(hat):adjuvant	1	0.007	0.007	6.103	0.014
formulation:adjuvant	2	0.009	0.005	3.906	0.021
Residuals	306	0.369	0.001		

1 the minimal adequate model retained the factor adjuvant type with only two levels, no addition *vs*. adjuvant addition, either adj1 or adj2.

3.2. Model checking

Quantile-quantile plot and Shapiro-Wilk normality test



Quantile-quantile plot and Shapiro-Wilk normality test

Shapiro-Wilk normality test. W = 0.99335, *p*-value = 0.1632

3.3. Testing population effect for the most effective treatment (G3 plus adjuvant) at 96 hat

Shapiro-Wilk normality test
W = 0.88419, *p*-value = 0.03072 # non-normal residual distribution

Non-parametric Kruskal-Wallis rank sum test

Kruskal-Wallis chi-squared = 15.189, df = 2, *p*-value = 0.0005031

Post-hoc pairwise comparisons using the Wilcoxon rank sum test with Bonferroni adjustment:

	R1	R2
R2	0.015	-
S	0.015	0.015

Supplementary material 4. Glyphosate translocation

4.1. Manova tables

MANOVA table for the initial, complete model testing the effect of *C. sumatrensis* population, glyphosate formulation, adjuvant type on allocation pattern of ^{14}C-glyphosate among treated leaf, remaining of the shoot and roots.

effect	df	Pillai's trace	approx. F	num. df	den. df	*p*-value
population	2	1.0006	17.6873	0.112	6	<0.001***
formulation	2	0.1377	1.3061	158.384	6	0.2608
adjuvant	2	0.1283	1.2115	94.539	6	0.3062
pop:frm	4	0.2499	1.2267	0.220	12	0.2689
pop:adj	4	0.0332	0.1509	0.015	12	0.9996
form:adj	4	0.1632	0.7764	37.055	12	0.6741
pop:frm:adj	8	0.2921	0.7282	0.140	24	0.8174
Residuals	54					

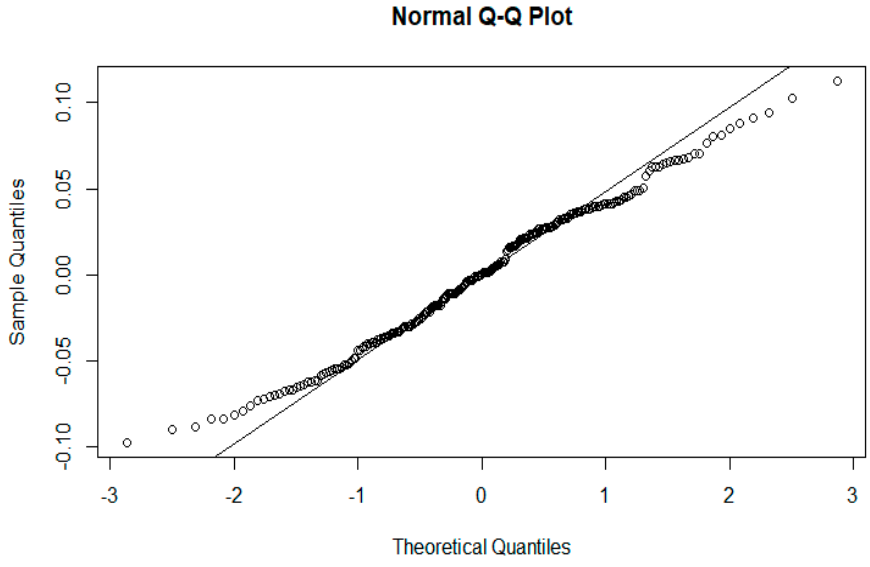
***: $p < 0.001$

MANOVA table for the final, minimal adequate model testing the effect of *C. sumatrensis* population, glyphosate formulation and adjuvant type on allocation pattern of ^{14}C-glyphosate among treated leaf, remaining of the shoot and roots.

term	df	Pillai's trace	approx. F	num. df	den. df	*p*-value
population[1]	1	0.99132	2929.9	3	77	<0.001
Residuals	79					

1 the minimal adequate model retained the factor population type with only two levels, R1 and remaining populations (R2 and S)

4.2. Model checking



Quantile-quantile plot and Shapiro-Wilk normality test

Shapiro-Wilk normality test. W = 0.98922, *p*-value = 0.06673