

Landscape and Micronutrient Fertilizer Effect on Agro-Fortified Wheat and Teff

Grain Nutrient Concentration in Western Amhara

Supplementary Files

Wheat Zn

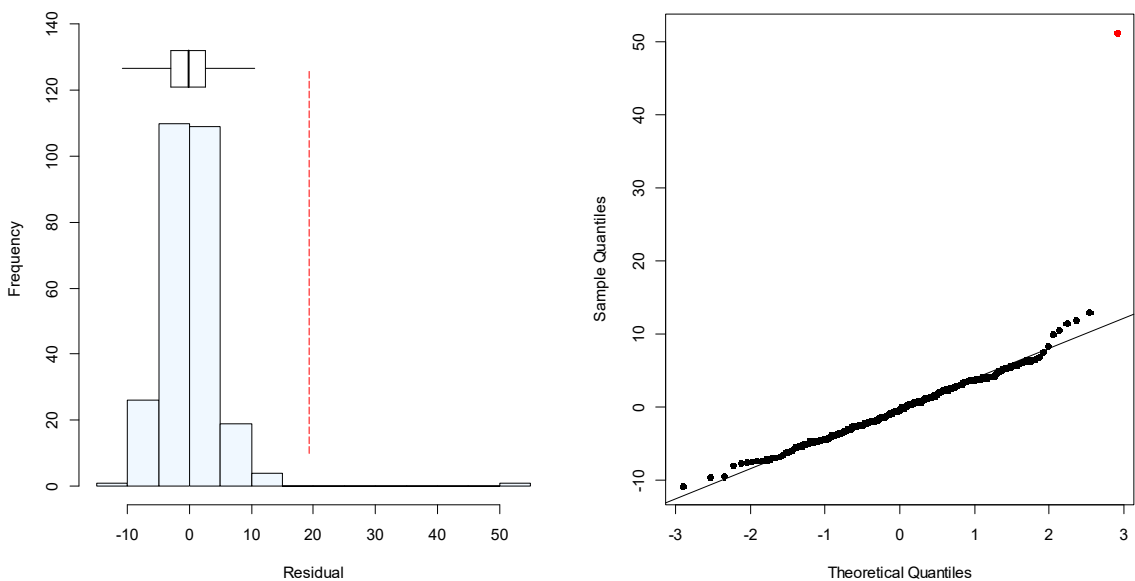


Figure S1. Wheat-Zn summary statistics for the residuals from the initial fit.

Mean	Median	Q1	Q3	Var	SD	Skew	Octile skewness	Kurtosis	No. outliers
0.000	-0.18	-2.97	2.60	25.60	5.06	3.90	-0.02	37.27	1

The residuals look plausibly normally distributed, although with one large outlier. Re-examining the raw data shows one outlying Zn value approximately twice the second-largest value in the set. Because such an observation could skew statistics (see, for example, the large skewness coefficient), the outlier was removed before further analyses.

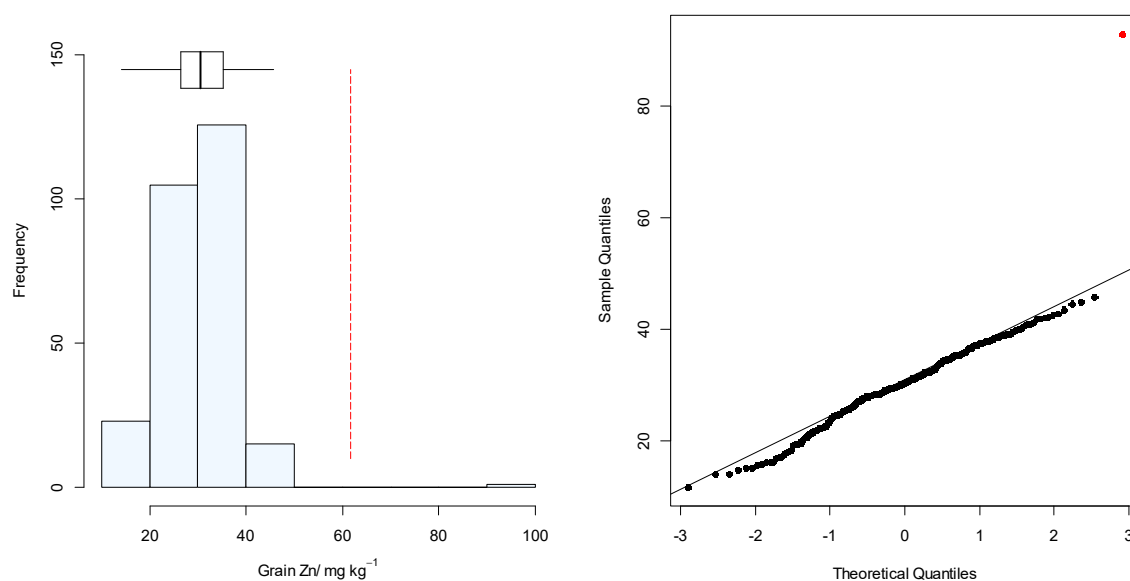


Figure S2. Wheat-Zn summary statistics for the residuals after removal of an outlier.

Removing just the outlier alone caused convergence problems (this is probably because of the fact that each farm is a single replicate), and so the whole field including the outlying value was removed to avoid this. The summary statistics and plot for the edited data set are below

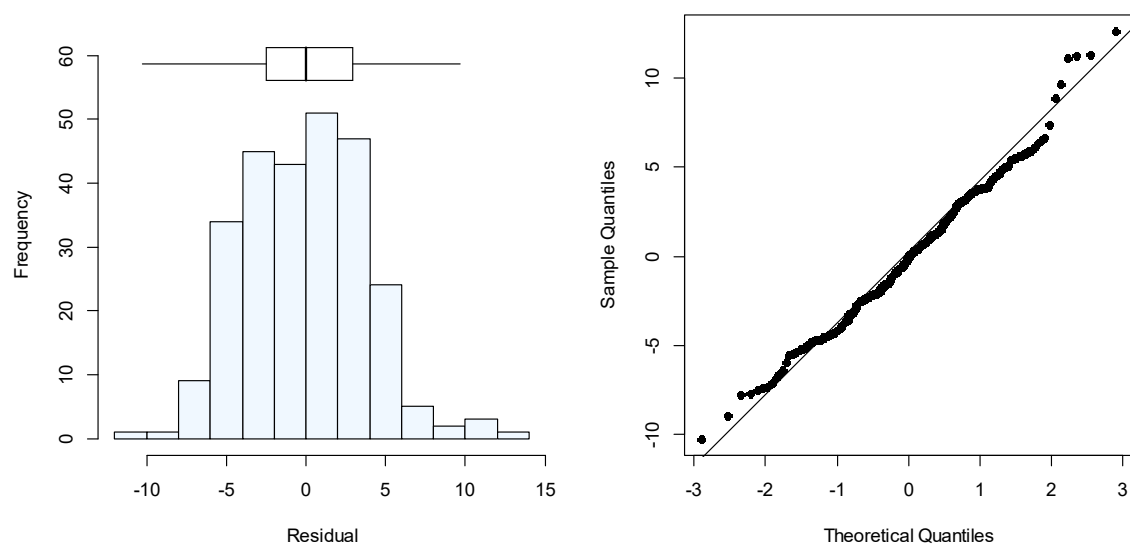


Figure S3. Wheat-Zn summary statistics for the residuals after removal of the whole field data set with the outlier.

Mean	Median	Q1	Q3	Var	SD	Skew	Octile	skewness	Kurtosis	No. outliers
0.000	0.01	-2.48	2.92	14.77	3.84	0.28	-0.03		0.19	0

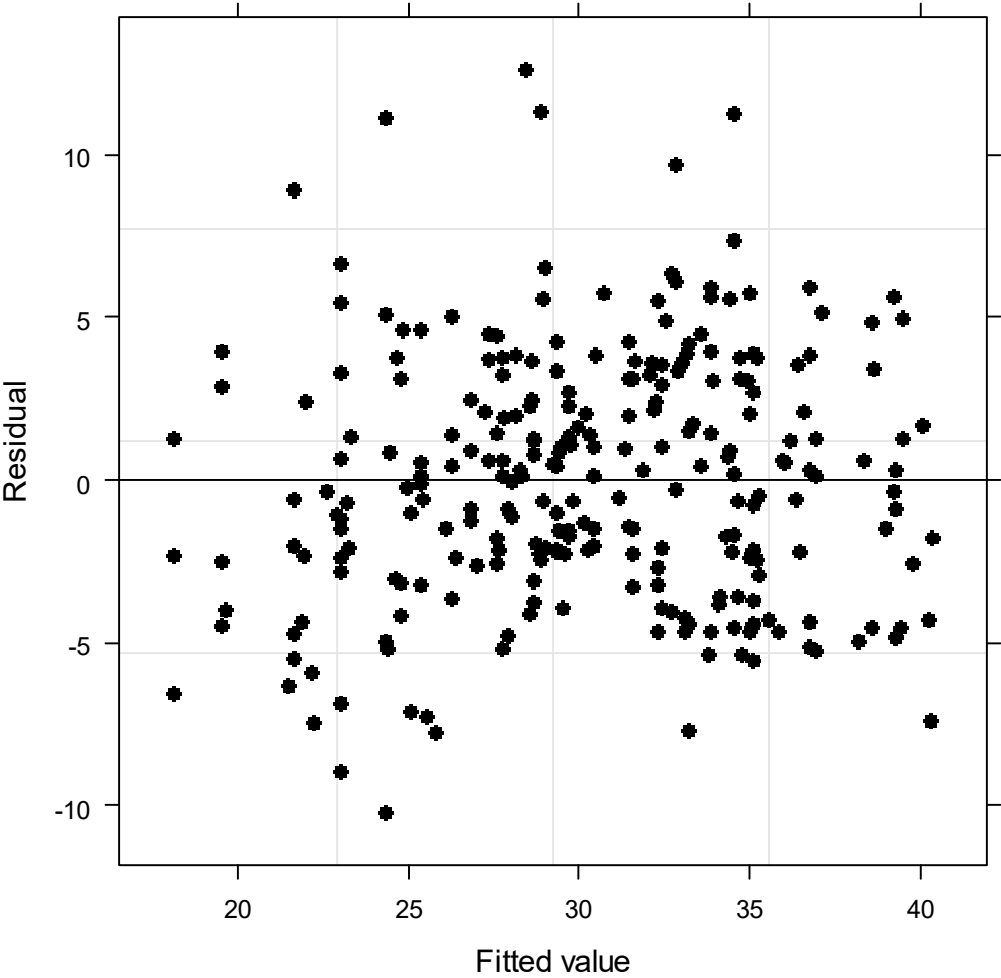


Figure S4. Plot of residuals against fitted values for Zn in wheat.

Analysis of variance

Variance component estimates

(NB the year and site components are based on two levels only)

Groups	Variance
Farmer.Site:Site	4.568
Site	18.063
Year	1.927
Residual	17.544

Table S1. ANOVA Table for Zn in wheat.

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)
Landscape.unit	133.02	66.51	2	53.046	3.7909	0.02892
C1	2021.40	2021.40	1	241.442	115.2161	< 2.2e-16
C2	365.89	365.89	1	249.031	20.8551	7.794e-06
C3	0.12	0.12	1	242.925	0.0068	0.93438
C4	56.90	56.90	1	246.165	3.2435	0.07293
Landscape.unit:C1	51.15	25.58	2	240.181	1.4578	0.23481
Landscape.unit:C2	74.49	37.24	2	241.596	2.1228	0.12192
Landscape.unit:C3	8.22	4.11	2	241.755	0.2343	0.79134
Landscape.unit:C4	34.09	17.04	2	242.931	0.9714	0.38000

Teff Zn

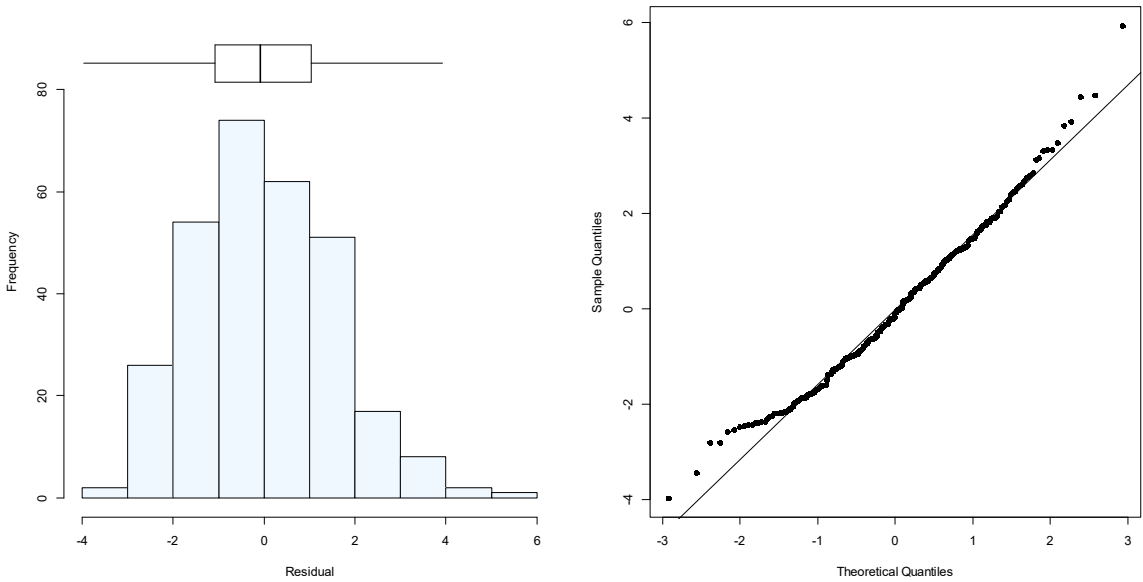


Figure S5. Teff-Zn summary statistics for the residuals from the initial fit.

Mean	Median	Q1	Q3	Var	SD	Skew	Octile	skewness	Kurtosis	No. outliers
0.000	-0.08	-1.08	1.04	2.43	1.56	0.44	0.03		0.23	0

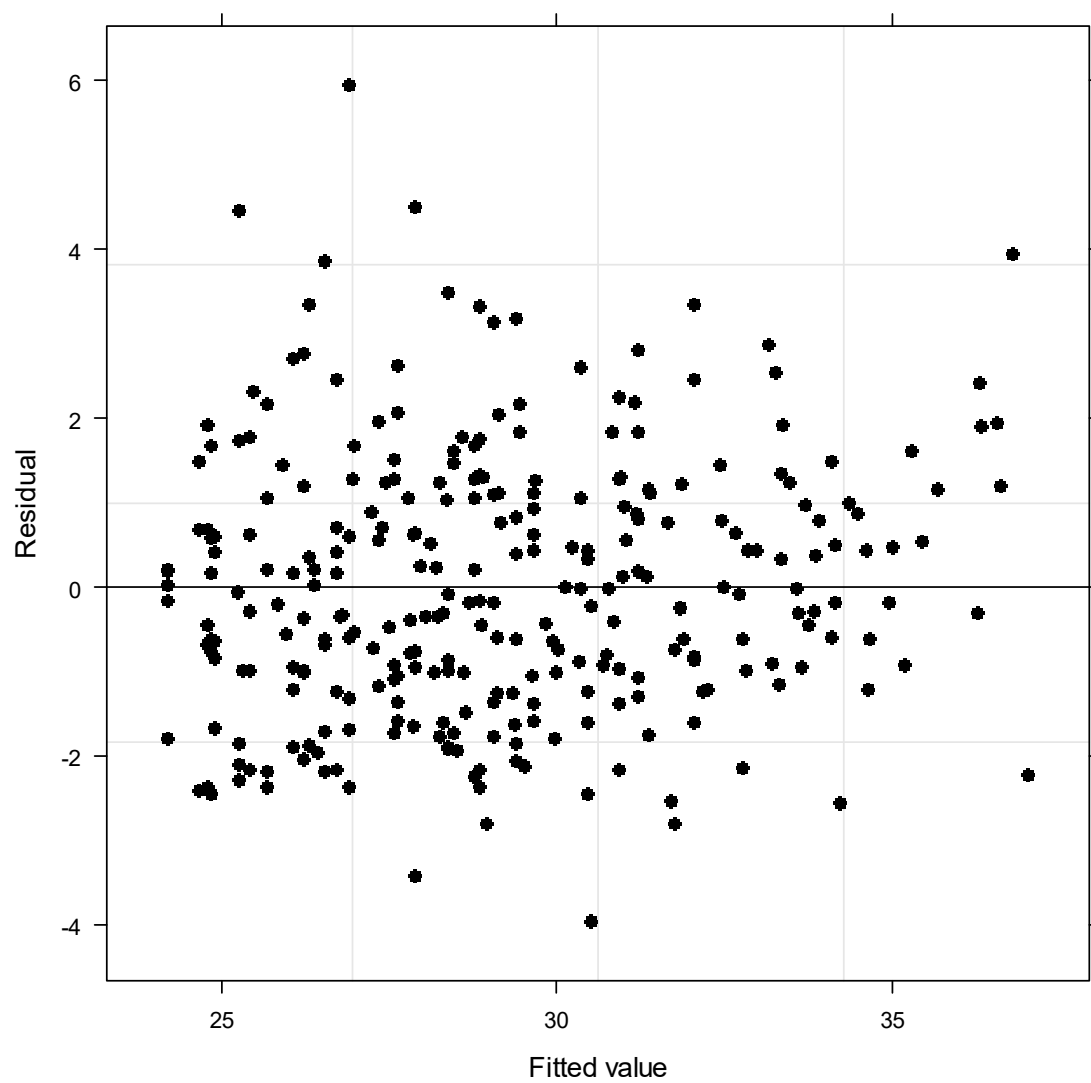


Figure S6. Plot of residuals against fitted values for Zn in teff.

Analysis of variance

Variance component estimates

(NB the year and site components are based on two levels only)

Groups	Variance
Farmer.Site:Site	5.237
Site	1.226
Year	5.196
Residual	3.075

Table S2. ANOVA Table for Zn in teff.

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)	
Landscape.unit	13.368	6.684	2	107.48	2.1734	0.11877	
C1	150.471	150.471	1	265.92	48.9265	2.151e-11	***
C2	14.539	14.539	1	265.18	4.7273	0.03057	*
C3	14.023	14.023	1	265.33	4.5597	0.03365	*
C4	4.252	4.252	1	265.68	1.3826	0.24071	
Landscape.unit:C1	11.070	5.535	2	264.59	1.7998	0.16735	
Landscape.unit:C2	2.668	1.334	2	263.91	0.4338	0.64850	
Landscape.unit:C3	2.025	1.012	2	264.44	0.3292	0.71982	
Landscape.unit:C4	10.102	5.051	2	265.70	1.6424	0.19547	

Wheat Se

Initial analysis shows that the grain Se data are strongly positively skew, and so are the residuals for a first fit of the model. Some outliers (upper and lower) appear in the residuals, but there is no evidence of outliers in the original data. Otherwise an assumption of normal and homogeneous residuals seemed plausible:

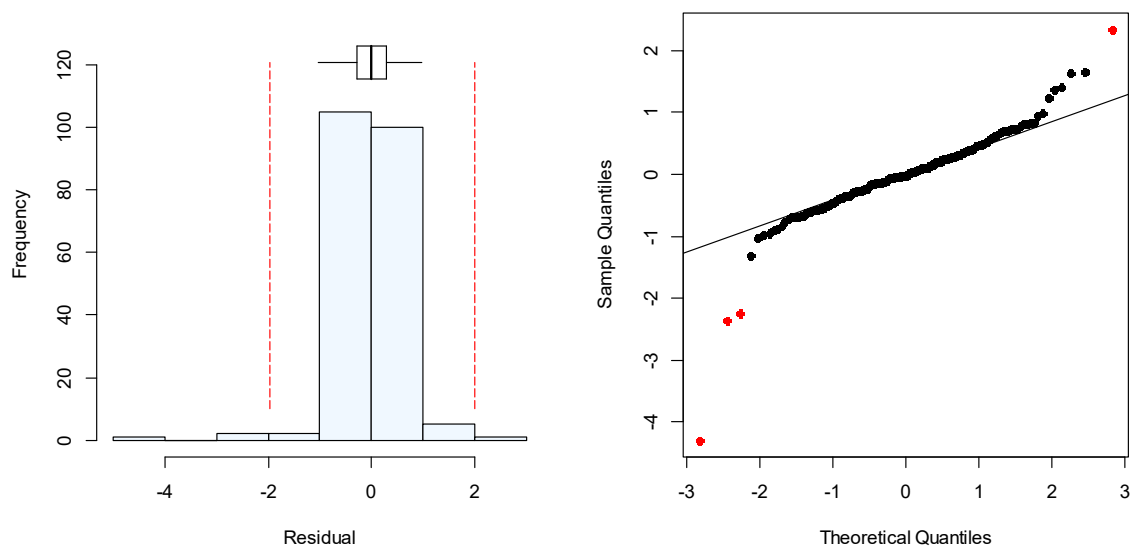


Figure S7. Wheat-Se summary statistics for the residuals from the initial fit.

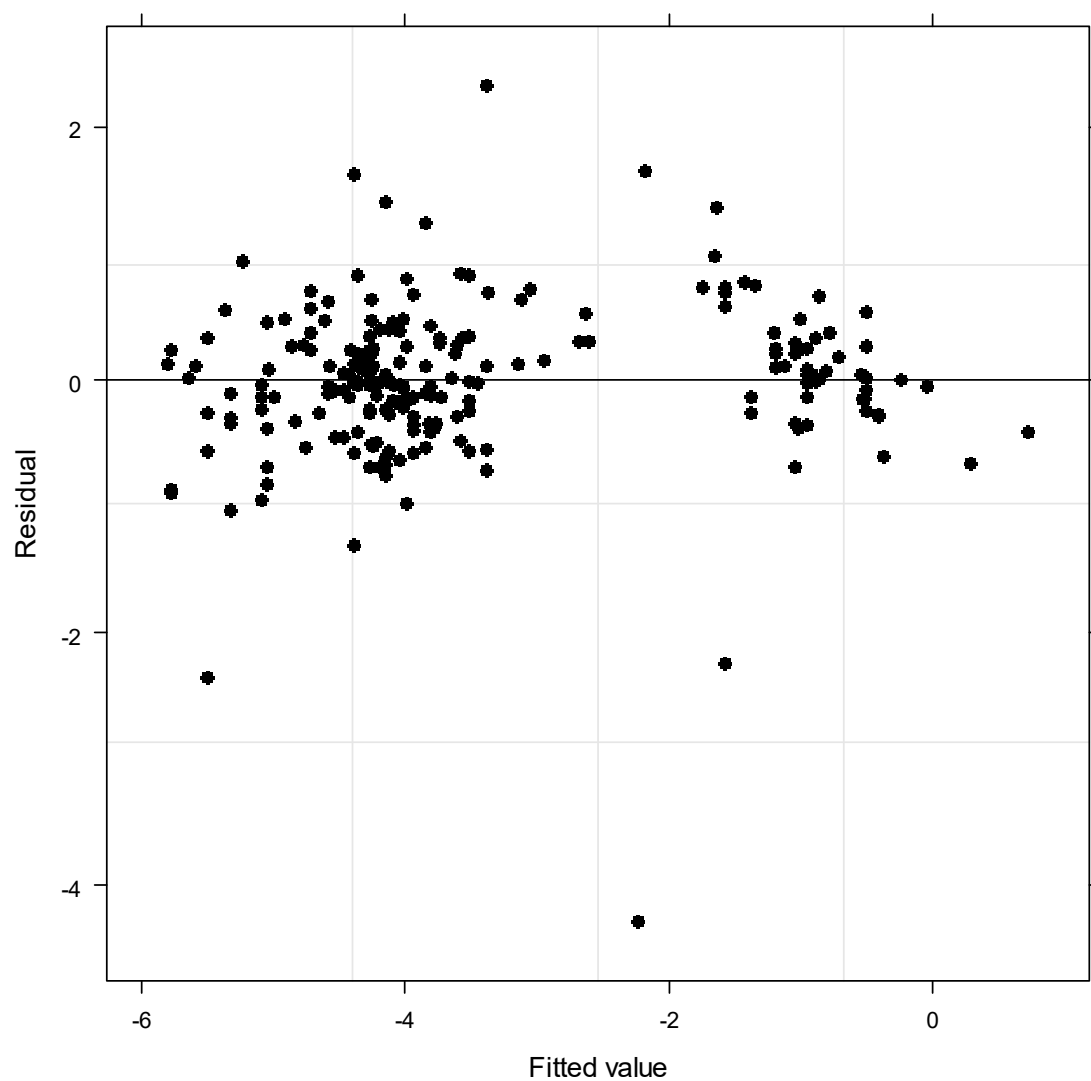


Figure S8. Plot of residuals against fitted values for Se in wheat.

Mean	Median	Q1	Q3	Var	SD	Skew	Octile	skewness	Kurtosis	No. outliers
0.000	-0.01	-0.27	0.29	0.38	0.62	-1.15	0.02		11.9	4

Analysis of variance

Variance component estimates

(NB the year and site components are based on two levels only, log units)

Groups	Variance
Farmer.Site:Site	0.341
Site	0.026
Year	0.053
Residual	0.487

Table S3. ANOVA Table for Se in wheat.

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)
Landscape.unit	5.468	2.734	2	49.913	5.6159	0.0063125
C1	300.048	300.048	1	199.133	616.3718	< 2.2e-16
C2	1.051	1.051	1	199.361	2.1600	0.1432234
C3	5.888	5.888	1	196.886	12.0949	0.0006222
Landscape.unit:C1	0.430	0.215	2	198.678	0.4413	0.6438000
Landscape.unit:C2	0.094	0.047	2	199.129	0.0970	0.9075643
Landscape.unit:C3	0.415	0.208	2	195.939	0.4266	0.6533375

Teff Se

Initial analysis shows that the grain Se data are strongly positively skew, and so are the residuals for a first fit of the model. Some outliers (upper and lower) appear in the residuals, but there is no evidence of outliers in the original data. Otherwise an assumption of normal and homogeneous residuals seemed plausible:

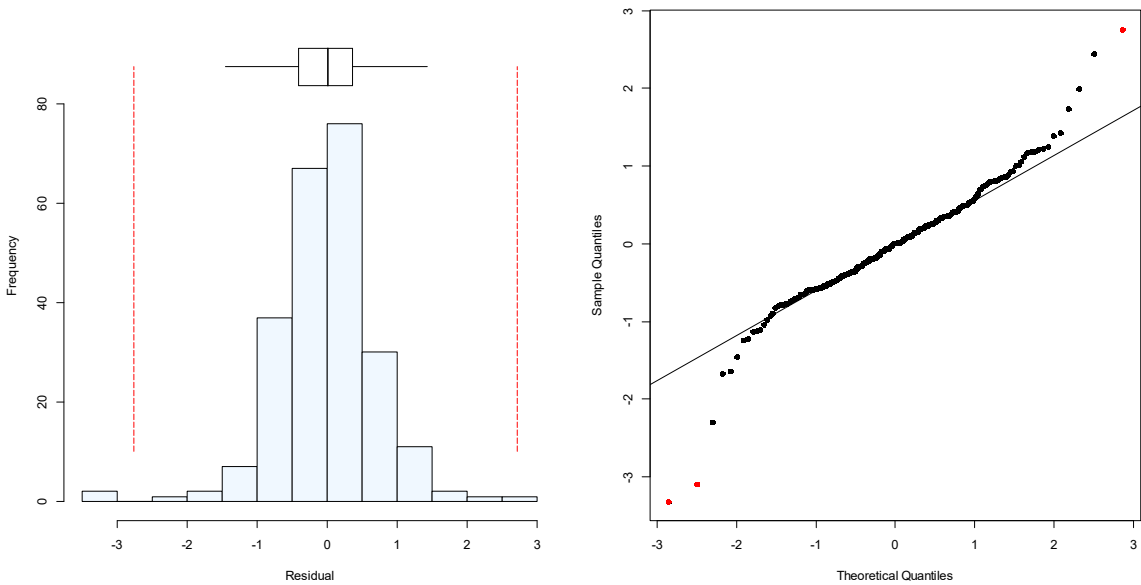


Figure S9. Teff-Se summary statistics for the residuals from the initial fit.

Mean	Median	Q1	Q3	Var	SD	Skew	Octile	skewness	Kurtosis	No. outliers
0.000	0.01	-0.41	0.37	0.52	0.72	-0.33	0.08		3.8	3

Analysis of variance

Variance component estimates

(NB the year and site components are based on two levels only, log units)

Groups	Variance
Farmer.Site:Site	0.118
Site	0.018
Year	0.000

Residual	0.603
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Table S4. ANOVA Table for Se in teff.

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)
Landscape.unit	12.196	6.098	2	60.142	10.1079	0.0001643
C1	279.763	279.763	1	208.226	463.7194	< 2.2e-16
C2	0.788	0.788	1	213.607	1.3061	0.2543887
C3	1.492	1.492	1	201.109	2.4732	0.1173766
Landscape.unit:C1	9.417	4.709	2	204.508	7.8048	0.0005414
Landscape.unit:C2	1.474	0.737	2	207.014	1.2218	0.2968238
Landscape.unit:C3	0.983	0.492	2	201.143	0.8150	0.4441135