Solution to Exercise 5.2a (Version 1, 26/09/14)

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Exercise 5.2a (Data: courtesy K. Hammond-Kosack, Rothamsted Research)

For the data set of Exercise 4.2, produce a set of residual plots based on standardized residuals, including a histogram of residuals, a fitted values plot, an absolute residuals plot and a normal plot. Give a critical assessment of whether the ANOVA assumptions are reasonable. Is there any evidence of outliers?

Solution 5.2a

A composite display of residual plots is shown in Figure S5.2.1; there are only 30 observations so we do not expect perfection, but are looking for major deviations from the expected patterns.

The histogram (bottom left) is reasonably symmetric and bell-shaped and the normal plot (bottom right) is reasonably linear. The variation in the residuals appears reasonably constant across the five treatments in both the residuals plot (top left) and the absolute residuals plot (top right). Only one observation, for the first replicate of treatment B, has a standardized residual greater than two (see also Solution 5.1a); there are no obvious outliers. The data appear to conform reasonably well to the assumptions of normality and heterogeneity of variances.
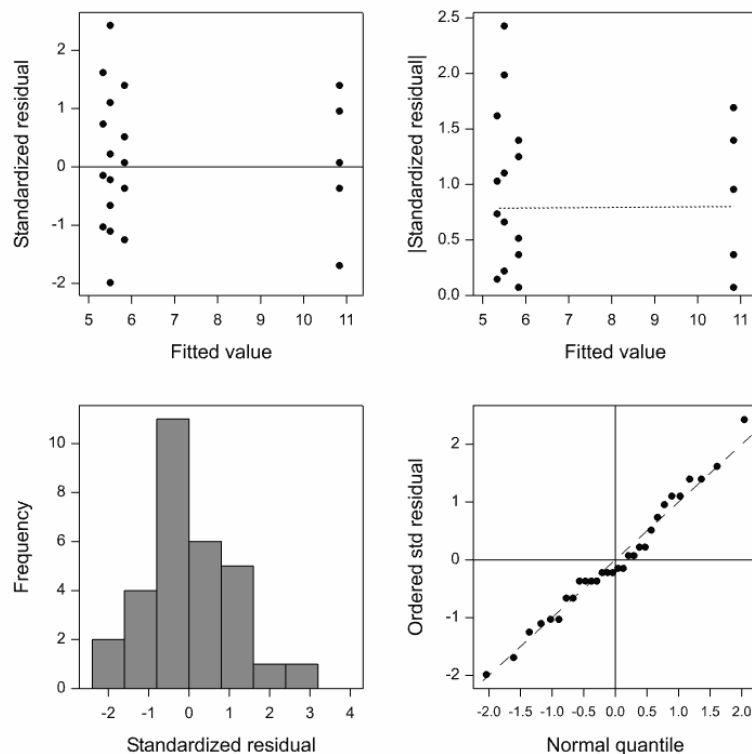

Figure S5.2.1. Composite set of residual plots based on standardized (std) residuals.