Automatic report for a Randomized Complete Block Design (RCBD)

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# 1. Model specification and data description

There are data from 16 treatments evaluated using a randomize complete block design with 3 blocks. The statistical model is

where

* is the observed response with treatment and block .
* is the mean response over all treatments and blocks.
* is the effect for treatment .
* is the effect for block .
* is the error term.

In this model we assume that the errors are independent and have a normal distribution with common variance, that is, .

# 2. Analysis for trait 1:Maize\_Grain\_Fresh\_weight\_g

## 2.1. ANOVA

You have fitted a linear model for a RCBD. The ANOVA table for your model is:

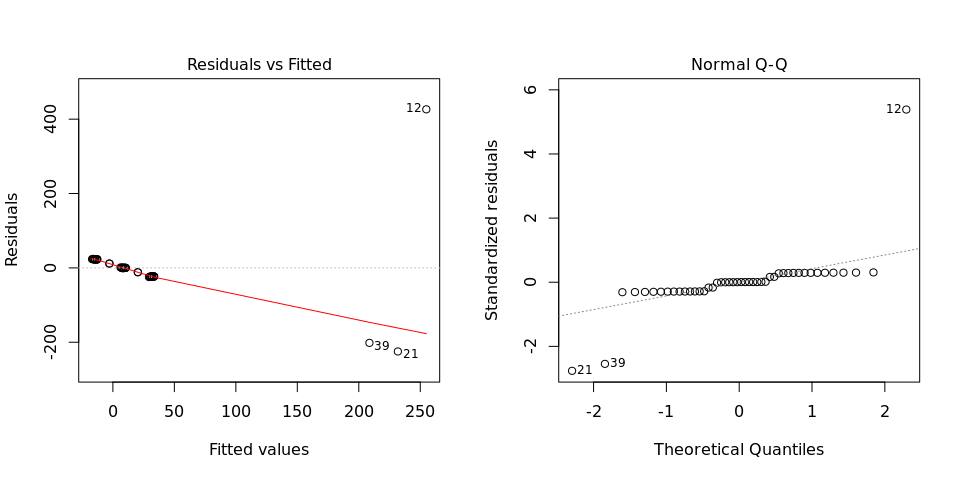
## Analysis of Variance Table  
##   
## Response: "1:Maize\_Grain\_Fresh\_weight\_g"  
## Df Sum Sq Mean Sq F value Pr(>F)  
## TREATMENT 15 138877 9258.5 0.9200 0.5539  
## BLOCK 2 24430 12215.0 1.2137 0.3122  
## Residuals 28 281789 10063.9

You have some missing values (4.17%) and they have been estimated before running ANOVA.

The coefficient of variation for this experiment is 409%. The p-value for treatments is 0.5539 which is not significant at the 5% level.

## 2.2. Assumptions

Don’t forget the assumptions of the model. It is supposed that the errors are independent with a normal distribution and with the same variance for all the treatments. The following plots must help you evaluate this:



Any trend in the residuals in the left plot would violate the assumption of independence while a trend in the variability of the residuals –for instance a funnel shape– suggests heterogeneity of variances. Departures from the theoretical normal line on the right plot are symptoms of lack of normality.

## 2.3. Treatment means

Because the effect of treatments was not significant in the ANOVA, multiple comparison tests are not presented. The means of your treatments are:

## v1\_Irrigation sprinkler system\_200mm\_0 cm\_2019-04-08   
## 7.222222   
## v1\_Irrigation sprinkler system\_200mm\_0 cm\_2019-05-08   
## 24.619048   
## v1\_Irrigation sprinkler system\_200mm\_10 cm\_2019-04-08   
## 7.333333   
## v1\_Irrigation sprinkler system\_200mm\_10 cm\_2019-05-08   
## 6.222222   
## v1\_Irrigation sprinkler system\_300mm\_0 cm\_2019-04-08   
## 10.000000   
## v1\_Irrigation sprinkler system\_300mm\_0 cm\_2019-05-08   
## 10.222222   
## v1\_Irrigation sprinkler system\_300mm\_10 cm\_2019-04-08   
## 8.777778   
## v1\_Irrigation sprinkler system\_300mm\_10 cm\_2019-05-08   
## 8.666667   
## v2\_Irrigation sprinkler system\_200mm\_0 cm\_2019-04-08   
## 8.333333   
## v2\_Irrigation sprinkler system\_200mm\_0 cm\_2019-05-08   
## 8.222222   
## v2\_Irrigation sprinkler system\_200mm\_10 cm\_2019-04-08   
## 6.888889   
## v2\_Irrigation sprinkler system\_200mm\_10 cm\_2019-05-08   
## 231.777778   
## v2\_Irrigation sprinkler system\_300mm\_0 cm\_2019-04-08   
## 10.333333   
## v2\_Irrigation sprinkler system\_300mm\_0 cm\_2019-05-08   
## 10.444444   
## v2\_Irrigation sprinkler system\_300mm\_10 cm\_2019-04-08   
## 8.555556   
## v2\_Irrigation sprinkler system\_300mm\_10 cm\_2019-05-08   
## 24.785714

## 2.4. Variance components

Below are the variance components for this model, under the assumption that treatments and blocks are random. Here the model is fitted using REML and missing values are not estimated.

## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control  
## $checkConv, : Model failed to converge with max|grad| = 0.011097 (tol =  
## 0.002, component 1)

## Variance Std.Dev.  
## TREATMENT 1.592315 1.261870  
## BLOCK 57.755075 7.599676  
## Residual 9802.540556 99.007780