Automatic report for a factorial experiment

AgroFIMS

January 07, 2021

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# 1. Model specification and data description

The data frame has two factors with 3 and 2 levels. The experimental design is a completely randomized design with 2 replications. The statistical model is

$$y\_{ijk}=μ+α\_{i}+β\_{j}+(αβ)\_{ij}+ϵ\_{ijk}$$

where

* $y\_{ijk}$ is the observed response with level $i$ of factor A, level $j$ of factor B, and replication $k$.
* $μ$ is the mean response over all levels of factor A, factor B, and replications.
* $α\_{i}$ is the effect for level $i$ of factor A.
* $β\_{j}$ is the effect for level $j$ of factor B.
* $(αβ)\_{ij}$ is the interaction effect between level $i$ of factor A and level $j$ of factor B.
* $ϵ\_{ijk}$ is the error term.

In this model we assume that the errors are independent and have a normal distribution with common variance, that is, $ϵ\_{ijk}∼N(0,σ\_{ϵ}^{2})$.

# 2. Analysis for trait chickpea\_grain\_fresh\_weight\_1000\_grain\_g

There are no missing values for this trait; the design is balanced.

## 2.1. Descriptive statistics

### 2.1.1. Means by individual factor levels

## v1 v2 v3
## 59.25 63.25 79.00
## Mixed intercropping Row intercropping
## 70.00000 64.33333

### 2.1.2. Means by factor levels combinations

## Mixed intercropping Row intercropping
## v1 78 40.5
## v2 55 71.5
## v3 77 81.0

## 2.2. ANOVA

### 2.2.1. Checking assumptions

As it was stated in section 1, it is supposed that the error has a normal distribution with the same variance for all the combinations among the levels of the factors. The following plots help to evaluate this assumptions:



Funnel shapes for the first plot may suggest heterogeneity of variances while departures from the theoretical normal line are symptoms of lack of normality.

### 2.2.2. ANOVA table

## Analysis of Variance Table
##
## Response: chickpea\_grain\_fresh\_weight\_1000\_grain\_g
## Df Sum Sq Mean Sq F value Pr(>F)
## crop\_variety1\_f1 2 872.2 436.08 0.5948 0.5812
## intercrop\_arrangement2\_f2 1 96.3 96.33 0.1314 0.7294
## crop\_variety1\_f1:intercrop\_arrangement2\_f2 2 1598.2 799.08 1.0899 0.3947
## Residuals 6 4399.0 733.17

The coefficient of variation for this experiment is 40.31%.

# 3. Analysis for trait chickpea\_grain\_subsample\_fresh\_weight\_100\_grain\_g

There are no missing values for this trait; the design is balanced.

## 3.1. Descriptive statistics

### 3.1.1. Means by individual factor levels

## v1 v2 v3
## 58.75 60.50 43.50
## Mixed intercropping Row intercropping
## 45.66667 62.83333

### 3.1.2. Means by factor levels combinations

## Mixed intercropping Row intercropping
## v1 40.5 77.0
## v2 66.0 55.0
## v3 30.5 56.5

## 3.2. ANOVA

### 3.2.1. Checking assumptions

As it was stated in section 1, it is supposed that the error has a normal distribution with the same variance for all the combinations among the levels of the factors. The following plots help to evaluate this assumptions:



Funnel shapes for the first plot may suggest heterogeneity of variances while departures from the theoretical normal line are symptoms of lack of normality.

### 3.2.2. ANOVA table

## Analysis of Variance Table
##
## Response: chickpea\_grain\_subsample\_fresh\_weight\_100\_grain\_g
## Df Sum Sq Mean Sq F value Pr(>F)
## crop\_variety1\_f1 2 699.50 349.75 1.0229 0.4147
## intercrop\_arrangement2\_f2 1 884.08 884.08 2.5857 0.1590
## crop\_variety1\_f1:intercrop\_arrangement2\_f2 2 1245.17 622.58 1.8209 0.2410
## Residuals 6 2051.50 341.92

The coefficient of variation for this experiment is 34.08%.