RMarkdown

Mussa

11/3/2021

## Importing a csv file

The collected data was cleaned and aggregated in MS-Excel and saved as csv.This private data set is available on kaggle with the name of the data sets:“Biological data analysis Using R”.The excel file contain metadata that explain the factors(Nitrogen fertilizer and Harvesting time).

Onion\_data<-read.csv("C:/Users/user/Desktop/Oniondata2.csv")

### View the data

View(Onion\_data)

### Structure

str(Onion\_data)

## 'data.frame': 36 obs. of 5 variables:  
## $ X : int 1 2 3 4 5 6 7 8 9 10 ...  
## $ Replication : int 1 1 1 1 1 1 1 1 1 1 ...  
## $ Nitrogen : chr "N0" "N1" "N2" "N3" ...  
## $ Harvesting\_Time: chr "HT1" "HT1" "HT1" "HT1" ...  
## $ Yield : num 2.5 3.61 9.17 11.11 2.78 ...

In the data frame, R gave a numeric and character for Replication, Nitrogen and Harvesting\_Time.These are factors, so it should be changed to factor.

#### change the Replication to factor

Onion\_data$Replication<-factor(Onion\_data$Replication)

#### change the Nitrogen to factor

Onion\_data$Nitrogen<-factor(Onion\_data$Nitrogen)

#### change the Harvesting\_Time to factor

Onion\_data$Harvesting\_Time<-factor(Onion\_data$Harvesting\_Time)

#### Checking the Structure again

str(Onion\_data)

## 'data.frame': 36 obs. of 5 variables:  
## $ X : int 1 2 3 4 5 6 7 8 9 10 ...  
## $ Replication : Factor w/ 3 levels "1","2","3": 1 1 1 1 1 1 1 1 1 1 ...  
## $ Nitrogen : Factor w/ 4 levels "N0","N1","N2",..: 1 2 3 4 1 2 3 4 1 2 ...  
## $ Harvesting\_Time: Factor w/ 3 levels "HT1","HT2","HT3": 1 1 1 1 2 2 2 2 3 3 ...  
## $ Yield : num 2.5 3.61 9.17 11.11 2.78 ...

## Analysis

Analysis of variance (ANOVA) is important to see the treatment effect on the shallot yield. First, the dependent and independent variables explained by linear model “lm”, then ANOVA followed.

onion<- lm(Yield~Replication + Nitrogen + Harvesting\_Time + Nitrogen:Harvesting\_Time,data =Onion\_data )

#### Run ANOVA

anova(onion)

## Analysis of Variance Table  
##   
## Response: Yield  
## Df Sum Sq Mean Sq F value Pr(>F)   
## Replication 2 0.75 0.374 1.5812 0.2282   
## Nitrogen 3 681.09 227.030 960.9014 < 2.2e-16 \*\*\*  
## Harvesting\_Time 2 33.54 16.770 70.9791 2.539e-10 \*\*\*  
## Nitrogen:Harvesting\_Time 6 16.03 2.672 11.3071 8.910e-06 \*\*\*  
## Residuals 22 5.20 0.236   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

#### Result-interpretation

The analysis of variance indicated that there is highly significant (P<0.001) effect on shallot yield(t/ha) due to nitrogen (Urea) fertilizers and harvesting time.

```{r}

library(agricolae)

```

```{r}

onion\_duncan<-duncan.test(Onion\_data$Yield,Onion\_data$Nitrogen,22,0.236,console = TRUE)

```

Table

Description automatically generated

Result-interpretation

From mean separation, treatment N3(150Kg/ha of Nitrogen fertilizer) gave high shallot yield.

```{r}

install.packages("ggplot2")

```

```{r}

library("ggplot2")

```

Interaction plot

```{r}

with(Onion\_data,(interaction.plot(Nitrogen,Harvesting\_Time,Yield,type = "b",pch =c(18,24,22),leg.bty = "o",col="blue",main="Interaction plot of Nitrogen fertilizer and Harvesting time",xlab = "Nitrogen",ylab="Yield" )))

```

Chart, line chart

Description automatically generated