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# Abstract

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**Keywords:** Lorem, ipsum, dolor, sit amet, consectetur.

# Introduction

Lorem ipsum Lozano-Isla, Campos, Endres, Bezerra-Neto, & Pompelli ([2018](#ref-lozano-isla2018Effects)) dolor sit amet, consectetur adipiscing elit. Integer nec odio. Praesent libero. Sed cursus ante dapibus diam. Sed nisi. Nulla quis sem at nibh elementum imperdiet. Duis sagittis ipsum. Praesent mauris Fusce nec tellus sed augue semper porta. Mauris massa. Vestibulum lacinia arcu eget nulla Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Curabitur sodales ligula in libero. Sed dignissim lacinia nunc (Maluszynski, Szarejko, Bhatia, Nichterlein, & Lagoda, [2009](#ref-maluszynski2009Methodologies); Pompelli et al., [2012](#Xebb02d5d081d321a9f857ff47b319bed940052e)).

Curabitur tortor (Avenot, Sellam, & Michailides, [2009](#ref-avenot2009Characterizationa); Zárate & Gianina, [2017](#ref-zarate2017Respuesta)) Pellentesque nibh. Aenean quam. In scelerisque sem at dolor. Maecenas mattis. Sed convallis tristique sem. Proin ut ligula vel nunc egestas porttitor. Morbi lectus risus, iaculis vel, suscipit quis, luctus non, massa. Fusce ac turpis quis ligula lacinia aliquet. Mauris ipsum. Nulla metus metus, ullamcorper vel, tincidunt sed, euismod in, nibh. Quisque volutpat condimentum velit. Nulla facilisi. Ut fringilla. Suspendisse potenti. Nunc feugiat mi a tellus consequat imperdiet. Vestibulum sapien. Proin quam. Etiam ultrice. Suspendisse in justo eu magna luctus suscipit. Sed lectus. Integer euismod lacus luctus magna.

# Materials and Methods

The data was analyzed in the statistical software R (R Core Team, [2019](#ref-R-base)). The germination analysis and graphics was carried out with the package GerminaR (Lozano Isla, Benites Alfaro, & Pompelli, [2019](#ref-R-GerminaR)). Each variable was submitted at analysis of variance (ANOVA) and the mean comparison test used was Student-Newman Keuls (P<0.05)(de Mendiburu, [2019](#ref-R-agricolae)). For the multivariate analysis, the principal components analysis (PCA) and cluster hierarchical classification analysis (HCPC) will be used (Husson, Josse, Le, & Mazet, [2019](#ref-R-FactoMineR)).

The vertical bars represent the means (±SE). The mean differences between the groups are represented by different capital letters and into the group different lowercase letters (SNK, p = 0.05) (Gutierrez, Vega, Garc’ıa, & Casas, [2018](#ref-gutierrez2018Contribution)).

More information about multivarite analysis in <http://factominer.free.fr/index.html>. Explanation for intepretation and analysis:

**PCA:** <https://www.youtube.com/watch?v=pks8m2ka7Pk&feature=youtu.be>

**HCPC:** <https://www.youtube.com/watch?v=4XrgWmN9erg>

## Data set

The data set used for this analysis is available in the following link: [DATA SET](https://docs.google.com/spreadsheets/d/1QziIXGOwb8cl3GaARJq6Ez6aU7vND_UHKJnFcAKx0VI/edit#gid=137089581)

## Nulla metus metus

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# Results

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# load data  
  
library(GerminaR)  
  
fb <- prosopis %>% dplyr::mutate( nacl = as.factor(nacl), temp = as.factor(temp), rep = as.factor(rep))  
  
# germination analysis  
  
gsm <- ger\_summary(SeedN = "seeds", evalName = "D", data = fb)  
str(gsm)  
  
# analisys of variance  
  
av <- aov(formula = GRP ~ nacl\*temp + rep, data = gsm)  
summary(av)  
  
# mean comparision test  
  
mc <- ger\_testcomp(aov = av, comp = c("temp", "nacl"), type = "snk")

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Nulla metus metus, ullamcorper vel, tincidunt sed, euismod in, nibh. Quisque volutpat condimentum velit. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Nam nec ante. Sed lacinia, urna non tincidunt mattis, tortor neque adipiscing diam, a cursus ipsum ante quis turpis. Nulla facilisi. Ut fringilla. Suspendisse potenti. Nunc feugiat mi a tellus consequat imperdiet. Vestibulum sapien. Proin quam. Etiam ultrices. Figure: 1.

# Discussion

Curabitur tortor León, Gutierrez, Riojas, & Casas ([2018](#ref-leon2018Nitrogen)) and Dixit ([2015](#ref-dixit2015Adaptacion)), Pellentesque nibh. Aenean quam. In scelerisque sem at dolor. Maecenas mattis. Sed convallis tristique sem. Proin ut ligula vel nunc egestas porttitor. Morbi lectus risus, iaculis vel, suscipit quis, luctus non, massa. Fusce ac turpis quis ligula lacinia aliquet. Mauris ipsum. Nulla metus metus, ullamcorper vel, tincidunt sed, euismod in, nibh. Quisque volutpat condimentum velit. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Nam nec ante (Table 1).

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# Conclusions

Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Curabitur sodales ligula in libero. Sed dignissim lacinia nunc. Curabitur tortor. Pellentesque nibh. Aenean quam. In scelerisque sem at dolor. Maecenas mattis. Sed convallis tristique sem. Proin ut ligula vel nunc egestas porttitor. Morbi lectus risus, iaculis vel, suscipit quis, luctus non, massa. Fusce ac turpis quis ligula lacinia aliquet. Mauris ipsum. Nulla metus metus, ullamcorper vel, tincidunt sed, euismod in, nibh. Quisque volutpat condimentum velit. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Nam nec ante. Sed lacinia, urna non tincidunt mattis, tortor neque adipiscing diam, a cursus ipsum ante quis turpis. Nulla facilisi. Ut fringilla. Suspendisse potenti. Nunc feugiat mi a tellus consequat imperdiet.

# Acknowledgments

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# Tables

Table 1: Main functions in the GerminaR R package for seed germination variables and graphical analysis.

|  |  |
| --- | --- |
| Function | Description |
| ger\_summary | Calculate ten germination indices maintaining the factors levels for analysis of variance |
| ger\_intime | Calculates and displays cumulative germination data. |
| fplot | Function that allows to graphic the results in bar or line plot. |
| GerminaQuant | Runs the interactive application in offline mode for use on a personal computer. |
| prosopis | Dataset with germination experiment in *Prosopis juliflor* seeds under under different osmotic potentials and temperatures. |

# Figures

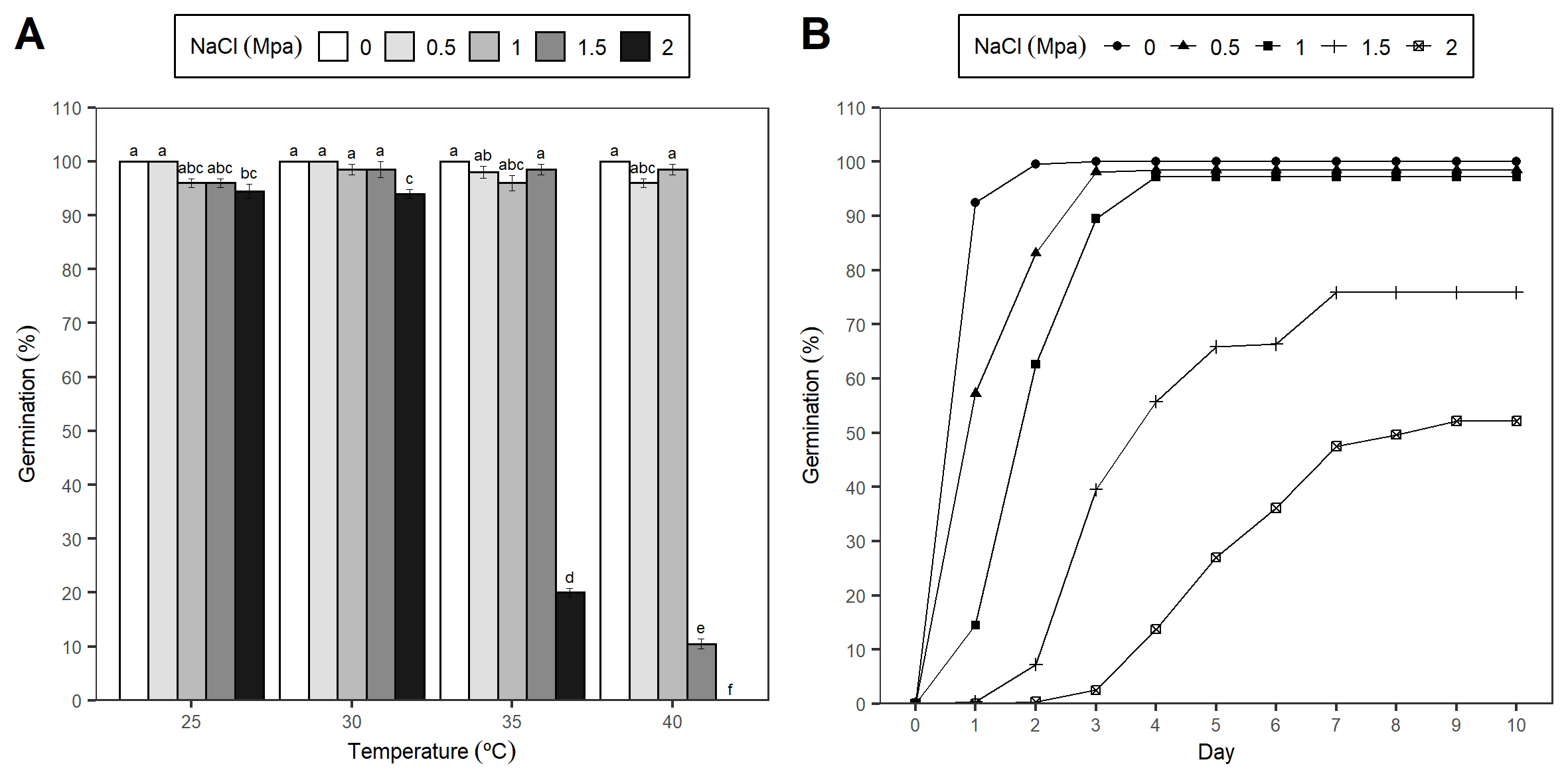


Figure 1: Germination experiment with *Prosopis juliflor* under different osmotic potentials and temperatures. A) Bar graph with germination percentage in a factorial analisys. B) Line graph from cumulative germination under different osmotic potentials.



Figure 2: Plant of *Jatropha curcas*. A) Foliage, B) Leaf, C) Fruit.

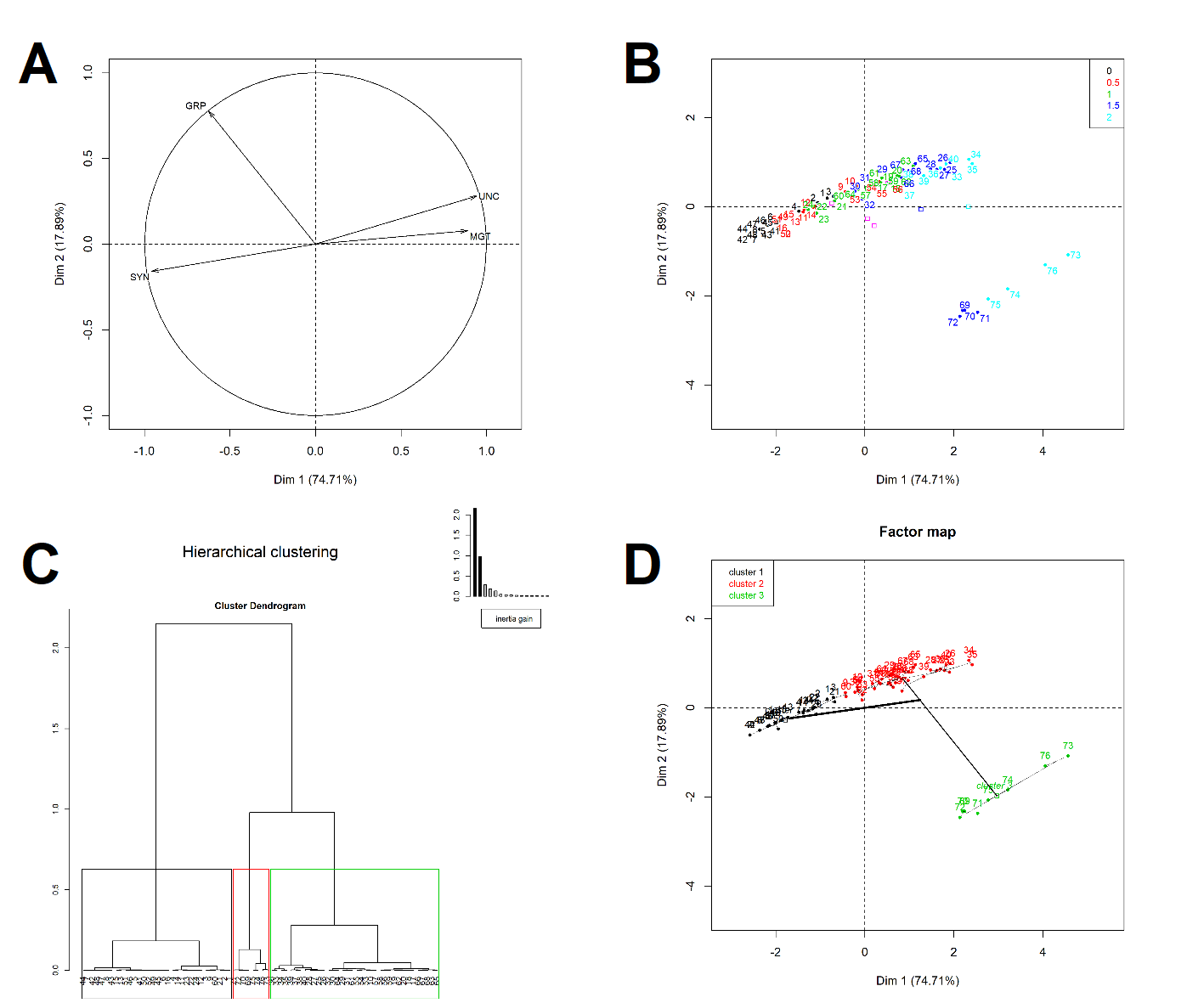


Figure 3: Multivariate Analysis: Principal component Analysis and Hierarchical Clustering Analysis.

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# Anexos

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