# ACCUMULATION OF MACRONUTRIENTS IN LEAVES OF *Capsicum annuum* SUSCEPTIBLE AND RESISTANT TO *Xanthomonas euvesicatoria*

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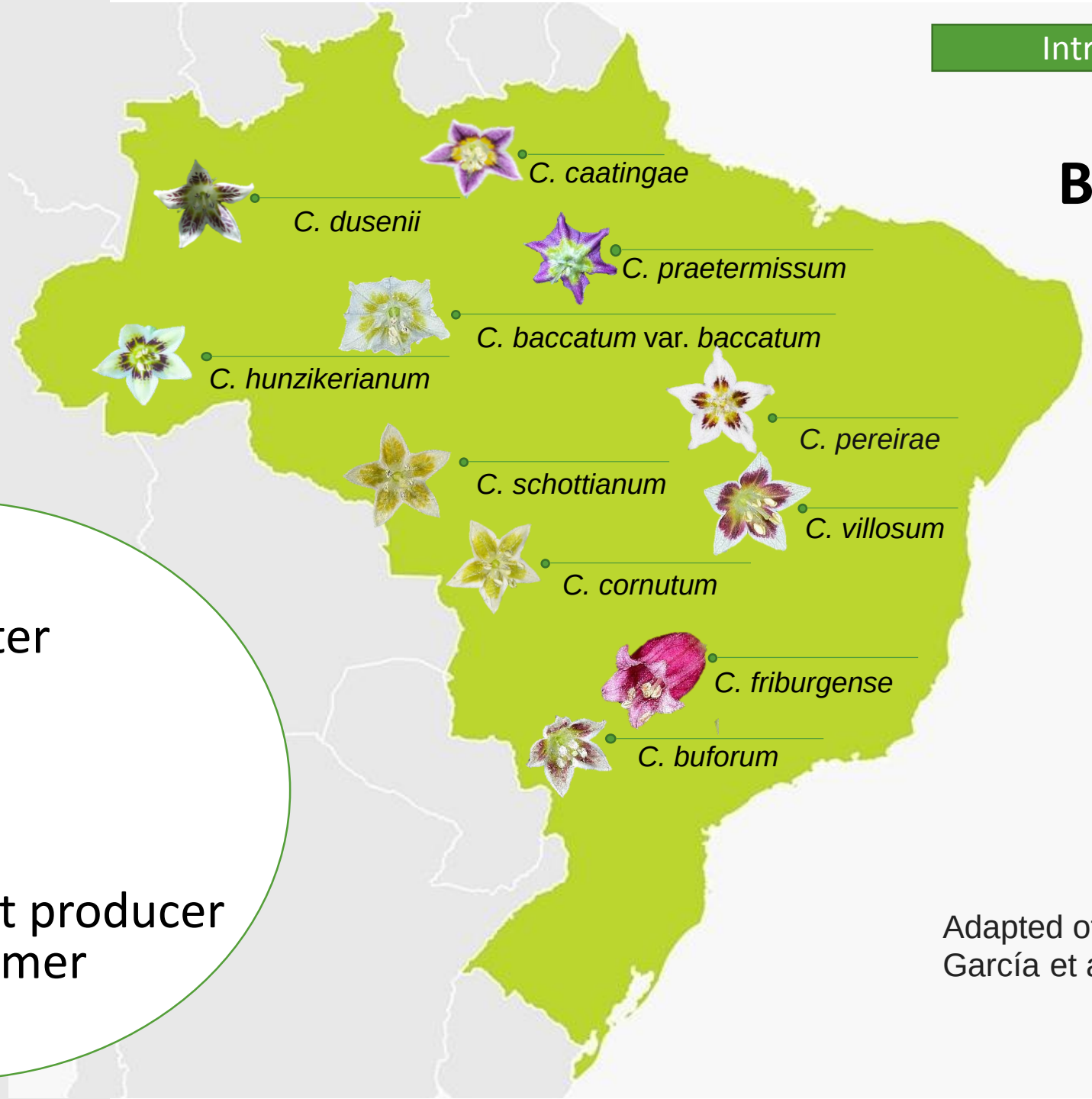
# Contextualization

- This work is a part of my master degree.
- I worked together with Sthefanny Neto at UENF.
- I studied the metals in the pepper leaves in genotypes resistant and susceptible to bacterial spot, which has a natural occurrence in fruit and leaf, mainly in the leaves.
- Hence study this interaction plant, pathogen and nutrient, but in this work only nutrient and plant.


The World According to Chile Peppers
Kalocsa
Espelette
Padron
Diamante
Hatch
Atlantic Ocean
Pacific Ocean
Indian Ocean
Nuclear Area
Top Producers of Chiles
Fresh and Dried
Dried
Fresh
Chile Pepper Festivals
Origin of Capsicum

# Brazil




- Diversity Center
- Consumer
- Producer
- *C. annuum*
  - The largest producer and consumer

Adapted of Carrizo García et al., 2016

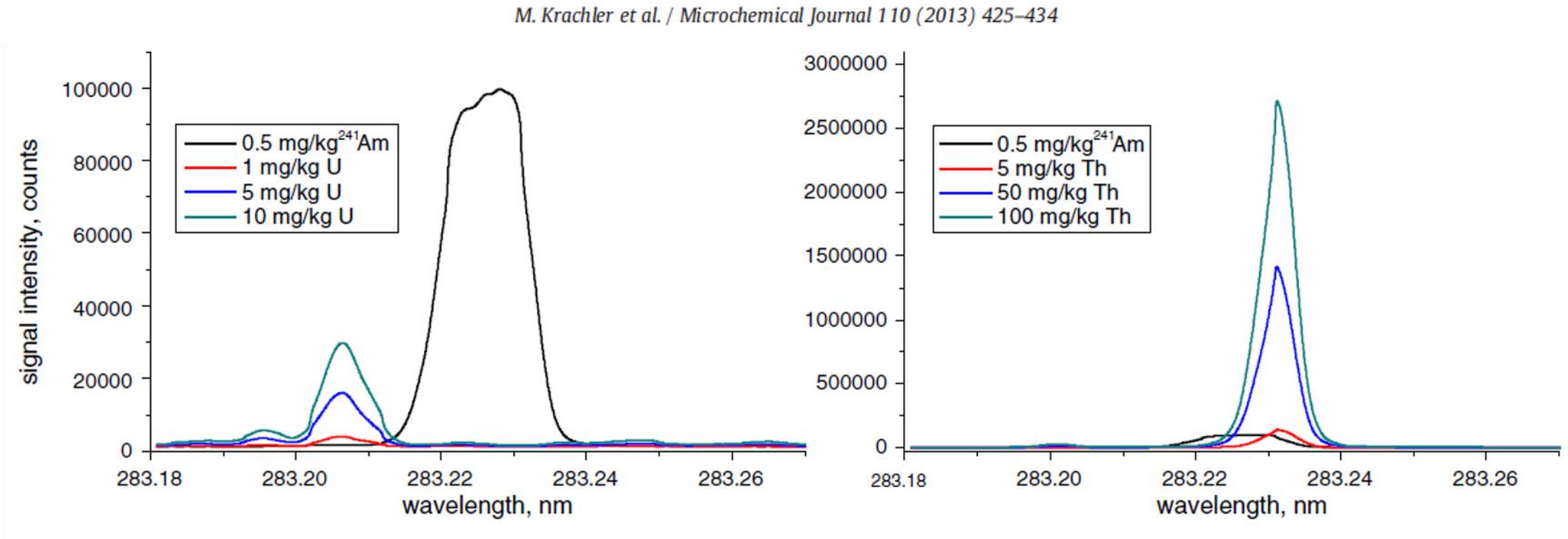
Genotypes

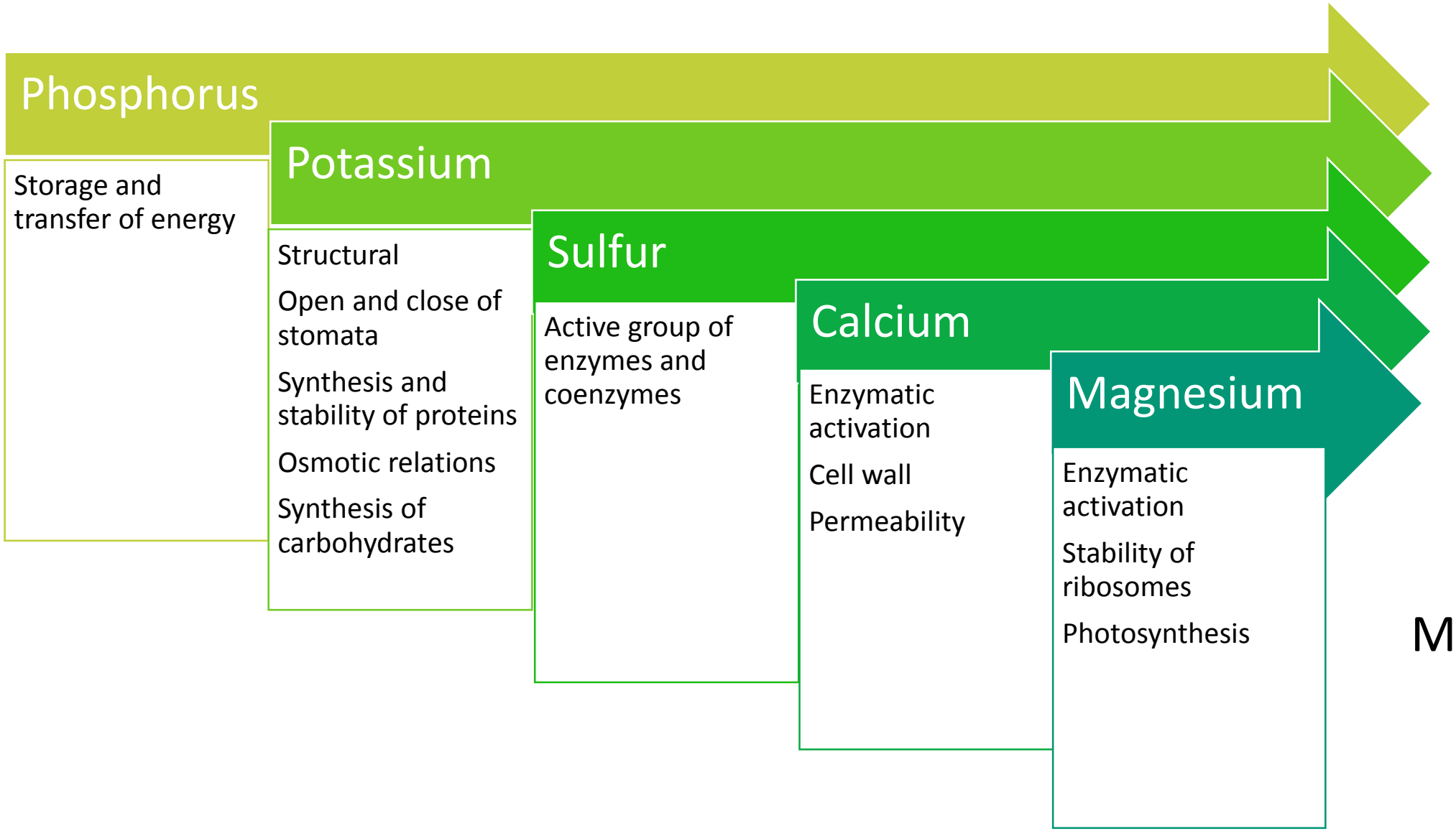
Development stages

Nutrition

≠

**Mineral profile**

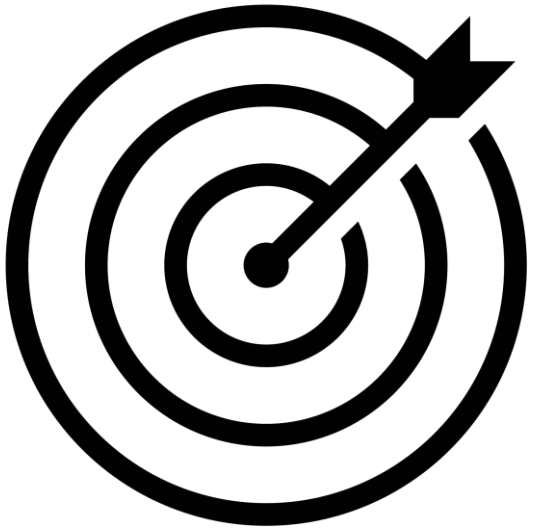





Essential Nutrients

Macronutrients

The aim of this work was to analyze the macronutrient content in two genotypes of *Capsicum annuum* var. *annuum*, one resistant (UENF 1381) and another susceptible (L11) to *Xanthomonas euvesicatoria*.



Irrigation control:
Once a day with deionized $H_2O$

Temperature control:
28 °C

Luminosity control:
16:8 hours - day/night

Local control:
Growth chamber

Humidity control:
80% RH

UENF 1381 (Resistant)

L11 (Susceptible)

Hoagland

Greenhouse located at *UENF*, Campos dos Goytacazes, RJ, Brazil.

Randomized

2 treatments

2 collects

Until the appearance of definitive leaves

Sand and vermiculite 2:1

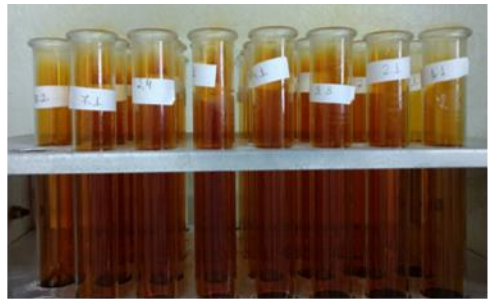
2nd - 4th nodes

Vegetative (23 DAT)

Reproductive (94-104 DAT)

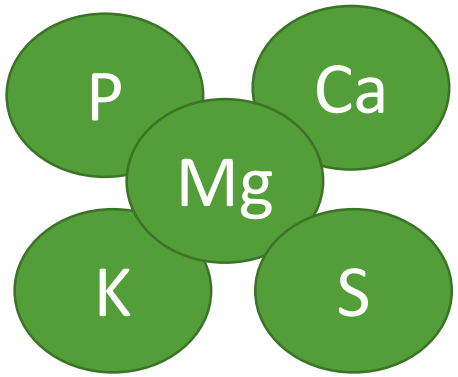
Freeze drying
(Rijke et al., 2015)

0.10 g of dry leaves + 10 mL $HNO_3$ conc.



Digestion: 140°C, 2h
(Rodushkin et al., 2998)

Dilution 1: 2.5 with deionized water
(Ko et al., 2014)

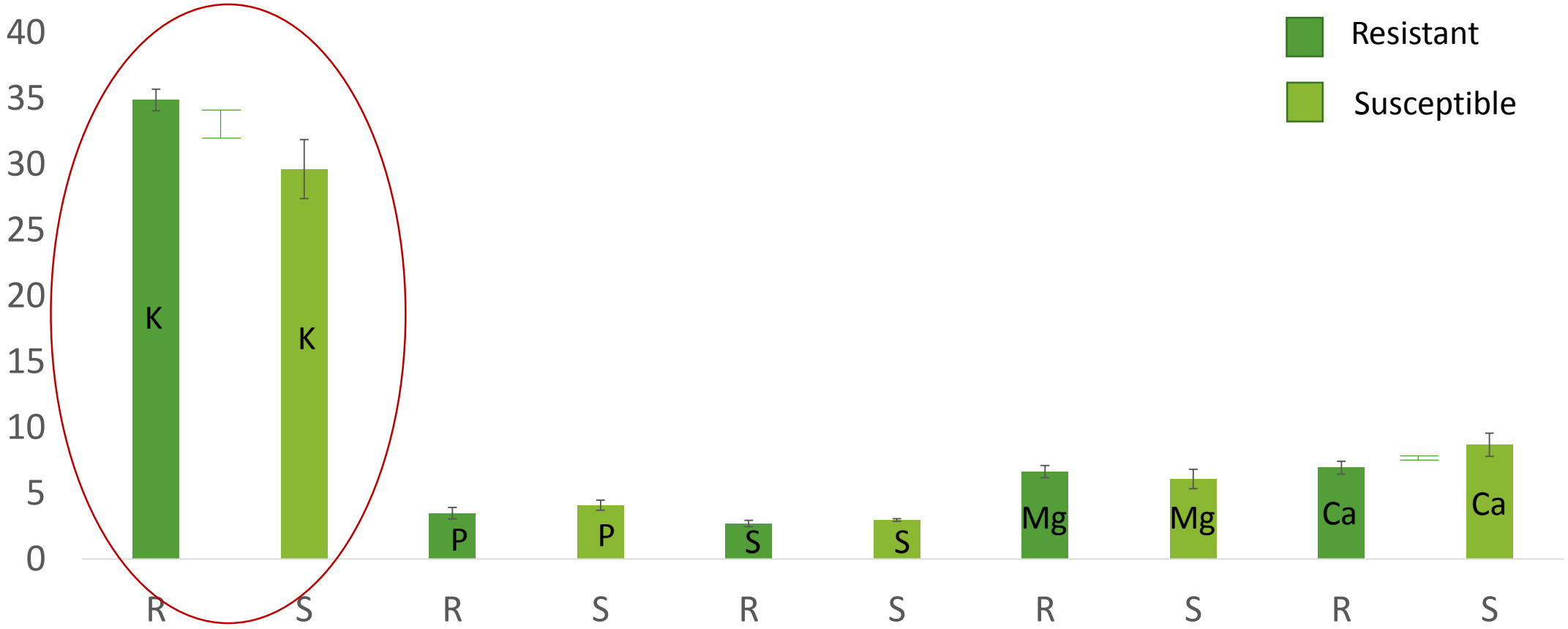



ICP OES

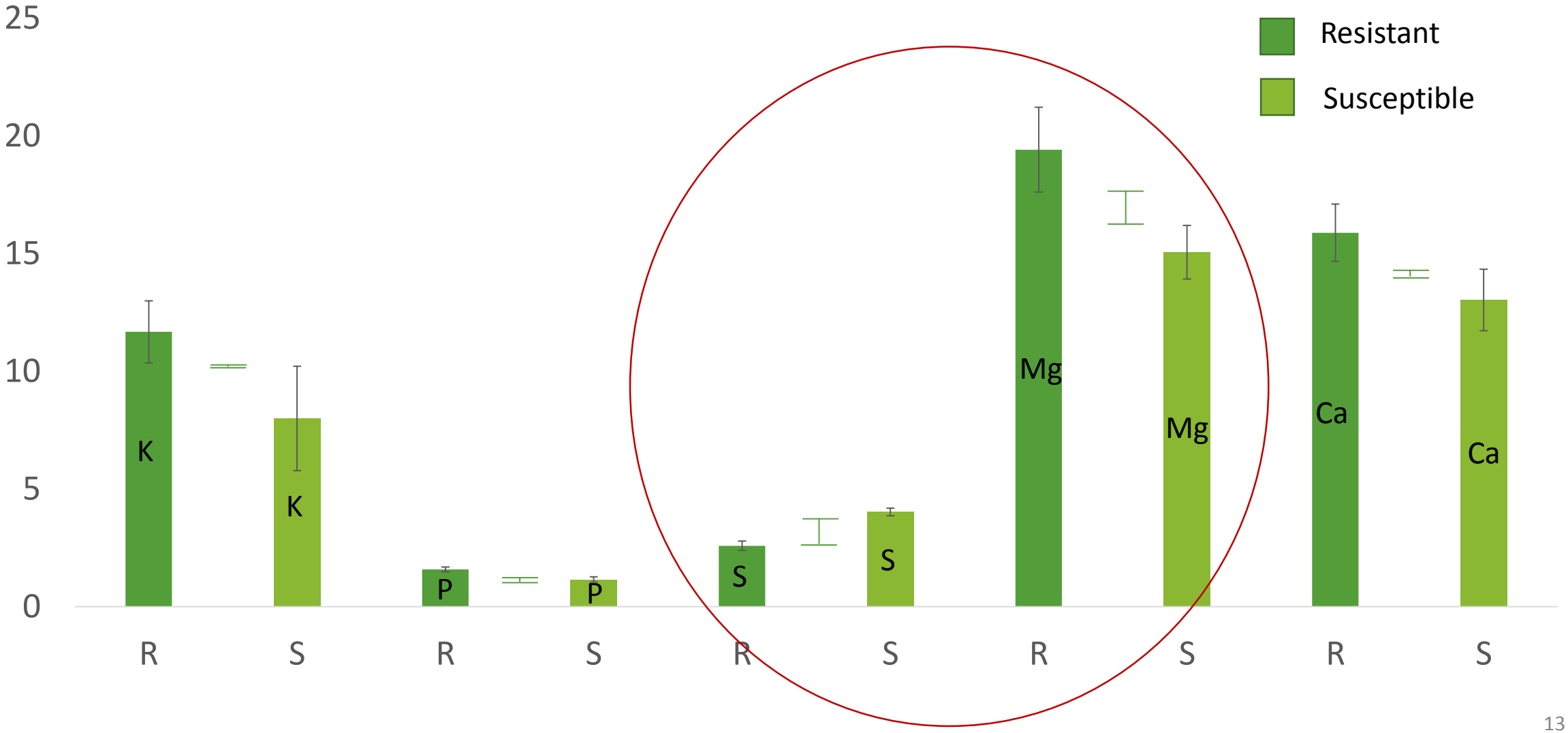

External calibration

| | |
|---|---|
| 0.1 mg $L^{-1}$ to 50 mg $L^{-1}$ c | P, Ca, Mg and S |
| 1 mg $L^{-1}$ to 200 mg $L^{-1}$ | K |

# Vegetative stage (23 DAT)



# Reproductive stage (94-104 DAT)



- Vegetative stage

  - L 11
    Susceptible

  ↑Ca

  Enzymatic activation
  Cell wall
  Permeability

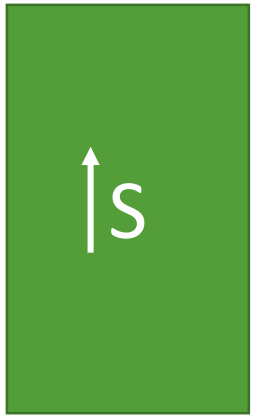
  - UENF 1381
    Resistant

  ↑K

  Structural
  Open and close of stomata
  Synthesis and stability of proteins
  Osmotic relations
  Synthesis of carbohydrates

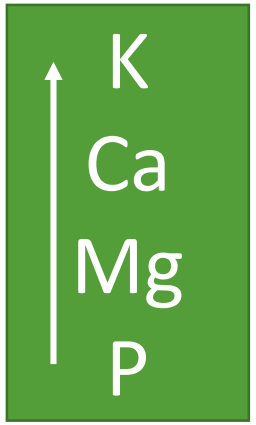
- Reproductive stage

  - L 11
    Susceptible




Active group of enzymes and coenzymes

  - UENF 1381
    Resistant




Storage and transfer of energy (P)
Enzymatic activation, stability of ribosomes and photosynthesis (Mg)

# Conclusions

- In the vegetative stage the genotypes differed as regards potassium. This one with higher content in resistant plants.
- The reproductive stage is ideal to differentiate all the macronutrients among the studied genotypes.
- The mineral profile can be used as a tool to differentiate these two genotypes (UENF 1381 and L11).
- Further studies should be carried out to investigate the influence of these elements as players in bacterial spot genetic resistance expression.

# Acknowledgment