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AGROSAVIA

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RESPONSE OF GAS EXCHANGE PARAMETERS IN *Ipomoea batatas* UNDER COLOMBIAN DRY CARIBBEAN CONDITIONS

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INTRODUCTION

Ipomoea batatas L. is one of the crops that has greater importance in the world for its high content of dietary fiber, vitamins and antioxidant compounds; and it is widely known for its consumption in more than 100 countries (García-Méndez et al., 2016).In addition being a source for industrial production of flour, starch and alcohol, the sweet potato is a rustic species, which has great resistance to pests and diseases and is adapted to various tropical areas (Reina,2015). Its rusticity also implies the requirement of lower doses of fertilizers, such as N and P, and lower quantity of pesticides. The sweet potato is considered one of the most efficient species in the use of water; so it could be grown on soils with marginal agricultural value (La Rosa, 2008).

MATERIAL AND METHODS

Vegetal material. Different genotypes of sweet potato collected in Colombia were evaluated, including the commercial varieties Corpoica Aurora and Corpoica Ambarina (Table 1).

Experimental design. The ecophysiological parameters were measured with the LI-6400XT equipment (Table 2), using a photosynthetically active radiation of 1500 µmol of photons m^{-2} s^{-1} and a reference CO_2 of 400 µmol CO_2 mol^{-1}.

Table 1. Genotypes of *Ipomoea batatas* L.

Genotypes	
076CES	582BOY
086CES	587BOY
096NS	595BOY
099NS	596BOY
105CES	600BOY
191002_5	606BOY
243NAR	610BOY
251STR	618STR
256STR	620STR
257STR	680CUB
261STR	686CUB
263STR	688CUB
283aSTR	689CUB
286STR	697CUB
299STR	704CUB
300STR	705CUB
352HUI	707CUB
357QND	712CUB
440224	716CUB
491CLD	722CUB
503CLD	615STR
515CLD	Corpoica Aurora
581BOY	Corpoica Ambarina

Table 2. Ecophysiological parameters

Parameter	Abbreviation	Units
CO_2 assimilation rate	CAR	µmol CO_2 m^{-2} s^{-1}
Stomatal conductance	SC	mol H_2O m^{-2} s^{-1}
Internal CO_2 concentration	IC	µmol CO_2 mol^{-1}
Transpiration rate	T	mmol H_2O m^{-2} s^{-1}
Vapor pressure deficit	VPD	kPa
Leaf internal temperature	IT	°C

The measurements were made on fully expanded young leaves that fulfilled the function of the source organ, located in the upper third of the plant (Figure 1).

Figure 1. Measurement of ecophysiological parameters in *Ipomoea batatas* L.

RESULTS AND DISCUSSION

Table 3. Analysis of variance for the ecophysiological parameters in *Ipomoea batatas* L.

Source of variation	DF	CO_2 assimilation rate	Stomatal conductance	Internal CO_2 concentration	Transpiration rate	Vapor pressure deficit	Leaf internal temperature
Genotype	45	28,70 **	0.25 **	319,31 **	5,41 **	0,19 **	5,38 **
CV		7.09	21.17	3.19	9.42	15.55	1.37

CO_2 assimilation rate

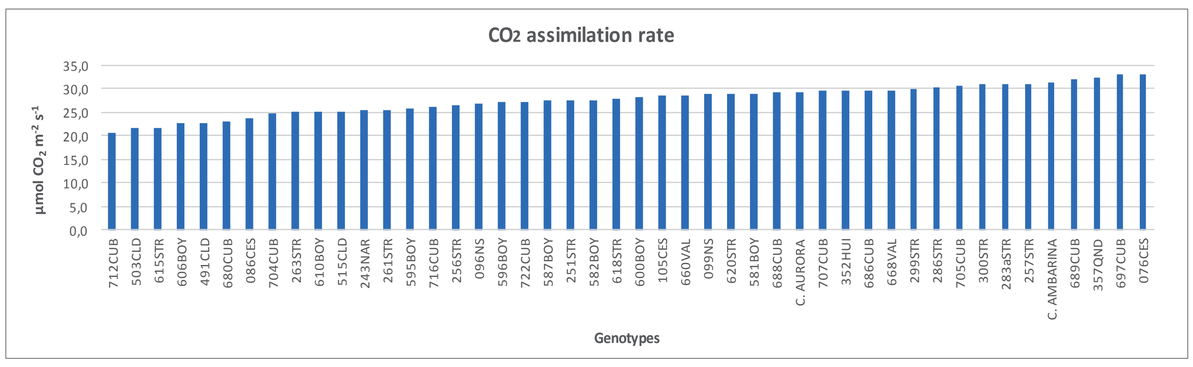

Figure 2. CO_2 assimilation rate in 46 *Ipomoea batatas* L genotypes.

Stomatal conductance

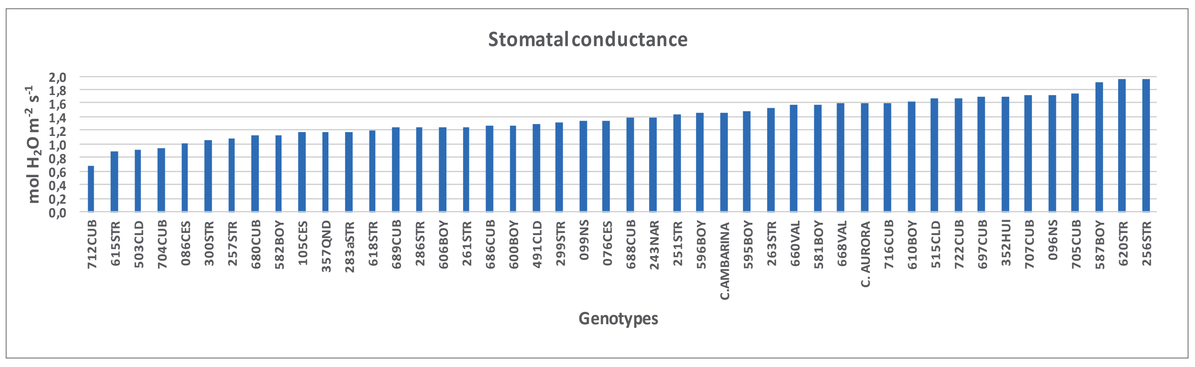

Figure 3. Stomatal conductance in 46 *Ipomoea batatas* L genotypes.

Internal CO_2 concentration

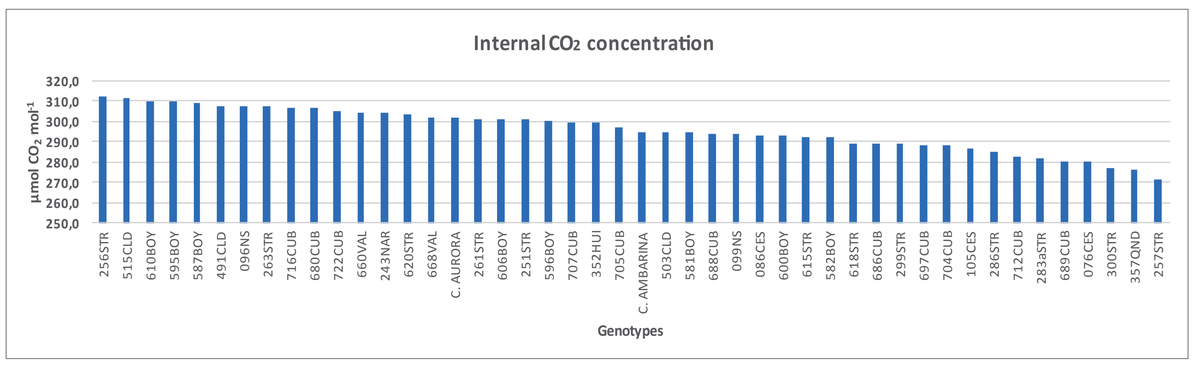

Figure 4. Internal CO_2 concentration in 46 *Ipomoea batatas* L genotypes.

Transpiration rate

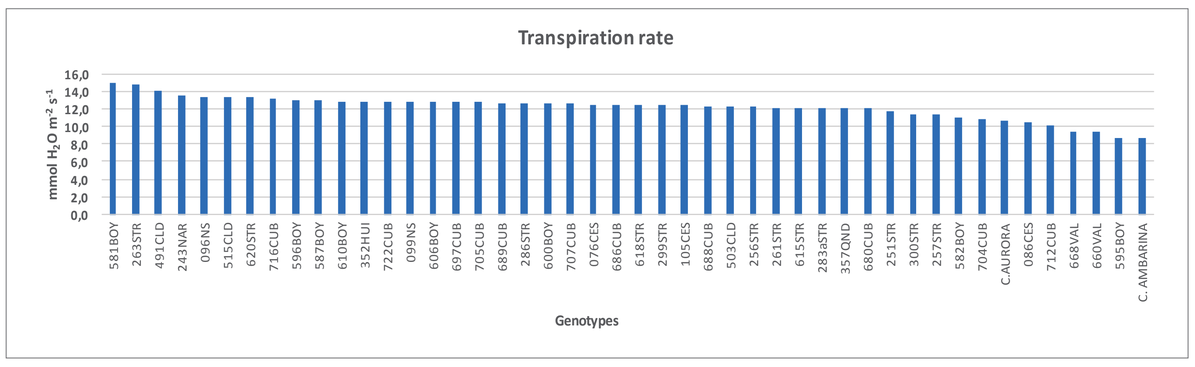

Figure 5. Transpiration rate in 46 *Ipomoea batatas* L genotypes.

Vapor pressure deficit

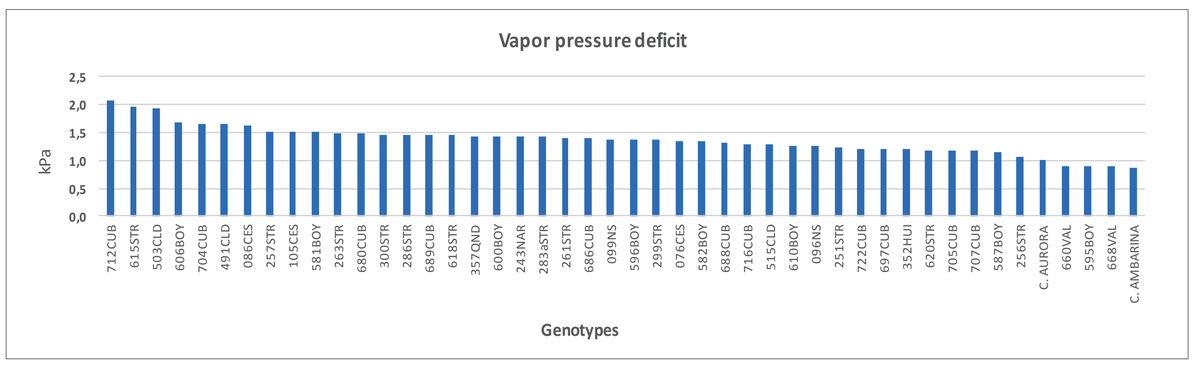

Figure 6. Vapor pressure deficit in 46 *Ipomoea batatas* L genotypes.

Leaf internal temperature

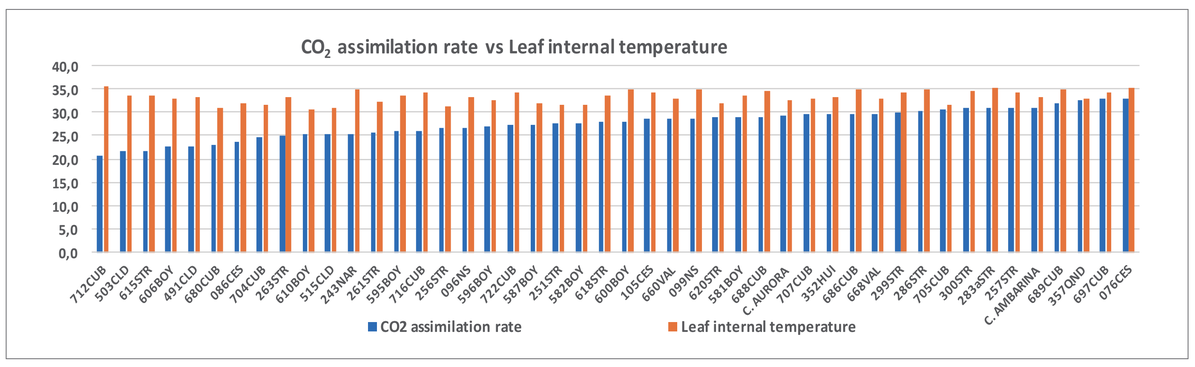

Figure 7. CO_2 assimilation rate vs Leaf internal temperature in 46 *Ipomoea batatas* L genotypes.

CONCLUSIONS

- Genotypes that showed high CAR, reached intermediate and low T. The commercial varieties Corpoica Ambarina and Corpoica Aurora, showed high CAR and low T.
- 076CES presented the highest CAR, adequate SC, less IC and adequate water consumption (T).
- 256STR showed the highest SC and highest IC.
- 712CUB showed the highest IT, the lowest SC, less T, the lowest CAR and the highest VPD.
- The optimal IT range in which the genotypes evaluated had the highest CAR ranged between 33 and 35 °C.

REFERENCES

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