Phenotypic plasticity of *Anacardium occidentale* L. seedlings to salt stress based on physiological indicators.

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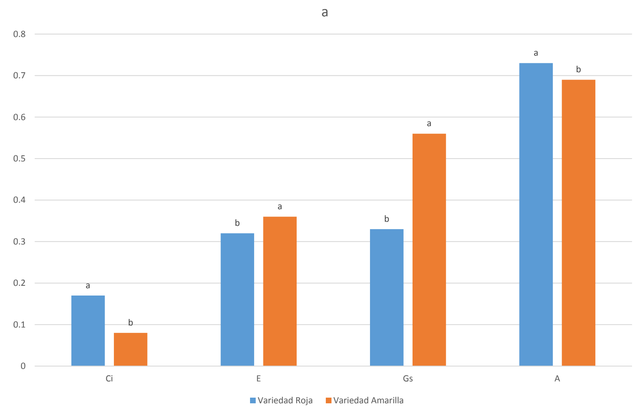
INTRODUCTION

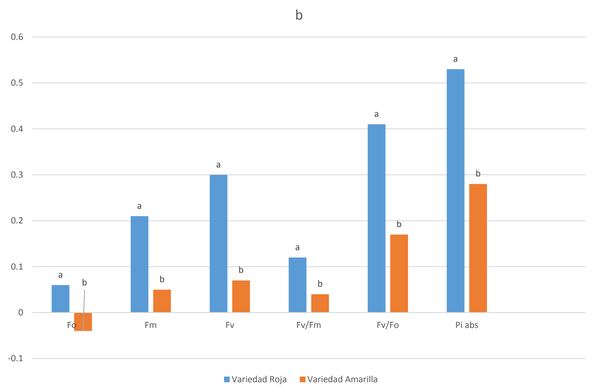
The cashew (*Anacardium occidentale* L.) is a tropical fruit tree of the *Anacardiaceae* family, native to the northern region of Brazil, and finds in Cuba enviable edaphoclimatic conditions for its growth and development: including abundant impoverished and semi-arid soils, where practically no other survives. fruit, however, are preferred by *A. occidentale* (Aguilera et al., 2001).
Salinity tolerance in plants is a complex phenomenon that involves morphological and developmental changes, as well as physiological and biochemical processes. Salinity disrupts cellular function, through the toxic effects of specific ions and through osmotic effects, or both (Munns 2005).

Although there is extensive knowledge on the subject, there are no references to the phenotypic plasticity of the species in response to salt stress. In this sense, the objective of this research is to analyze the phenotypic plasticity and the variation in indicators related to photosynthesis in two genotypes of *A. occidentale* during the seedling phase under controlled glass house conditions.

Table 1. Effect of varieties and salinity on stomatal conductance (gs), photosynthetic rate (A) and transpiration (E) and substomatal CO2 (Ci) in leaves of *A. occidentale*.

Variedades	Niveles de salinidad	Ci	E	Gs	A
Roja	Control	405.4 ± 12.6 a	0.72 ± 0.04 d	0.03 ± 0.001 c	1.64 ± 0.04 a
	5	357.7 ± 11.8 c	0.56 ± 0.05 e	0.03 ± 0.001 c	0.52± 0.02 b
	10	344.7 ± 9.65 c	0.59 ± 0.03 e	0.02 ± 0.002c	0.48 ± 0.02 c
	15	319.2 ± 14.2 d	0.44 ± 0.04 fg	0.02 ± 0.006 c	0.43 ± 0.01 c
	20	312.3 ± 35.8 d	0.35 ± 0.08 g	0.01 ± 0.001 cd	0.33 ± 0.02 d
Amarilla	Control	382.7 ± 23.8 b	1.66 ± 0.06 a	0.08 ± 0.001 a	1.74 ± 0.02 a
	5	358.9 ± 78.3 c	1.23 ± 0.04 b	0.05 ± 0.005 b	0.66 0.01 b
	10	358.9 ± 53.1 c	1.20 ± 0.06 b	0.03 ± 0.002 c	0.59 ± 0.02b
	15	348.1 ± 64.2 c	0.94 ± 0.03 c	0.03 ± 0.004 c	0.47 ± 0.01 c
	20	332.5 ± 45.2 cd	0.82 ± 0.08 cd	0.03 ± 0005 c	0.41 ± 0.02 c
Variedad		S	S	S	S
Salinidad		S	S	S	S
Variedad x Salinidad		S	S	NS	S





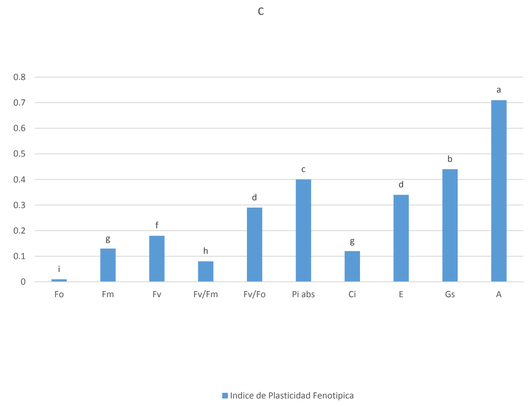


Figure 3. Phenotypic Plasticity Index in response to salt stress in seedlings of two varieties of A. occidentale in the characters of photosynthesis and gas exchange (a) content and fluorescence of chlorophyll (b), average of the two varieties (c).

Table 2. Effect of varieties and salinity on the content and fluorescence indicators of chlorophyll in leaves of *A. occidentale.*

Variedades	Niveles de salinidad	Fo	Fm	Fv	Fv/ Fm	Fv/Fo	Pi abs
Roja	Control	272±23.8 d	1249±58.2a	991±87.6 b	0.81±0.07a	4.18±0.2b	3.2±0.2c
	5	278±38.1cd	1085±56.1d	956±87.3 c	0.88±0.04a	3.53±0.2d	2.2±0.1d
	10	280±24.8 c	942±78.2 e	673±81.6 f	0.69±0.04c	2.42±0.1de	2.1±0.1d
	15	293±28.3 b	929±45.2 e	648±64.5 f	0.68±0.07c	2.3±0.4e	1.1±0.2e
	20	309±34.2 a	756±46.3 f	483±54.2 g	0.60±0.04c	1.56±0.8f	0.5±0.1f
Amarilla	Control	236±18.5 g	1252±87.3a	1008±90.5a	0.82±0.05a	4.7±0.7a	3.9±0.5a
	5	242±14.3fg	1251±91.2a	991±87.1 b	0.81±0.03a	4.18±0.3b	3.7±0.2b
	10	241±11.9 fg	1231±98.5b	972±96.5 c	0.77±0.04b	4.03±0.4c	3.3±0.2c
	15	249±17.7 ef	1178±92.4c	929±89.5 d	0.78±0.02b	3.82±0.7d	2.5±0.1d
	20	259±21.5 e	1065±89.5d	829±87.3 e	0.76±0.08b	3.53±0.3d	1.6±0.2e
Variedad		S	S	S	S	S	S
Salinidad		S	S	S	S	S	S
Variedad x Salinidad		S	S	S	S	S	S

CONCLUSIONS

1. Under the experimental conditions that this work was developed, the negative effect of salinity in the seedling stage on the indicators related to photosynthesis, gas exchange, chlorophyll content and fluorescence in the two varieties of *A. occidentale* is shown.

2. Significant differences were found in terms of the indicators evaluated and their levels of phenotypic plasticity between the two varieties of *A. occidentale* studied.

3. Photosynthesis, chlorophyll content and stomatal conductance were the indicators that showed the highest values of phenotypic plasticity.

4. From a practical point of view, it is important to know the behavior of different genotypes and the adaptive changes when facing salt stress for the evaluation of reforestation strategies in areas affected by salinity.