TITLE: MAIZE PLANT-*Herbaspirillum seropedicae* INTERACTION UNDER SALINE CONDITIONS

AUTHORS: [1]SANTOS, L.F.; [1]IRINEU, L.E.S.S.; [1]MALCHER, D.J.P.; [1]SOUZA, A.C.; [1]CANELLAS, L.P.; [1]OLIVARES, F.L.

INSTITUTION: [1]UNIVERSIDADE ESTADUAL DO NORTE FLUMINENSE DARCY RIBEIRO (AVENIDA ALBERTO LAMEGO, 2000, 28.013-602, CAMPOS DOS GOYTACAZES - RJ, BRAZIL)

ABSTRACT:

Soil salinity is a limiting factor for agricultural activity in arid and semi-arid regions. Inoculation with endophytic diazotrophic bacteria can ameliorate the negative impact of salt stress and may favor plant establishment. The aim of the present study was to evaluate the growth of maize seedlings in response to the inoculation of the bacterium labeled with green fluorescent protein (gfp) *Herbaspirillum seropedicae* strain RAM 10 under salinity conditions, as well characterize the structural relationship under light and epifluorescent microscopy. Under growth chamber conditions, maize seeds (*Zea mays* var. Dekalb 7815) were surface disinfested and transplanted into pots containing calcium chloride solution ($CaCl_2$) with the treatments: a) *H. seropedicae* ($2x10^7$ cells mL^{-1}) (Control); b) *H. seropedicae* ($2x10^7$ cells mL^{-1}) plus sodium chloride (60 mM NaCl) (3.507 mg L^{-1}). After 7 days, the seedlings were collected to measure the following parameters: length of the aerial part (LAP) and length root (LR); fresh mass of the aerial part (FMAP) and of the roots (FMR); and dry mass of the aerial part (DMAP) and of the roots (DMR), obtained by oven drying under forced air ventilation at 65 ºC for 48 h and subsequent weighted. The biometric results obtained for LR, FMAP, FMR, DMAP and DMR did not differ between stressed plants and control ($p>0.05$), except for LAP, which was higher in the absence of salinity (28% reduction LAP). The results of the structural interaction between *H. seropedicae* and maize seedlings in the control showed the epiphytic colonization of the roots by the bacterium over the entire root axis, mainly in the elongation and differentiation zones as well sites of lateral root emergence. The bacterial colonization in the control occurred in the form of isolated cells and small aggregates. Under saline stress, the colonization pattern of *H. seropedicae* was similar to control, however, bacterial biofilms were more frequently visualized over root surface. In this case, the presence of NaCl may induce bacterial aggregation, reducing salt stress impact over the bacteria. The *H. seropedicae* bacterium was also able to promote maize growth under saline stress, equaling variables analyzed to the control. It is concluded that the inoculation of *H. seropedicae* RAM 10 reduced the impact of salinity on plant growth and changed root-bacteria colonization.

KEYWORDS: abiotic stress, diazotrophic bacteria, microscopy, plant-growth

DEVELOPMENT AGENCY: UENF, CNPq, FAPERJ, Newton Foundation