Food and Agriculture Organization of the United Nations

PROCEEDINGS OF THE GLOBAL SYMPOSIUM ON SALT-AFFECTED SOILS

Halt soil salinization, boost soil productivity

20–22 October, 2021

Government of the Republic of Uzbekistan

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Introducing salt tolerant okra as a summer crop to coastal Lebanese area

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Introduction, scope and main objectives

Urban expansion and pressure on Mediterranean coast caused seawater intrusion into coastal groundwater, often used for irrigation of crops (El Moujabber *et al.*, 2006). Meeting the targets of the sustainable development goals requires the use of saline water for irrigation (Darwish and Fadel, 2017). Many growers fallow their land when ECw reaches higher salinity values (7 dS/m). To reduce this livelihood loss, we introduced a salt-tolerant okra to the coastal Lebanese farming systems.

Methodology

The study area is located in Jieh at 23 km south of Beirut. The experiment was carried out in an open field on loamy soil for the summer growing season of 2019 (between May and September). Four water salinity treatments were considered with the electrical conductivity of the irrigation water (ECw) comprised between 6 (T_c), 9 (T_1), 12 (T_2) and 15 dS/m (T_3). A total of 15 effective plants per treatment were selected for measurements. Crop performance of okra (PI 534521) was measured by non-destructive readings of the chlorophyll contents, canopy temperature and yield.

Results

As the salinity increased to 15 dS/m, chlorophyll contents significantly decreased as compared to Tc, T1 and T2 treatments. Okra canopy temperature in each treatment increased over time. At the beginning, canopy temperature was significantly different between all the treatments. At full harvesting, temperature in T_2-T_c, T_3-T_c, and T_3-T_1 was significantly different. Treatments T_c, T_1, and T_2 had maximum and similar yields throughout the study ($p>0.05$), while T_3 fresh yield decreased by 60 percent with respect to other treatments.

Discussion

Chlorophyll content was affected by the highest salinity level (15 dS/m), which is beyond the threshold this okra variety can withstand. Salinity tolerance in okra varieties can be done in a short time, three weeks after the onset of salt exposure. This study suggests that yield of okra subject to increased water salinity did not differ from the control up to 12.4 dS/m, which is twice the average value recorded in the wells in Jieh. Beyond this level, okra yield was significantly affected by higher salinity. The form of the pods, being similar with the local variety, they will readily find access to the consumers' desire.

Conclusions

Salt tolerant okra can be grown on the Lebanese coastal area witnessing higher salinity levels of irrigation water. ECw for this type of okra genotype should not exceed 10–12 dS/m. Moderate salinity did not affect okra pod quality nor yield. This provides one more opportunity to support farmer's income and encourage crop diversity on farmer's fields. For the first time, salinity tolerant genotypes were propagated and tested for salinity tolerance on the Lebanese coastal area and on farmer's fields.

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