

Growth Response of Date Palm (*Phoenix dactylifera*), Royal Palm (*Roystonea regia*), and Washington Palm (*Washingtonia robusta*) to Saline Irrigation Water

Samar Shawaqfeh, Timothy K. Broschat

University of Florida, Fort Lauderdale Research and Education Center, 3205 College Ave, Davie, FL, 33314



Figure 1. Salt injury on *Phoenix dactylifera* with increasing EC levels



Figure 3. Salt injury symptom on *W. robusta* with increasing EC levels

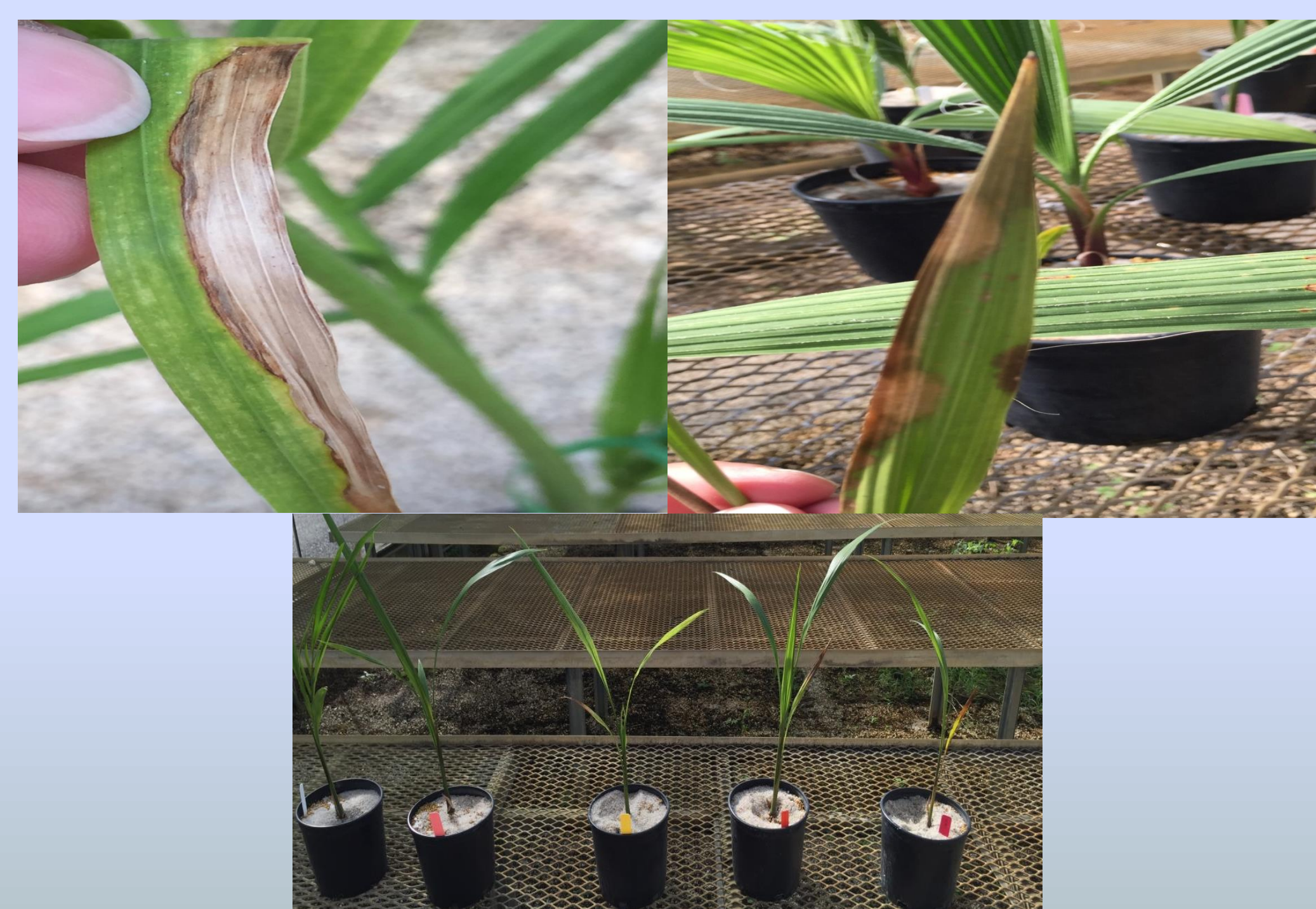


Figure 5. Salt injury symptoms on *Roystonea regia* with increasing EC levels

Introduction

With increasing population demands on the world's water supply, there is a greater need for water conservation. Thus, nursery producers are challenged to avoid the use of high-quality potable water for irrigation. In arid and semiarid climates where water is limited, soil salinity is major problem and palm production can be challenging. Salinity may cause major problems for agricultural production in semiarid tropics and areas subjected to seawater intrusion. The objective of this study was to evaluate the impact of different levels of salinity on the growth of date palm, royal palm, and Mexican fan palm.

Materials and Methods

Royal and date palms were grown in 1-gallon containers, Mexican fan palms were grown in 3-gallon containers in a greenhouse. Palms were irrigated with five different salt concentrations: 0 was the control where DI water was used, for date palm (0,5,10,15, and 20 mS/m), for royal palm (0, 2, 4, 6, and 8 mS/m), and for Mexican fan palm (0, 4, 8, 12, and 16 mS/m). Palms were fertilized with controlled- release fertilizer (Osmocote Plus, 15N-9P₂O-12K₂O, 12-14 months), supplemented with calcium sulfate, magnesium sulfate, and a micronutrient blend. Royal and date palms received 250 mL of salt solutions and Mexican fan palms received 500 mL every other day. Measurement of growth was taken monthly, height for each plant was measured to the tip of the tallest fully extended leaf, and number of new mature leaves per plant was counted.

Results and Conclusions

- Date palms showed the most tolerance to salinity up to 12 weeks under all treatments (Figure 1) and after that these plants began to show mild to low salt stress symptoms (leaflet tip necrosis) at the highest two EC levels (15 and 20 dS/m). With increasing the EC levels date palm showed significant decrease in growth rate (Figure 2)
- Mexican fan palms (*Washingtonia robusta*) started to show mild injury symptoms in all EC levels (4,8, 12, and 16 mS/m) by week 4 then severe injury symptoms started showing after week 8 (Figure 3). With increasing the EC levels, Mexican fan palms showed no increase in growth(Figure 4).
- Royal palms showed mild symptoms at the highest EC level (6 and 8 mS/m) after 6 weeks compared to other EC levels (Figure 5), and the growth was decreasing with increasing the salt concentration (Figure 6).

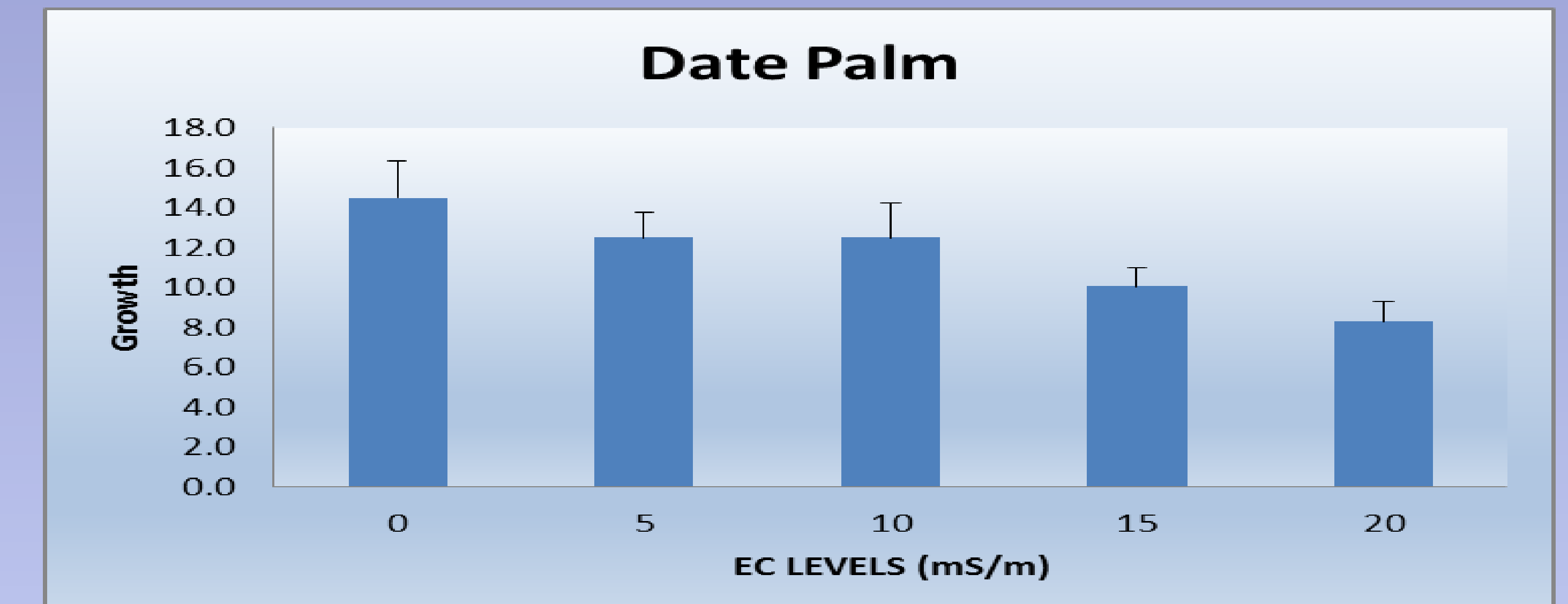


Figure 2. Impact of salinity on growth of *Phoenix dactylifera* After 14 weeks

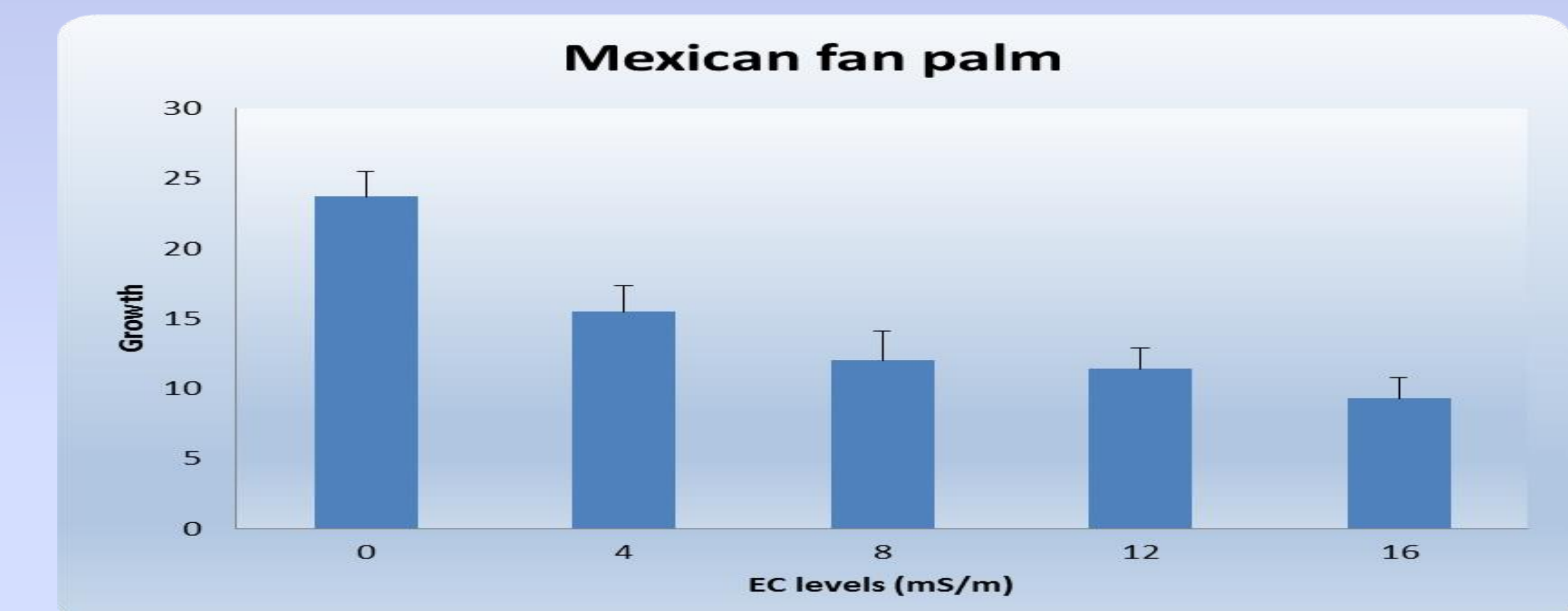


Figure 4 . Impact of salinity on growth of *W. robusta* after 4 weeks

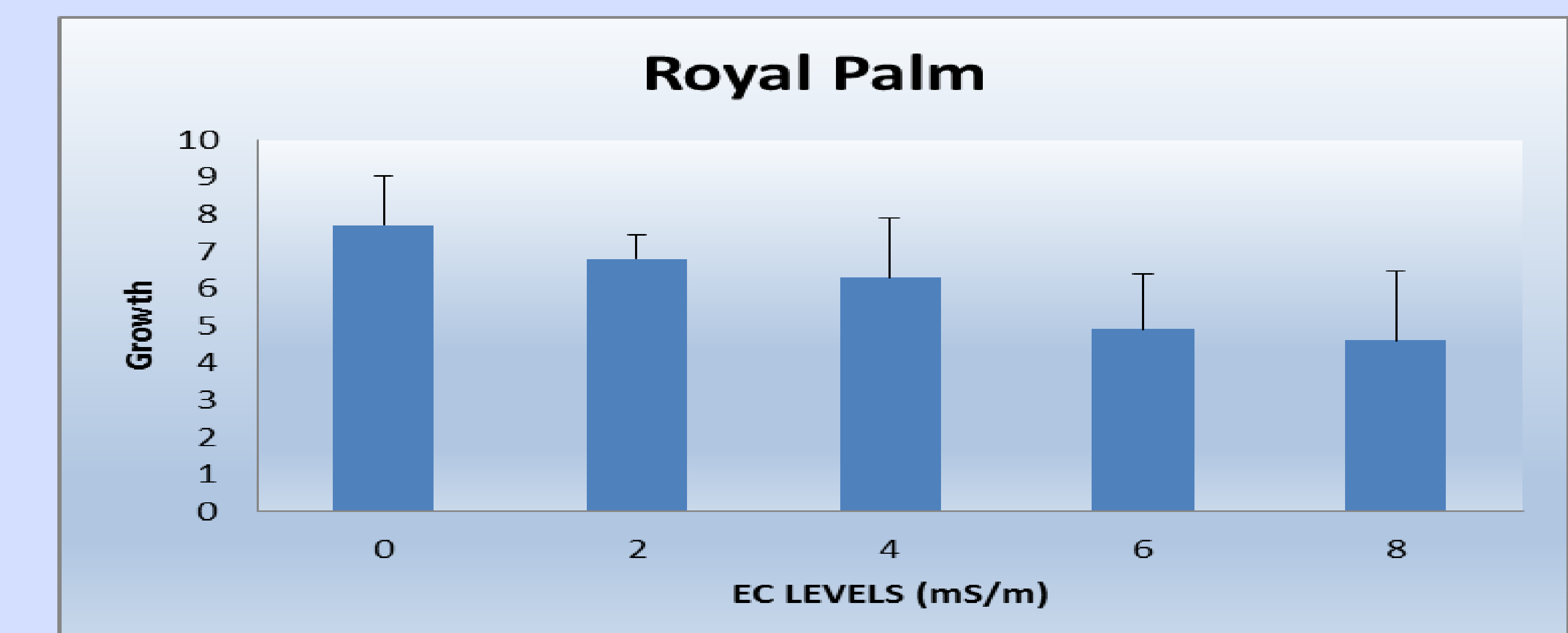


Figure 6. Impact of salinity on growth of *Roystonea regia* after 6 weeks.