Physiological and anatomical studies on tolerance of some fruit rootstocks to salinity

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The present study was carried out during two consecutive seasons of 2001 and 2002 in a greenhouse belonging to El-kanater Horticulture Research Station, Kalyobia Governorate, Egypt.Uniform and Healthy two year old transplants of two rootstocks namely: MM 106 and Pyrus communis were the plant material used in this study, on February 1st during both seasons plastic pots of 35 cm. diameter that had been filled with about 10 kg from each soils under study (clay; calcareous and sandy brought from Qaloub, Wady El-Mulak and Belbies , respectivelly). Soil types were taken from a depth of 0-30 cm; from ground surface. Soils were chemically and mechanically analyzed before period of equilibration. Irrigation was carried out twice weekly by adding one liter tap water per each pot until, investigated treatments of this study was started in both experimental seasons. whereas irrigation with different investigated saline solutions was start during both seasons of study.Saline solutions were prepared for irrigation at the concentration of tap water (0), 2000, 4000 and 6000 ppm of NaCl, Na2SO4, CaCl2, MgSO4, KC1 and K2SO4 as well as each concentration was prepared with two levels of sodium adsorption ratios (S.A.R.) i.e., 3 and 6 and each level of172 Summary and Conclusionsodium adsorption ratio have two Cl: SO4 levels i.e., (low and high). To avoid salts accumulation irrigation with tap water was applied every 21 days, then followed by rewatering with the same salt solution the next day.It was aimed to investigate the salt tolerance of MM 106 and Pyrus communis rootstocks by irrigation with saline solution of different concentrations; SAR and C1:SO4 under 3 soil types.Thus two factorial experiment were conducted, an experiment was devoted for each rootstock. The complete randomized block design with three replications, was employed whereas each was represented by 2 plants (grown individually in 35.0 cm. diameter plastic pots).Fourty eight treatments represented the different possible combinations between four investigated factors namely; a) 3 soil kinds (clay ; calcareous and sandy) ; b) saline concentration (2000; 4000 and 6000 ppm); c) SAR (3 & 6) and d) Cl: SO4 ratios (low & high), beside irrigation with tap water as control were investigated.Specific and interaction effects of the investigated factors and their combinations were studied through the response of the following measurements:0•11110114MOIV-I. Growth measurements:Average length of (stem and root); stem diameter number of leaves per plant; leaf & total assimilation area; fresh and dry weights of various transplants organs (stem, leaves, roots and total plant) and top/root ratio were the investigated growth measurements in both experiments.V-II. Some physiological properties:Leaf relative turgidity (L.R.T), leaf succulence grade (L.S.G.), leaf osmotic pressure (O.P.) in bar and leaf water potential (L.W.P.) in response to investigated treatments were estimated.V-III. Chemical analysis:In this regard, foliar photosynthetic pigments (chlorophyll a & b); stem total charabohydrates; proline contents and nutritional status (Leaf, N, P, K, Ca, Mg, Fe, Mn , Zn and Na contents) in response to the included treatments of two experiments were investigated.V-IV. Leaf anatomical structure:In this regard some leaf anatomical characteristics i.e, cutical & epidermal thickness of both upper and lower leaf blade surface; palisade & spongy tissues thickness and number of xylem rows in vascular bundle were investigated regarding their response to saline stress.