Growth and mineral composition of some citrus species transpecies transplants as influenced by rootstock

Mahmed Mohamed Sholah

This investigation was carried out during two successive seasons, 1999 / 2000 and 2000 / 2001 to study the effect of soil type and rootstock on growth; nutritional status (leaf & root mineral contents) for some citrus seedlings, whereas two factorial experiments were included.V.I. The first experiment:It was aimed to study the effect of soil type (calcareous and clay soils) on rootstocks growth and nutritional status of (Volkamer lemon and sour orange).V.II. The second experiment:The main purpose of this experiment hoped to study the performance of Washington Navel orange and Balady mandarin budded on sour orange and Volkamer lemon and Navel orange and Balady mandarin budded on sour orange (as an interstock) budded on Volkamer lemon rootstock under two soil types (calcareous and clay soils).The investigated treatments were as follows:1 — Navel orange on sour orange rootstock.2 — Balady mandarin on sour orange rootstock.3 — Navel orange on Volkamer lemon rootstock.4 — Balady mandarin on Volkamer lemon rootstock.139SUMMARY AND CONCLUSION5 — Navel orange on sour orange (interstock) on Volkamer lemon rootstock.6 — Balady mandarin on sour orange (interstock) on Volkamer lemon rootstock.The complete randomized block design with five replications was employed for arranging treatments of each included experiment. Every replicate was represented by either15 rootstock seedlings or 4 full successfully budded transplants for 1st & 2nd experiments, respectively.The main results obtained from this study could be summarized as follows:V.I. Experiment, I:Specific and interaction effects of investigated factors (soil type; citrus rootstock species and their combinations) on: V.I.1. Survival percentage of transplanting:A.Specific effect:The highest survival % was closely linked with clay soil as specific effect of soil type was concerned. However,Volkamer lemon seedlings exceeded those of sour orange in this regard.B.Interaction effect:The transplanted Volkamer lemon in pots filled with clay soil exhibited the largest % of survival.140SUMMARY AND CONCLUSIONV.I.2. Vegetative growth parameters:A.Specific effect:As for specific effect of soil type, data obtained during both seasons revealed that most growth parameters i.e., (length of stem & root; dry weight of leaves & total plant) were obviously increased under clay soil over calcareous soil. However, stem (diameter; dry weight & dry matter %); leaf number and average leaf area showed less pronounced response.Nevertheless, trend of response to specific effect of citrus rootstock species declared that Volkamer lemon seedlings surpassed significantly those of sour orange as most growth parameters (stem length; number of leaves; root length; dry weight of stem, leaves and total plant) were concerned, while the response was relatively less pronounced with stem diameter and leaf area. On the contrary, sour orange exceeded Volkamer lemon in dry matter % of 3 plant organs (stem, leaves & root).B.Interaction effect:Data obtained during both seasons revealed that the more pronounced response to specific effect of soil type which proved the superiority of clay soil over calcareous for most growth parameters from one had that associated with the relative tendency of Volkamer lemon to exceed sour orange from the other were reflected on interaction effect of soil type X citrus rootstock species. Herein, the greatest values of the investigated growth parameters were markedly in closed141SUMMARY AND CONCLUSIONrelationship to seedlings of both rootstock species grown in clay soil. However, Volkamer lemon in clay soil ranked 1st in most measurements (stem

length; number of leaves; dry weight of leaves, stem, root & total plant), while sour orange seedlings in clay soil ranked 1st pertaining the top /root ratio and dry matter % of 3 plant organs (leaves, stem and root). Moreover, seedlings of both citrus rootstock species in clay soil not only had the greatest values of both average leaf area and root length but also were statistically the same in this respect.V.1.3. Nutritional status (leaf & root mineral content): A. Specific effect:Regarding the specific effect of soil type on nutritional status i.e., leaf and root N, P, K, Ca, Mg, Fe, Mn and Zn contents, data obtained during both seasons revealed that the response varied from one nutrient element to another. Since, leaf and root N; K; Fe; Mn and Zn levels were obviously higher in rootstocks seedlings grown in clay soil than the analogous ones in calcareous soil. However, other nutrient elements i.e., P; Ca and Mg didn't respond to soil type except root Ca content was increased in calcareous soil.As for the specific effect citrus rootstock, data obtained revealed that most elements, especially N; P; Ca; Mg; Fe and Mn showed no significant differences between both citrus rootstock species. However, both K and Zn levels showed obviously significant increase in leaves and roots of Volkamer lemon seedlings over those in clay soil, besides the root Fe content followed also the same trend.142SUMMARY AND CONCLUSIONB. Interaction effect:Data obtained both seasons revealed that leaf and root mineral contents responded clearly to interaction effect of different combinations between soil type and rootstock species. Since, Volkamer lemon seedlings in clay soil had the richest leaves and roots in their N, P, K, Fe, Mn and Zn contents, while the reverse was true with seedlings in calcareous soil irrespective of citrus rootstock species. Both Ca and Mg showed no considerable variations in this concern.