

# Physiological studies on vegetative propagation of some citrus rootstocks

Attia Ibrahim Ibrahim

This study was carried out during two consecutive seasons of 1992 and 1993 on four citrus rootstocks namely: Volkamer lemon, Mexican lime, Cleopatra mandarin and Rangpur lime at the Experimental orchard of Horticultural Research Institute at Giza : Selected trees for this investigation were 22-year- old, except for Volkamer lemon (8-year -old). They received regularly the normal Horticultural practices. Hardwood cuttings were prepared from one- year- old branches. Cuttings of about 10-12' em long and 1-1.5 ern in diameter were prepared at three dates namely mid-March, mid-June and mid-September. Leaves on each cuttings were removed except only one leaf was left at the apex of cutting. However, just before planting the cuttings were grouped into two groups as follows: (a) First group : The basal end of the cuttings at about 5 ern was dipped for 5 seconds in tap water "general control" or one of indole butyric acid solutions at 2000, 4000, 6000, and 8000 PPM. (b) The second group: The basal end of cuttings were wounded (about one inch) by making 2 incisions. The cuttings were dipped in tap water "control" or one of indole butyric acid solutions 2000, 4000, 6000 and 8000 PPM. The treated cuttings were immediately planted at a depth of 5 ern in plastic flats (32 em length x 25 em width x 15 cm height) filled with a mixture of sand and peat moss at 2 : 1(v/v). The flats were kept for 60 days in a shade house under intermittent mist, operating during days house according to seasonal and daily weather conditions, within a range of 2.5 - 5.0 minutes between sprays and 5-15 seconds of mist duration. Thus, the study of each citrus rootstocks is considered a factorial experiment . consisted of 30 treatments (three planting dates x five IBA concentrations x two wounding treatments) . The treatments were arranged in a completely randomized block design with four replicates for each treatment and each replicate included ten cuttings . The obtained results could be summarized as follows : 5-1- Rooting of citrus rootstock cuttings : Generally, mid-September proved to be the most appropriate time for preparing and planting stem cutting of the studied citrus rootstocks: Volkamer lemon, Mexican lime, Cleopatra mandarin and Rangpur lime rather than mid-June or mid- March planting. In addition, wounding the basal ends of the cutting, enhanced all the studied rooting parameters (rooting percentage, number of adventitious roots per cutting and root fresh and dry weight parameters). Also, dipping the basal ends of cuttings in indole butyric acid solutions at 2000, 4000, 6000 or 8000 ppm for five seconds increased the rooting ability of the cuttings particularly, 8000 PPM IBA. Furthermore, the stimulating effect of the studied factors (planting date, IBA and wounding was increased when they used in combinations whether in double combination (planting date x wounding, ~ planting date x IBA or wounding x IBA) or triple combination (planting date x wounding x IBA ) Conclusively, planting citrus rootstocks cuttings in mid-September after wounding and treating with IBA at 8000 ppm gave the highest rooting percentage 5-2 Chemical study : 5-2-1- Total soluble indoles and phenols In general, planting date had significant effect on total indoles and phenols of cuttings . Shortly, planting Volkamer lemon, Mexican lime, Cleopatra mandarin and Rangpur lime cuttings in mid- September increased cutting content total soluble indoles and decreased its content of total soluble phenols as compared with those planted either in mid-March or mid-June. 5-2-2- Total carbohydrates and nitrogen content. The highest total carbohydrates and nitrogen content were shown in Volkamer lemon cuttings prepared and planted in mid-September followed by mid- March planting. While, those planted in mid-June showed be the lowest values in this respect. Generally, total

carbohydrates and nitrogen content of Mexican lime, Cleopatra mandarin and Rangpur lime cuttings took similar trend to that of Volkamer lemon. Anatomical study : Histological study reveals that the preformed root initials were noticed in the cortex of the four studied citrus rootstocks under investigation. Root initials were raised from cambium zone. Moreover, cambium was activated in all IBA treated cuttings, particularly, when IBA was supplemented by wounding treatment. Generally, the results showed that treating the wounded cuttings of Volkamer lemon, Mexican lime and Cleopatra mandarin as well as Rangpur lime with IBA at 4000, 6000 and 8000 PPM improved the studied rooting parameters. On the other hand, treating wounded cuttings with IBA and planting in mid-September proved to be the most effective treatments in enhancing rooting parameters (rooting percentage, number of roots per cutting fresh and dry weight of roots per cutting) as compared with the analogous ones planted in mid-March or mid-June.