# Evaluation of Selected Israeli Rootstocks for Productivity and Dwarfness Under Various Stress Conditions

**Continuing Project; Third Year**

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## Introduction:

Selection for resistant rootstocks of fruit trees is often a painstaking and time-consuming task. It requires long-term trials for proper selection utilizing varied field conditions. Paradoxically, it is one of the more concise methods to obtain practical solutions for soil-related enigmas such as disease and salinity. *Phytophthora cinnamomi* and salinity are major predicaments encountered by growers and researchers alike in avocado orchards worldwide.

## Materials and Methods:

The research is conducted in three experimental orchards: Two **existing plots**, which include part of the tested rootstocks. They were established in the spring of 1996 at **Mishmar-Haemek** (heavy soil, *P. cinnamomi*). The rootstocks were grafted with Hass cultivar in the spring of 1999. The second plot is located at **Kfar Hogla** (light soil and poor water quality). The rootstocks are grafted with Reed and Haas cultivars (Table 1). Horticultural surveys (Tree growth, leaf-burn, trunk diameter and flowering rates) were taken during 1999 - 2000. The preliminary results of the past year show an increment of leaf-burn, especially on the rootstocks ( VC 55, VC 207, VC 256 and VC 806, VC 820). P.cinnamomi symptoms have not been detected.

**New Plot:** 12 divergent rootstocks were planted in the northern area of Western Galilee at Idmit, characterized with heavy soil, high quality irrigation water (100 mg. Cl/l), presence of *P. cinnamomi*, and cold weather conditions. The study consists of evaluations of rootstocks from West Indian and the Mexican races (Table 1) planted 6m by 4m. These rootstocks were planted in the plot in June of 99'as ungrafted rootstocks. All rootstocks will be grafted with Hass variety in the month of June 00'. For improved pollination of Hass, the Ettinger cultivar will be grafted on West Indian Rootstock, Degania 117, each 4th row.

**Table 1:** Rootstocks in Experimental Plots

| Rootstock | Race | Test Idmit | Plot M.H.* | Location K.H.** | Budwood UCR *** |
|---|---|---|---|---|---|
| VC 28 | W.I. | + | + | + | + |
| VC 55 | W.I. | + | + | + | |
| VC 66 | W.I. | + | + | + | + |
| VC 207 | W.I. | + | + | + | |
| VC 256 | W.I. | + | + | + | |
| VC 265 | W.I. | + | | + | |
| VC 801 | W.I. | | + | + | |
| VC 802 | W.I. | | + | + | + |
| VC 803 | W.I. | + | | + | |
| VC 804 | W.I. | + | | + | |
| VC 805 | W.I. | | + | + | |
| VC 806 | W.I. | | + | + | |
| VC 820 | W.I. | | + | | |
| VC 821 | W.I. | | + | + | |
| VC 49 | Mex. | + | | + | + |
| VC 239 | Mex. | + | | | |
| VC 828 (Duke7) | Mex. | + | | + | |
| Ashdot 17 (s) | W.I. | + | | + | |
| Degania 117 (s) | W.I. | + | | | |

* M.H. : Mishmar Haemek.
** K.H.: Kfar - Hogla.
*** These rootstocks are part of the plant material sent to UCR during the previous years.

## Results

Horticultural Surveys: Tree growth, leaf-burn, and Chlorosis evaluations were taken during late summer. The results showed differences between the rootstocks, especially between W.I. and the Mexican races (Tab. 2). The most significant information in the first stage was concerning leaf growth rate, where differences between the growth potential of each of the rootstocks was recorded. These results are preliminary since the surveys were undertaken only a few months post planting, and the rootstocks were not as yet grafted.

**Table 2:** Horticultural Surveys of Selected Non-grafted Rootstocks "Idmit"(autumn 1999)

| Rootstock | Leaf-burn | Chlorosis (0 -2)** | Tree Circumference (cm.) | Leaf growth (0 - 2)** |
|---|---|---|---|---|
| VC207 | 0.32 ± 0.67 | 0.39 ± 0.92 | 4.00 ± 1.74 | 1.36 ± 0.83 |
| VC803 | 2.63 ± 1.33 | 0.37 ± 0.76 | 5.57 ± 1.85 | 0.77 ± 0.68 |
| Duke7 | 2.72 ± 0.75 | 1.14 ± 0.99 | 5.17 ± 1.67 | 1.21 ± 0.68 |
| VC256 | 0.52 ± 0.64 | 0.15 ± 0.46 | 5.96 ± 1.93 | 1.59 ± 0.64 |
| VC28 | 0.34 ± 0.61 | 0.21 ± 0.49 | 5.03 ± 2.28 | 1.38 ± 0.82 |
| VC804 | 0.97 ± 1.05 | 0.24 ± 0.58 | 7.41 ± 1.35 | 1.79 ± 0.41 |
| VC66 | 1.14 ± 1.03 | 0.34 ± 0.84 | 5.54 ± 1.75 | 1.51 ± 0.66 |
| VC265 | 2.75 ± 0.96 | 3.50 ± 1.00 | 3.0 ±0.00 | 1.25 ± 0.50 |
| VC49 | 2.83 ± 0.94 | 1.58 ± 1.44 | 4.59 ± 1.73 | 1.08 ± 0.79 |
| VC55 | 1.36 ± 1.16 | 0.68 ± 1.09 | 5.58 ± 2.37 | 1.43 ± 0.79 |
| VC239 | 3.24 ± 0.89 | 0.67 ± 1.06 | 6.69 ± 1.01 | 0.95 ± 0.67 |
| Ashdot 17 | 0.31 ± 0.55 | 0.04 ± 0.20 | 4.38 ± 2/02 | 1.54 ± 0.58 |

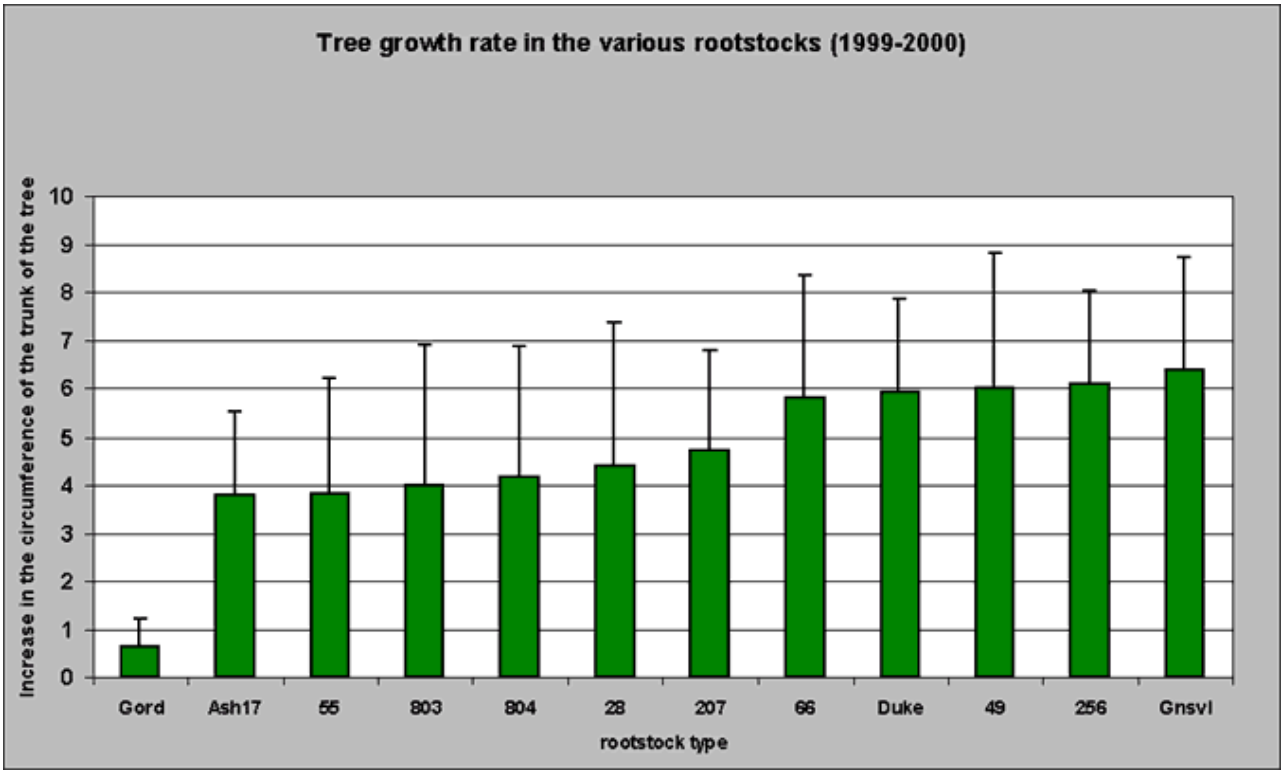
*Leaf burn : 0-5: 0- no leaf burn, 5-all the leaves are totally brown.
** Chlorosis : 0-2: 0- green leaves. 2- full yellowish leaves.
*** Leaf growth : 0-2: 0-no growth, 2 - new growth on most branches.

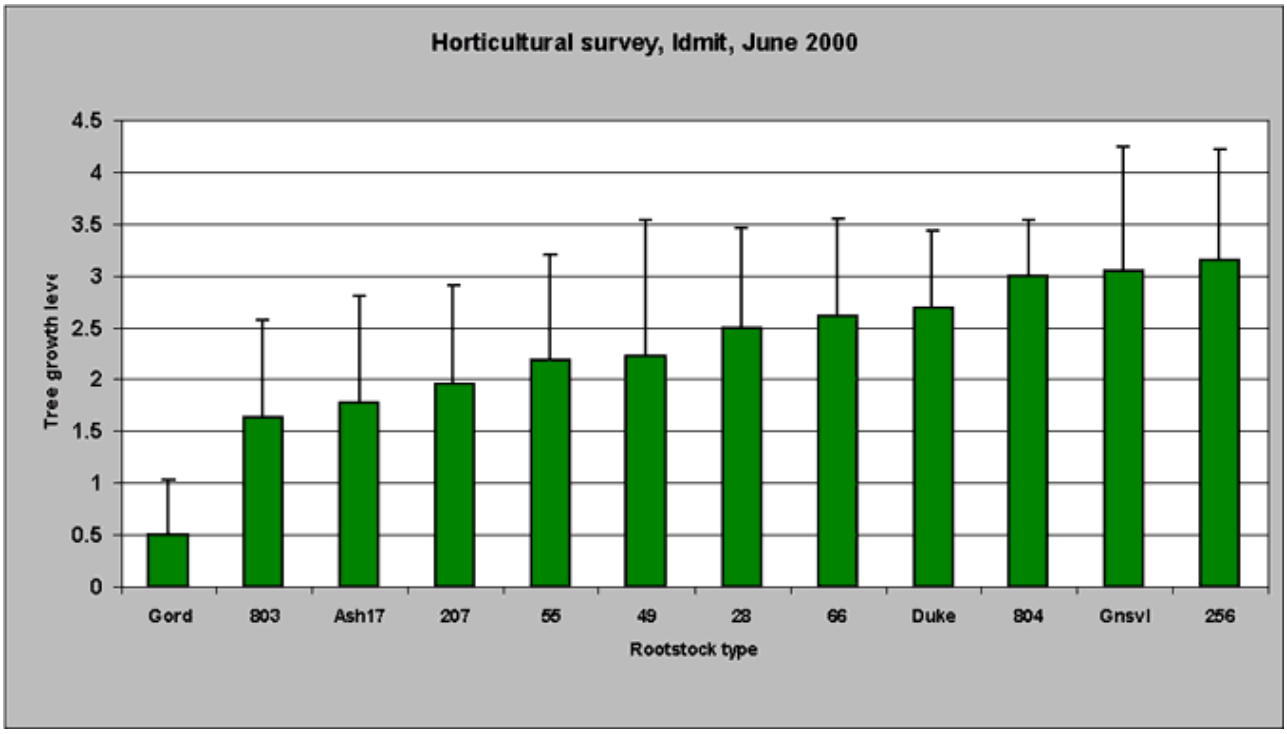
The following surveys were undertaken a year after the planting, prior to grafting. One survey estimated the number of saplings that did not survive. An overwhelming majority of the trees (87.2%) developed well in the soil and were suitable for cultivar grafting. The results shown in Graph #1 emphasize the differences between the classifications of the rootstocks. The Gordienco rootstock did not endure under the existing conditions at Idmit (heavy and anaerobic soil) while the entire collection of VC256 developed admirably.

In comparing the two horticultural surveys (September 1999 and June 2000) with respect to tree growth rate (according to scale: 0 - no growth, 4 - vigorous growth) there can be noticed a similar tendency (Table 2 & Graph 2). Rootstock VC 256 shows the largest increment in growth rate, while VC803 is the weakest, excluding the Gordienco (Graph 2). In respect to tree growth rate, as measured by trunk circumference there is substantial evidence of five rootstocks (VC66, Duke7, VC49, VC239 and VC256) being predominately vigorous, while VC804, VC803, VC55, Ashdot17 and Gordienco are effete. In our future course of research, there shall be conducted follow-up studies concerning the growth rate of those rootstocks as grafted trees.

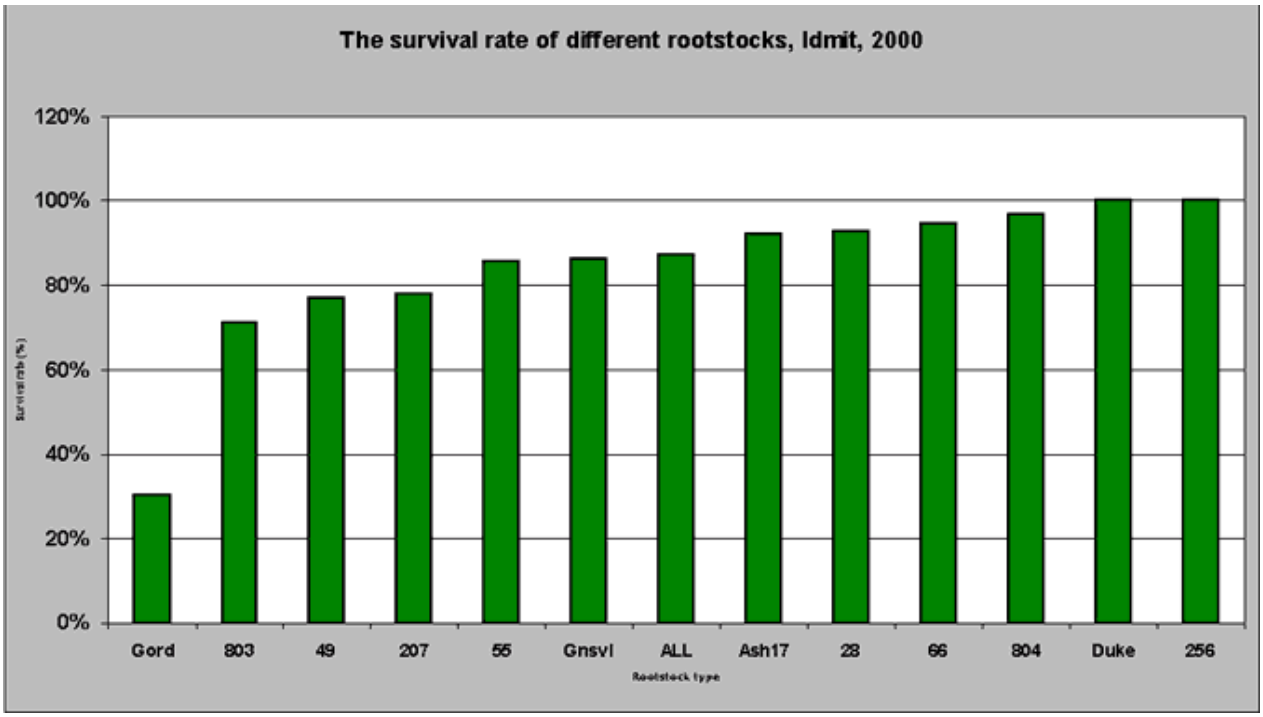
Similar data are being collected in the two additional plots. The results from these studies will be forthcoming in the ensuing reports.

Testing these rootstocks in diverse and remote cultivating regions in Israel enables our staff to accumulate comprehensive and abundant information and convey evaluations concerning specific cardinal characteristics.




**Horticultural survey scale: 0-No growth, 4-Vigour tree.**




**All: The total average of survival of the whole plantation.**