DWARFING EFFECT OF MANGO VARIETY KARUTHACOLOMBAN (Mangifera indica L.) BY USING WILLARD AS INTERSTOCK

W.M.S.P.K. Panampitiya, H.K.L.K. Gunasekera, and I.Medagoda
Department of Agricultural and Plantation Engineering and
Horticultural Crops Research and Development Institute

Introduction

Mango (*Mangifera indica* L.) is the most important fruit crop among the cultivated fruit crops in every parts of Sri Lanka. It has a high demand in local as well as export market as fresh and processed products. Most of the Mango varieties produce broad and tall structure directing for difficulties in tree management and harvesting. Dwarf trees have many advantages when compared with standard trees such as planting in high densities, take less space, easy agronomic and tree management practices such as fertilization, pruning, disease management and also facilitate the harvesting to produce quality fruits (Lawrence, 1948). Therefore, reduction in the size of mango trees would be a most desirable goal for the commercial and private planter. It would greatly assist harvesting and also would make it possible for the homeowner to maintain trees of different fruiting seasons in limited space. The common practice used for multiplication of mango is cleft grafting and the recommended root stocks were Kohu amba and Wal amba (Gunarathnam, 1946). Studies that have been carried out in other countries have identified cultivars which can be used as interstocks for dwarfing the mango. The variety Under Ground and Tom E.J.C. which can be used as interstocks were officially released in 1997 and 2005 respectively by the department of Agriculture (Medagoda, 1998). The other popular cultivars are Willard, Karutha Colomban and Vellai Colomban (Medagoda, 2006). Thus, this study was conducted using Willard interstocks and Kohu amba rootstocks to investigate the dwarfing behaviour of two scion varieties of Karutha Colomban and Under Ground varieties.The objective of the study is to investigate the dwarfing effect of Mango by using Willard as an interstock and Kohu amba rootstocks for Karutha Colomban and Under Ground varieties.

Methodology

This study was conducted at Horticultural Crops Research and Development Institute, Gannoruwa, Peradeniya. The grafted plants were established in the field following RCBD with 4 treatments and 6 replicates. Karutha Colomban and Under Ground were used as scion varieties. Kohu amba is the recommended rootstock variety in Sri Lanka. Willard is a dwarf variety but it has no good root system. Willard and Kohu amba varieties were used as interstock and rootstock respectively to investigate the dwarfing effect. Number of plants per treatment was 40.

Treatments

T_1 - KC/ W/ Ko – Karutha Colomban/ Willard/ Kohu amba
T_2 - UG/W/Ko – Under Ground/ Willard/ Kohu amba
T_3 - KC/Ko – Karutha Colomban / Kohu amba
T_4 - UG/Ko – Under Ground / Kohu amba

Results and Discussion

Among different treatments tested the highest percentage of success grafted plants was observed in treatment 3 (Kohu amba/ Karutha Colomban). The success achieved in the treatment 1 (Kohu amba/ Willard/ Karutha Colomban) was 92.5. The lowest percentage success (60%) was noticed in the treatment 2 (Kohu amba/ Willard/ Under Ground). The success percentage of treatment 4 was 62.5. However, all treatments showed over 60% success rate of grafting (Table 1).

Table 1: Success percentages of grafted Mango plants (six weeks after grafting)

Treatments	Total number of plants used	Number of success plants	Percentage success (Success rates)
KC/W/Ko- (T1)	40	37	37/40 x100 =92.5%
UG/W/Ko- (T2)	40	24	24/40 x100 =60%
KC/Ko-(T3)	40	40	40/40 x100 100%=
UG/Ko- (T4)	40	25	25/40 x100 =62.5%

After six weeks, the grafted plants were evaluated before field establishment and the highest number of leaves was recorded in T3 treatment (Figure 1). All the plants in all treatments tested showed over 5 leaves (5-9) at four months after grafting. Number of leaves in the 2nd leaf whorl ranged from 5-7 whereas the highest was recorded in T3 as in first leaf whorl.

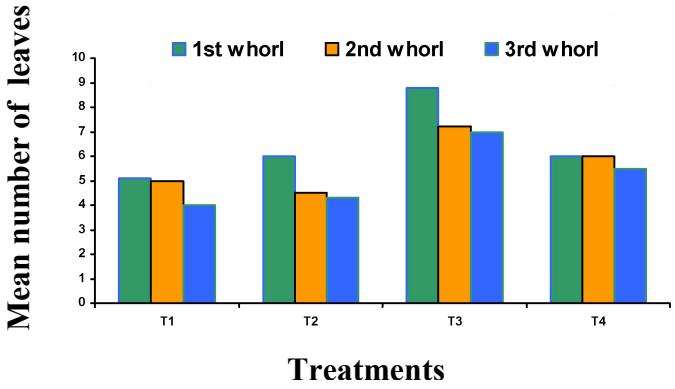

Figure 1 Variation in the mean number of leaves 1st, 2nd and 3rd leaf whorls of each treatment. Each data point is the measurements of four replicates.

The means of the recorded data on height of the scion in all treatments at 2, 4, 6, 10 and 14 weeks after field establishment and their significance are shown in figure 2. The scion height at 2 weeks after planting was lowest in T1 and the highest in T2. The Karutha Colomban scion has shown less height. The trend of the response of different treatments remained same at 4 and 6 weeks after planting. At 10 weeks after planting also the trend of scion growth remained same showing the lowest growth of the scion from T1 where Karutha Colomban scion with Willard interstock compared to the controls. Similarly the treatment T2 recorded the faster scion growth, where Under Ground scion was used with

Willard interstock. When the growth pattern of the scions (from field planting up to 14 weeks) of all treatments are considered, all the treatment showed increased in height and the initial gap between treatments were wider after the 14th week of the growth. Results showed that the variety Karutha Colomban is the best scion for getting dwarfing effect with Willard or Kohu amba as interstock or rootstock respectively.

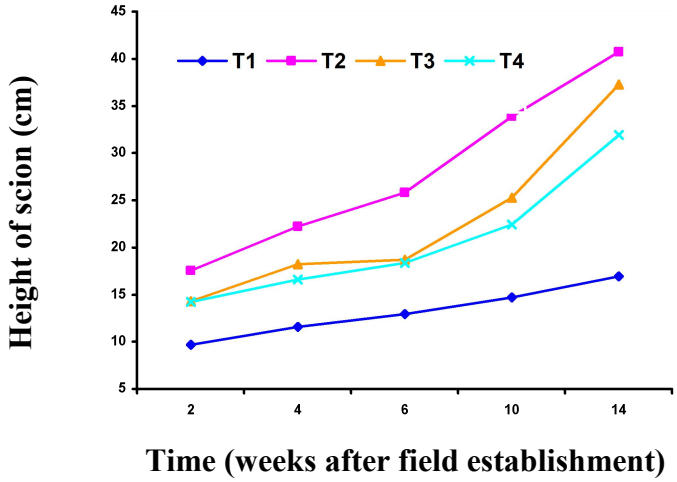

Figure 2 Mean height of scion (cm) after field establishment. Each data point is the measurements of four replicates.

Conclusions and Recommendations

The study findings clearly revealed that dwarf Mango plants can be obtained by combining Willard interstock and Karutha Colomban scion for Kohu amba rootstock. The data collected so far has shown positive results pertaining to the set objectives. This indicates the possibility of obtaining good results in the later stage of the crop as the observations clearly indicate the possibility of obtaining dwarf Mango plants.

References

Gunarathnam, (1946). The Cultivation of Mango in the dry zone. *Tropical Agriculturist* 95-23-30.
Lawrence Southwick, (1948). Dwarf Fruit Tree. The Macmillan Company. Pp 5-9

Medagoda. I, (1998). Evaluation of Mango Variety Malwana Amba (under ground) Sri Lanka Association for The Advancement of Science 54th Annual Session, part 1.

Medagoda, I. (2006). Mango cultivars in Sri Lanka and future needs accepted publishing in “Krushi”.