

Cherry Rootstocks Trials at Geneva

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Cherry trees on seedling rootstocks are large, slow to bear and do not lend themselves to high-density plantings. As has been done with apple, dwarfing rootstocks are key to successful intensification of cherry orchards. Ever since 1986, when Dr. Jim Cummins planted the first NC-140 sweet-cherry rootstock trial at Geneva, we have continued to have an avid interest in finding better stocks than Mazzard and Mahaleb seedlings.

1986 NC-140 Sweet-Cherry Rootstock Trial

Gisela 6 (Gi.6) emerged from the 1986 trial as the most reliable semi-dwarfing stock. Gi.5 also showed promise as a stock that is about 25% smaller than Gi.6. Both stocks have been planted commercially and gained favor with some growers; Gi.5, however, has proven to be unsuccessful if it is not irrigated. Both stocks suffer from over-setting and small fruit size if horticultural management practices, like strong pruning and irrigation, are not utilized. More recent trials with additional cherry rootstocks have given additional support to Gi.6, and have shown some additional promising rootstocks.

1998 NC-140 Sweet-Cherry Rootstock Trial

From our sweet-cherry trial planted in 1998, there are three groups of rootstocks to discuss with respect to tree vigor. The two seedling stocks (Mazzard and Mahaleb) continue as the most vigorous with Gi.6, Weiroot 10, and Weiroot 13 remaining close in size. Weiroot 158, Gi.195-20, and Edabriz continue to comprise the mid-vigor group. The low-vigor group includes Gi.7, Weiroot 72, Gi.5, Weiroot 53, and Gi.3 (formerly Gi.209/1). Relative

propensity to sucker (most to none) were: Weiroot 10, Weiroot 158, Weiroot 13, Gi.7, Mazzard, Weiroot 72, Weiroot 53, Edabriz, Gi.195/20, Gi.6, Gi.3, Mahaleb, Gi.5. Some low-vigor stocks have shown early cessation of terminal growth, minimal extension growth, and unhealthy, pale green-yellow leaves which prematurely cupped and drooped in late August through September and October. These symptoms resembled drought stress but no prolonged period had passed without rains. This trial is not irrigated and the lack of irrigation may be the cause of the poor performance of the most dwarfing stocks. An analysis of trunk cross-sectional area increase for the last few years indicates that the low vigor stocks have shown a depressed growth rate despite a light to zero crop during the last three growing seasons at Geneva. In another trial of cherry orchard systems with both Hedelfingen/Gi.5 and Hedelfingen/Gi.6, this one irrigated, both stocks showed adequate growth and no leaf cupping and poor leaf coloration.

Winter injury to flower buds in January 2004 caused major losses of fruiting for the second year in a row. With Hedelfingen, trees on Gi.3 had the lowest live flower count followed by Gi.5, Weiroot 53 and 72, Gi.7 and Gi.195/20 (Table 1). The greatest number of live flowers was with trees on Mazzard, Mahaleb, Weiroot 10, and 13 followed by Weiroot 158, Edabriz and Gi.6. During the 2003/2004 winter, a mid-season warm spell caused an early loss of hardiness by some stocks. Temperatures dropped from 60°F on January 2 to minus 18.5°F on January 9.

Some of the less vigorous stocks failed to be more yield efficient than more vigorous stocks. This was due in part to severe bud damage in the winter but may also have been due to poor compatibility between the scion and the rootstock. The exception to this was Weiroot 72, which

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in 2004 had one of the best yield efficiency ratings.

After four cropping seasons, Gi.6 appears to be the best overall rootstock in the trial. Weiroot 72 would be a close second choice because of high yield efficiency and good winter survival if suckering propensity weren't considered of importance; however it had six times as many suckers as Gi.6. Gi.5 can only be recommended if trees are irrigated and under high levels of commercial horticultural management.

2002 PiKu1 and PiKu3 Rootstock Trial

The PiKu series of cherry rootstocks were bred in Pillnitz (Dresden), Germany. The plant material was provided for trials in the United States via International Plant Management Inc. in the spring of 2002. The trial compares eight scions varieties (Attika, BlackGold, Hedelfingen, Lapins, Regina, Summit, Ulster, WhiteGold) and 2 PiKu rootstocks. At the end of three seasons, trees on PiKu1 were significantly smaller than trees on PiKu3. Three cultivars (Hedelfingen, WhiteGold and Regina) were significantly lower in vigor than the other five more vigorous scions. PiKu1 shows some aerial roots, which are attractive to borers.

TABLE 1

Live flower ratings for thirteen sweet-cherry rootstocks with Hedelfingen as the scion in the 1998 NC-140 sweet cherry rootstock trial at Geneva, NY taken on May 5, 2004 following a severe January freeze event.

Rootstock	Live Flower Rating*
Mahaleb	4.0
Mazzard	4.0
Weiroot 10	4.0
Weiroot 13	4.0
Edabriz	3.6
Weiroot 158	3.6
Gi.6	3.4
Gisela 195/20	2.9
Gi.7	2.7
Weiroot 72	2.6
Weiroot 53	2.0
Gi.5	1.5
Gi.3	1.1

0 = no live flowers, 1 = fewer than 50 live flowers, 2= 50 to 100 live flowers, 3= 100 to 250 live flowers, 4 = over 250 live flowers per tree.

Rootstock Trial

In our 1998 NC-140 Montmorency Sour-Cherry Trial, Mahaleb, Gi.6 and MXM60 are the most productive rootstocks. Maheleb performs well except in sites prone to phytophthora root rot. Where this disease is prevalent on heavier soils, Gi.6 and MxM 60 have shown greater promise.

After three years, there were three groups of vigor classification for Montmorency. The most vigorous group includes: Weiroot 13, Weiroot 10, Mahaleb, and Gi.6. 'Weiroot 53' has a malady just above the graft unions on all trees. Emanations in the bark just above the union take the form of three-quarter-inch bark lumps with deep vertical grooves about every 5cm apart and some horizontal grooves in the erupted bark. These eruptions were about 30cm in height and were thicker and longer if the graft union was fully exposed above the soil line. Weiroot 53 had a very marked decline in yield efficiency in 2004 compared to earlier seasons when it had been the most yield-efficient stock under Montmorency.

Although results of this trial are showing greater production for Montmorency with some of the newer stocks, New York growers are unlikely to adopt dwarfing stocks, especially Gisela stocks since they

are too expensive for their use to be justified.

2002 Balaton Tart Cherry on PiKu1 and PiKu3 Rootstock Trial

With Balaton tart cherry there were no significant differences in trunk circumference between PiKu 1 and PiKu 3 at the end of three growing seasons. This was surprising, since with sweet cherry, trees on PiKu1 were significantly less vigorous than trees on PiKu3.

Conclusions

Cherry rootstock trials at Geneva since 1986 have shown Gi.6 rootstock to be the most reliable semi-dwarfing stock for sweet cherry. For commercial plantings we recommend Gi.6 be planted at densities from 300-600 trees/acre. Precocious and productive varieties such as Sweetheart will require more aggressive pruning and irrigation to avoid small fruit size. The greatest drawback with Gi.6 is that it is a semi-dwarfing rootstock and will not be suitable for planting densities above 500 trees/acre. Gi.5 has also shown promise as a stock that is about 25% smaller than Gi.6 and can be planted in densities up to 800 trees/acre. However, it can only be recommended if trees are irrigated and under high levels of horticultural management. Newer trials have resulted in additional dwarfing stocks that are promising. Weiroot 72 is dwarfing and could be a good choice because of high yield efficiency and good winter hardiness; however, propensity to suckering is high. The newer stocks PiKu 1, 3 and 4 show promise but it is too early for any definitive conclusions.

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