Rootstock report to WTFRC
January, 2011

Significant Rootstock Findings

- Geneva rootstocks continue to show genetic mitigation of replant disorders. Elite selections including G.214, G.41 and G.935 continue to perform well in fumigated and non-fumigated sites. G.890 and CG.4011 are performing well in non-fumigated sites and warrant more evaluation. CG.4814 and CG.4210 are showing virus sensitivity. G.202 does not have competitive crop density and may reduce fruit size a ½ box size.
- Availability of Geneva rootstocks is finally approaching commercial numbers. Demand is significantly greater than supply.
- G.41 and G.11 are smaller than M.9 337.
- G.214 is larger than M.9 337 and was released in 2010.
- G.935 is similar in size to Pajam 2 or M.9 emla. Eastern trials utilizing data from young trees report G.935 is M.26 size. In Washington, G.935 is M.9 class in tree size. G.935 can be vigorous as a newly planted non-bearing tree.
- G.890 is a vigor class larger than M.9. It is very crop efficient and produces good fruit size. Eastern data is overstating its class size, at least for Washington State.
- G.41, G.11, G.214, G.935 are all fireblight resistant.
- In tough replant sites, G.41, G.214, G.890 and G.935 are improving consistency of performance.
- G.11 is not wooly aphid resistant nor replant tolerant. It is reasonably fire blight resistant and per forms M.9 clones in fumigated and unfumigated replant.
- G.16 is available, is fire blight resistant, moderately replant tolerant but is hypersensitive to virus infection. The virus issue is a problem only if grafting with wood of questionable heritage.

Figure 1: 2006 Wapato Gala accumulated yield in bins per acre 2007-2010.

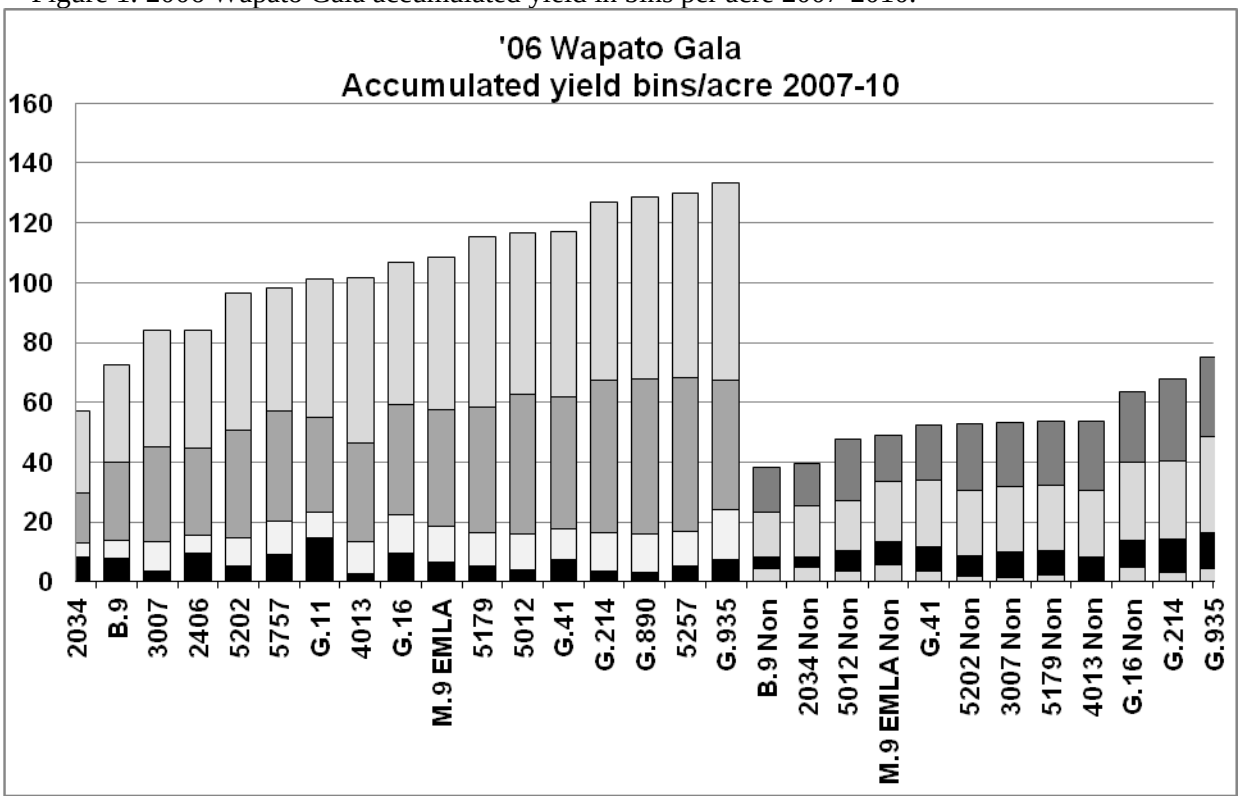


Figure one's data shows that if the new production canopy is short of growth for any reason, it is behind for many years. In this case, in addition to no fumigation the trial had irrigation issues. The nonfumigated plots poor performance in the first two seasons was multiplied by lack of water. Note that G.214, G.935 and even G.41 are recovering from year one and two irrigation problems. Some genotypes such as B.9 and M.26 typically never recover from first year difficulty. This trial demonstrates the importance of genetic resistance to replant disorder. Even though the trees were obviously stressed, the Geneva Elites are recovering and increasing yields annually.

Figure 2: 2006 Vantage Fuji cumulative yield in bins / acre

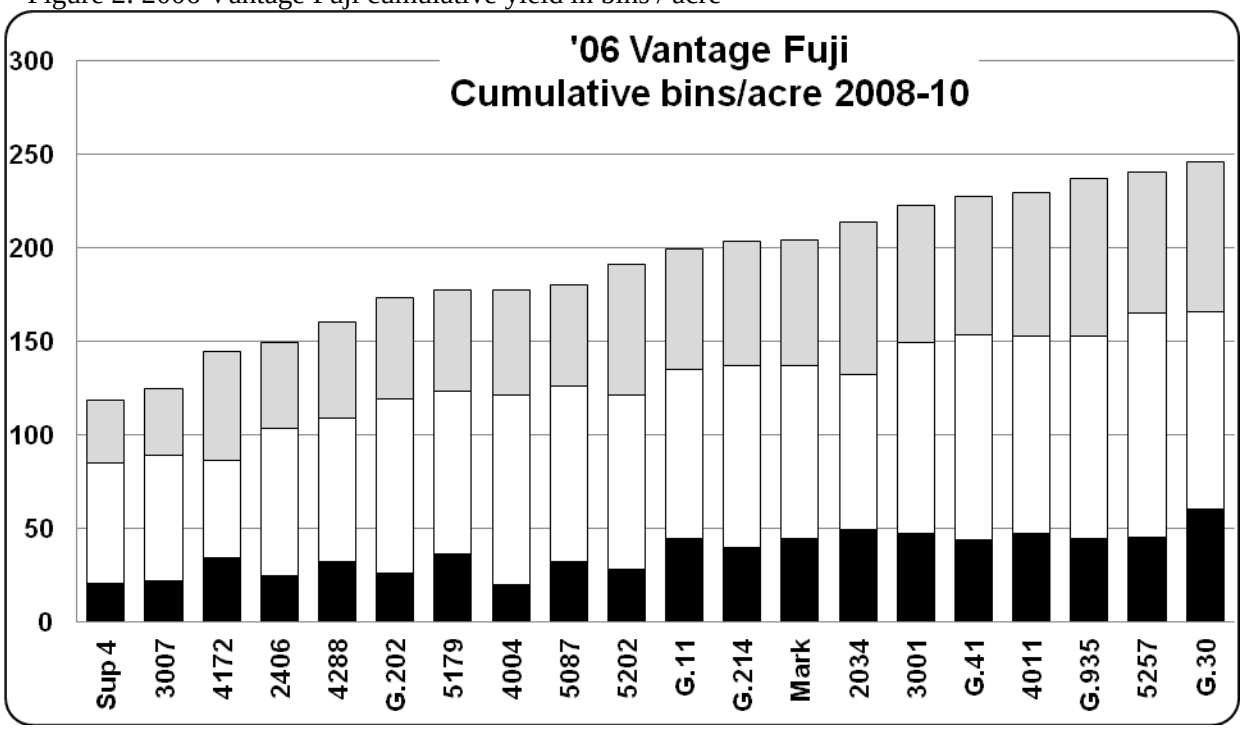
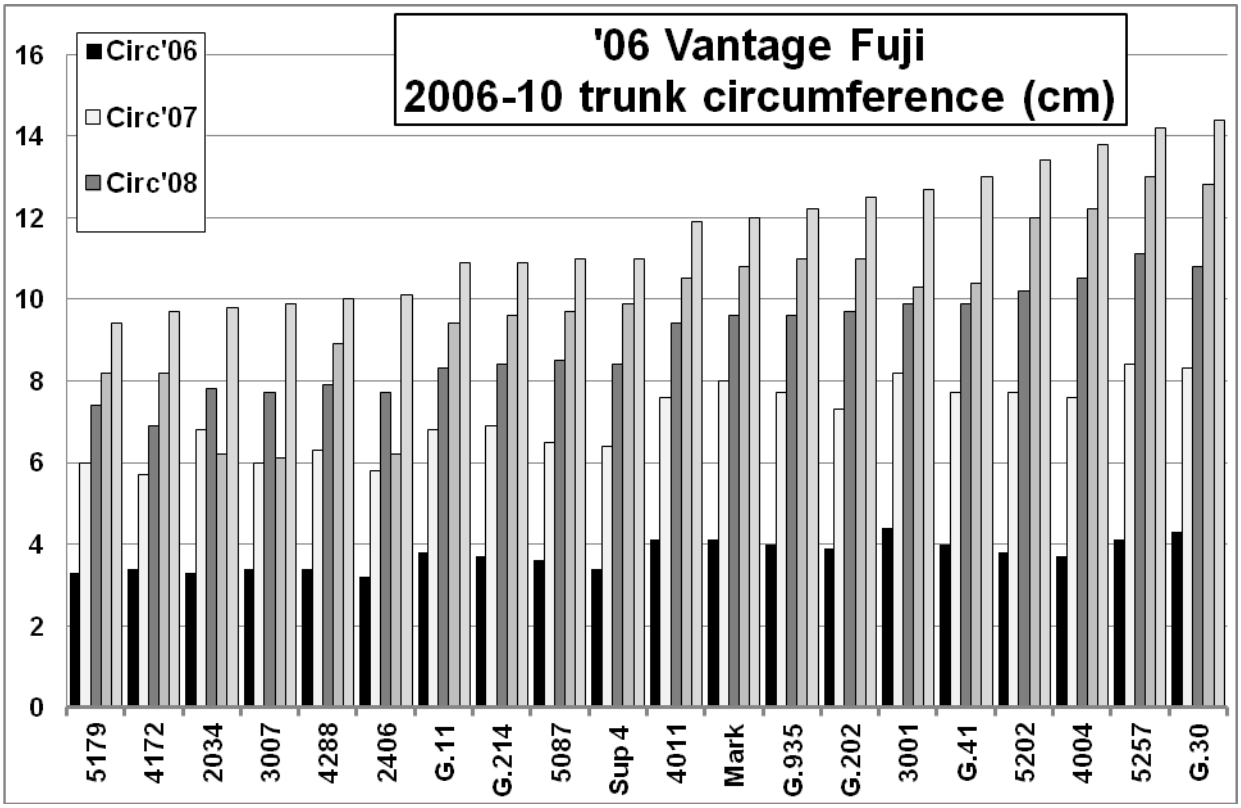


Figure 3: 2006 Vantage Fuji Trunk circumferences from 2006 to 2010

The high performing dwarf rootstocks in the vantage trial have slowed their increase in trunk circumference (figure 3) and have been increasing their annual, thus their cumulative yields (Figure 2). Mark, G.214, G.41 and G.935 have been following similar paths by with increasing yields influencing the reduction of trunk circumference increase. Mark is the standard rootstock in this trial, and the Geneva elites are very comptitive or even better performing for yield than Mark. Some larger, more vigorous rootstocks such as Supporter 4, have been increasing trunk size but yields are considerably off the pace.

Two vigorous Geneva genotypes, CG5257, G.222 and G.30 are demonstrating the precocity of their genetics. Their high yields are in agreement with the hypothesis that the canopy must be developed quickly, then yield follows. The challenge with these three genotypes is they have excessive shoot growth and the cropping efficiency will start to decline. It is too bad that G.30 is such a difficult tree for nurseries to propagate, for its properties make it a high performing, relatively low risk rootstock.



The Vantage and Brewster trials are highlighting another rootstock, CG4011 that is a bit more vigorous than G.214.

CG 4814 has been looking promising especially as a high performing replacement tree, but in 2010 viruses in the fuji blocks induced severe decline and some tree loss. CG5046 also appeared to be an excellent choice to replace missing trees in commerical plantings, but it too, succumbed to virus sensitivity.

As of December, 2010, progress in commercial production of Geneva rootstock liners from stool beds and tissue culture is evident. The older selections are available in quantites of 100's of thousands, and the newer elite selections are entering the finished tree production in quanties of 10's of thousands, and rapidly increasing.