Malling Apple Stocks in Ohio

FREEMAN S. HOWLETT*
Wooster, Ohio

Experimental work utilizing the Malling rootstocks as a means of regulating the growth of apple trees has been in progress in Ohio since 1940. It now becomes possible, by comparing results here with those presently available in other areas, to arrive at a more reliable conclusion as to the response one can expect from given combinations of apple stocks and scion varieties growing under varying environmental conditions.

In Ohio the Malling stocks were obtained directly from the East Malling Station in the late thirties. The first planting made in 1940 utilized Stayman Winesap and Jonathan on Malling stocks I, II, III, IV, V, VI, VII, and XIII. The standard sized check trees were established on French Crab seedlings. A second planting, similar to the first, was made a year later. The trees were planted at intervals of 18 by 23 feet using from 5 to 13 trees of each stock-scion combination. Immediately after planting, the orchard was established in Kentucky Bluegrass sod. From that time on, the trees were heavily mulched with hay or straw. A nitrogen carrying fertilizer was applied intermittently to the grass between the trees.

Records of tree circumference, weight of prunings, number and weight of fruits per tree, have been taken annually. The trees in the 1940 and 1941 plantings flowered sparingly for the first time in 1944 and 1945 respectively. In the severe frost of 1945 all flowers were killed. Then in the period from 1946 through 1948 considerable flower abcission occurred, particularly in Stayman Winesap, as a result of oil sprays applied in the late delayed dormant period when temperatures approached the freezing point. The growth of the trees during the first decade therefore, is believed to have been somewhat more vigorous than normal. As a result the planting had to be thinned in 1952 by removing alternate rows. At present the trees in the row are touching, a situation which in the near future will require some shearing back of alternate trees.

The results obtained for several of the Malling stock combinations of the 1940 planting are presented in Table 1. Possibly the most noteworthy result was the relatively large growth of the trees on the Malling stock combinations as compared with that on French Crab seedlings. For example, in Stayman Winesap the circumference of the trees on both Malling II and VII was only 23 percent less than on French Crab. In Jonathan the difference between French Crab and Malling VII was only 4 percent. On the other hand, the amounts of prunings removed from Stayman Winesap on Malling II and VII were 60 and 44 percent less respectively than from those on French Crab. The prunings from Jonathan on Malling VII were only 16 percent less than from Jonathan French Crab.

From the angle of total accumulated yield over the 15-year period, Stayman Winesap on Malling II and VII produced 87 and 82 percent respectively of the yield produced by the trees on French Crab. Jonathan on Malling VII also produced 87 percent of the yield obtained from trees on the French Crab rootstock. Both Stayman Winesap and Jonathan trees propagated on Malling I produced a yield

*Chairman, Department of Horticulture and Forestry, Ohio State University.

TABLE 1. The circumference, weight of prunings and yield from Stayman Winesap and Jonathan apples on several Malling rootstocks during their first 15 years in a test orchard.

Root-Stock	Average tree circumference (inches)	Average weight prunings (pounds)	Average number fruits	Average accumulated yield/tree (pounds)
Stayman Winesap				
French Crab	32.6	271.3	6044	2060
M. I	27.6	227.7	7802	2635
M. II	25.4	112.7	5692	1800
M. V	27.8	167.9	4736	1600
M. VI	28.6	227.3	7428	2412
M. VII	25.3	154.5	5068	
Jonathan				
French Crab	26.9	196.5	4785	1409
M. I	27.6	198.9	5771	1993
M. IV	24.5	156.2	3264	1003
M. V	27.2	144.3	4270	1274
M. VI	27.8	196.3	4810	1440
M. VII	25.9	165.4	3861	1175

superior to those on any stock, including French Crab.

The record should also indicate a heavy loss of trees of Jonathan and Stayman Winesap on Malling IV and VI. Furthermore, the loss of trees of Stayman Winesap on Malling II has been disturbing. Generally speaking, trees of both varieties on Malling VII have proven distinctly more satisfactory than those of any other combination. This result is true of the 1941 planting as well.

In general, the data indicate that the total yield from both the semi-dwarf and standard trees has been proportional to their respective bearing surfaces. In view of this fact it would be expected that the acreage yield of trees on semi-dwarf and standard non-dwarfing stocks would be proportional to the respective number of trees to an acre. The growth attained by the trees on Malling VII in this experiment would suggest a planting distance of 25 feet by 25 feet. Since Ohio recommendations for trees on standard stocks is 30 feet by 30 feet, the difference in yield per acre between trees on these two types of stocks would obviously be less than would be the case were the differences in planting distances greater than recommended.

Malling VII, tested because it has a more pronounced dwarfing effect than any of the other types, appears to be the most desirable for commercial planting in Ohio. Actually, however, a rootstock more dwarfing than VII, but more vigorous than Malling IX, (the most dwarfing of the Mallings) would be preferable under Ohio conditions. It is hoped that in view of outstanding cultural improvement given such semi-dwarf trees, they will attain a longevity not evident when dwarf trees were recommended in this country 50 years ago.

Fenton Apple

The new Fenton apple was ready for commercial picking in 1956 about August 18, as against August 14 in 1955 in LaPorte County, Indiana. The color and firmness of this variety continue to recommend it for planting north of Lafayette; but the fruit on two-year grafts at Bedford, Indiana did not carry enough color, and seemingly did not like the high temperatures prevalent in this area the first week in August.—*C. L. Burkholder, Purdue University, Lafayette, Ind.*