



Choosing the Right Apple Rootstock

Grafting as a means of propagating apples asexually dates back several thousand years or more. Grafting is used for two principal reasons: apples do not come true to seed (seeds from a McIntosh apple do not grow into McIntosh trees) and apple cuttings do not root easily. So a propagation technique such as grafting is necessary to produce new McIntosh trees (or trees of any other apple cultivar).

Until the last 45 years most apple trees were propagated by grafting scion wood from the desired cultivar onto apple seedlings. The use of apple seedlings as rootstocks produced trees that were very large (up to 40 feet wide and tall) and late coming into production, often up to 10 years after planting. Today we have a wide range of rootstock choices that will produce trees of varying sizes from very large to true dwarfs (less than 10 feet tall at maturity). In addition, the various rootstock choices vary in their winter hardiness, resistance to certain insects and diseases, and performance in the various soil drainage types. Most of these dwarf rootstocks offer precocity (fruit production early in the tree's life) as an additional benefit.

Dwarfing rootstocks are not a recent find. A very dwarf rootstock, *Jaune de Metz Paradise* (named Malling No. IX by the East Malling Research Station in East Malling, Kent, England in 1917) and a semi-dwarf rootstock, *Doucin* (Malling No. II) have been used in Europe for at least several hundred years. Dwarfing rootstocks, like cultivars, must be propagated asexually since they too will not come true to seed. As noted above, cuttings of apple do not root easily so a system of propagation called *stooling* is used. A rootstock of the desired cultivar is planted and pruned off a few inches above ground. Several upright, vigorous vegetative shoots will develop. As these grow, the lower portion is mounded with moist sawdust which allows rooting of these shoots while they are attached to the parent plant. In late autumn or early spring, the sawdust is pulled back and these *rooted layers* are removed for use as rootstock in grafting new trees.

What rootstock should the home gardener choose? Here are a few notes on some of the common rootstocks available:

Seedling: As noted above, the use of seedling rootstock will result in large trees that are very difficult to prune, harvest and manage for pests. Yet these trees may have value when used for wildlife plantings. They cost less than trees with dwarfing rootstock and will grow rapidly, soon outgrowing the browse reach of deer if provided protection for just a couple of years. I do not recommend seedling rootstock for use in home gardens. Few home gardens have space for these 40 foot-wide monsters and the delay to first fruit will discourage most growers. Many of the dwarfing selections have superior winter hardiness.

M.III: This rootstock produces a large tree, not as large as a seedling, but still much too large for most home garden use. Yet this rootstock will tolerate droughty conditions better than any other rootstock, so it could be useful if the only place available for planting is on excessively well-drained gravel or sand soils. This rootstock is relatively hardy and resistant to the Woolly Apple Aphid as well. It needs no support.

M.7: Malling 7 has been the workhorse rootstock in New Hampshire orchards for the past 40 years. It produces a semidwarf tree that reaches 15 feet in height and needs 13 to 15 feet of space. Fruiting usually begins by the 5th year from planting. M.7 has a number of weaknesses, well documented because of its widespread use. It produces numerous root suckers that must be cut each year. It has a tendency to lean on some sites. (Red) Delicious on M.7 is a very poorly rooted tree, so M.7 is not recommended for Delicious. Why use it, what with all these problems? M.7 performs. It tolerates a wide range of soil types, including some that are too wet for most other rootstock choices. It is tolerant of collar rot, a major soilborne disease of apple. And most cultivars grafted on M.7 are very fruitful. I recommend M.7 for marginally drained soils or in situations where the site is questionable - if a tree as large as M.7 is not a problem. It really should be staked to provide leader (trunk)

support for the first 4 or 5 years.

M.26: Malling 26 has become the commercial rootstock of choice over the past 5 to 8 years. It is precocious, often bearing some fruit as early as the year after planting if limb bending is practiced. It is quite hardy and should do well in reasonably well drained soils throughout the state. It produces very few root suckers. M.26 is not without faults. It needs support (preferably a stake that will last the life of the tree) and it produces masses of fleshy root initials (called burr knots) on that portion of the rootstock above ground. These burr knots are attractive to borers and are a potential entry point for the bacterial disease *fire blight*. The potential negative impacts of these burr knots can be minimized by planting the tree with graft union only an inch or so above ground so less rootstock is exposed. Most cultivars on M.26 can be planted at an 8 to 10 foot spacing if good tree training is employed.

M.9: Malling 9, the old *Paradise* stock of Europe, is the number one choice when a full dwarf is needed. This rootstock is productive, very precocious and matures stands 7 to 8 feet tall at maturity. It has brittle roots, so it needs a substantial stake, such as a 4 inch round pressure treated stake 8 to 9 feet tall, set at least 30 inches deep. It is moderately hardy and should survive throughout southern New Hampshire. It will not tolerate either soils that are only marginally well drained nor those that are droughty.

There are many other rootstock options:

Mark is a newer rootstock from Michigan that produces a tree just slightly larger than M.9. While Mark needs support, it is substantially better anchored than M.9. And Mark will tolerate poorly drained soils reasonably well. Unfortunately, some Mark trees will develop a distinct soil line swelling associated with a loss of vigor, so we recommend Mark for trial only.

M.27 is a real small one, producing trees perhaps half the size of M.9. This rootstock requires support and could be used in southern NH where super dwarf specimen trees are desired, perhaps as part of a formal garden or where space is extremely limited.

P.2 and Bud.9 are two newer rootstocks from Poland and Russia, respectively. These produce trees about M.9 size but both have much better anchorage. These should be considered for trial by the serious master gardener.

Geneva 65 (CG 65) is a new stock out of New York that combines dwarfing (slightly smaller than M.9), fire blight resistance, precocity, and reasonably good anchorage. Root suckers may be a problem but this is a new rootstock that could be valuable in New Hampshire.

Several catalogs offer *interstem* combinations. An interstem tree is produced by grafting a 6 inch-long dwarfing stempiece between a well-anchored root system and the cultivar, to provide, at least theoretically, the best of both worlds, a dwarf tree that requires little or no support. Unfortunately, performance of these trees can be variable so we do not recommend them for general planting. If you want to graft some of your own I suggest you try **Novole** as the understock (it is resistant to pine voles) and M.9 as the interstem. This could yield a vole-resistant dwarf tree.

The following nurseries offer rootstocks for sale in small quantities for home growers interested in grafting:

Rocky Meadow Orchard & Nursery
360 Rocky Meadow Road N.W.
New Salisbury IN 47161

Bear Creek Nursery
PO Box 411, Northport WA 99157

I also recommend you join a great organization called the North American Fruit Explorers (NAFX). The quarterly magazine (*Pomona*), which comes with membership in NAFEX, contains dozens of articles about fruit growing, articles written by home gardeners and professionals alike, all who share a burning love of fruit and its culture. To join, send a check of \$10.00, payable to NAFEX to: NAFEX, Rt. 1, Box 94, Chapin, IL 62628. Or visit their website: <http://www.nafex.org/>
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