

Guidelines for Planting Fruit Trees in 2012

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The Best Time to Plant

We have routinely advised growers in the upper Midwest to plant bare rooted trees mid/late March, April to June. Several research studies have been conducted demonstrated the advantages of planting as soon in the spring as the soil conditions will allow. Trees planted in April have a decided advantage over those planted even one month later. As temperatures increase in late spring, trees planted late will break bud sooner and struggle initially without a regenerated new root system developed. Avoid planting trees in frozen or water-saturated soils. Some growers have experimented with fall planting, but this method has its risks associated with subjecting young trees to severe winter temperatures. Additionally, many nurseries can not sell and ship these trees in time for a fall planting. We have tried planting trees in mid-November in East Lansing and we were pleasantly surprised with the outcome of some Tall Spindle apple trees on cold hardy Bud.9 rootstock. Trees that were not pruned following planting not only survived fully, but had a crop of several fruit in the first growing season. Certainly, this approach is discouraged for more tender stone fruit.

Upon receipt of trees in late winter/early spring, inspect them for root health and moisture. Sometimes trees shipped begin to dry in transit and/or in dry conditions in temporary storage venues. Unpack the trees from their containers and add moisture, moist shavings or shredded paper to insure roots are not dry. Hold them in humid cold storage above freezing temperatures until you are ready to plant. Do not store trees in fruit cold store rooms where ethylene has accumulated. The slightest exposure to ethylene can stimulate bud break. Always keep trees moist and protected from freezing temperatures. Trees that are kept for more than a few days should be "healed in" in a well-drained location using moist light soil, wood shavings, sand or sawdust. Inspect and count trees immediately after delivery. Call the nursery if you discover a problem with your trees upon arrival. Trees should not be stored in boxes longer than 5 days without adding additional moisture around the roots. Make sure trees are hydrated within a day or two prior to planting using oxygenated (flowing) water for 4-20 hours. Check tree roots for Crown Gall disease caused by *Agrobacterium tumefaciens* which causes disease in many fruit and nut tree species (dicotyledonous); another strain called biovar 3 causes crown gall disease in grapevines, also known as *Agrobacterium vitis*. Report the incident to the nursery who provided the trees. Infected trees have tumor-like swellings called galls on the crown of the plant just above the soil. Crown gall disease does not usually seriously harm older plants; however, it may reduce the value of a plant in a nursery. Tree roots can be dipped in *Agrobacterium radiobacter* isolate K-1026 (commercial product known as NOGALL™ (often accomplished at the nursery) to suppress crown gall caused by *Agrobacterium tumefaciens*. Applications to roots and stems to non-bearing: almond, pecan, apricot, caneberries, cherry, nectarine, peach, plum, prune, walnut, and ornamentals such as euonymus and rose.

Preparing the Site

Many gardeners recommend the use of compost in the planting hole to improve root regeneration and initial growth. Make sure that the compost is aged and avoid green vegetation when working soil. Do not fertilize trees at planting time. Instead, if a grower needs and wants healthy growth, wait until May or June when trees have begun to grow. Use a balanced fertilizer with light amounts to avoid burning roots (particularly a problem in sandy soils).

Digging the Hole and Planting the Tree

Your soil should be dry enough to easily crumble. The holes should be dug just prior to planting to minimize sidewall glazing. Glazing can also occur when an auger is used but can be avoided with auger bits which have a “scarifying wedge” welded to the edge of the bit. Glazing can also be avoided by scarifying with a shovel. Dig the hole slightly larger and deeper to accommodate the roots. Holes that are too deep may cause trees to settle too low after irrigation or rainfall. Broken or damaged roots should be trimmed off. No additional pruning is recommended. Do not prune the roots to fit the hole; instead, dig the hole to fit the roots. Remember to remove tree labels to avoid trunk girdling. Backfill the hole with the most friable soil available, and avoid large clods. Tamp soil around backfill soil to extinguish air-pockets around roots. Watering immediately afterward effectively completes this process. Trees can be leaned at planting time towards the west or southwest on windy sites. Planting trees at an incorrect depth can be a serious mistake that can ruin a new orchard for life. Generally, this mistake is most serious if trees are planted too deep. Shallow planted trees can usually be corrected and have less serious consequences, if there are any at all. The consequences for deep planted trees can range from them having a slow start to scion rooting, particularly to apples. Stone fruit can be most sensitive to root systems that have been deep planted. Deeper portions of the soil profile possess more free water, lower temperatures and less oxygen. These conditions inhibit new root growth and lend to a slower start for trees. A grower may not intentionally plant trees excessively deep. Trees that are augered in (trees planted in holes made with an auger) have a tendency to settle following rains or irrigation as much as 3-5 inches in depth, depending on soil type. Mechanically planted trees will settle less at 2-4 inches.

Apple and Pear Trees

Scion rooting of apple trees on dwarfing rootstocks is a serious and common problem caused by deep planting. At the time of planting, the orchardist may have thought that the trees were planted correctly, only to find out 5-7 years later that the unions are not visible and trees appear abnormally vigorous. As a consequence, adventitious roots arising from the scion become dominant and the trees take on the normal vigorous level, which approximates seedling. Unfortunately, at that point, nothing can be done to correct the problem. Digging down to expose the unions and cutting roots causes a depression in the soil which allows water to fill causing Phytophthora Crown Rot or later in the year, ice formation and subsequent injury to the crown. Secondly, the depression refills with eroded soil later in the year anyway, requiring follow up attention.

My standard recommendation for apples has been to plant trees that are on clonal rootstocks so

that the union is a minimum of 4 inches above soil line when using a mechanical planter and a minimum of 6 inches above the soil when planting by shovel or augured holes. As a tip and if you are supervising a crew of workers, have them use a 2"X6" (2-4 ft long) piece of wood to help as a guide. Place the 2"X6" board on its edge adjacent to the planted tree (perpendicular to the row) to check its depth. The union should clearly appear above the edge of the board indicating that it is at least 5.5" high. The dilemma for the grower is to make sure that rootstock shank is exposed, even though it is vulnerable (usually by year 2 or 3) to Dogwood Borer *Synanthedon scitula* (Harris) (DWB) which is a common pest problem in the Midwest and Eastern United States. My experience thus far with apples is that trees are most vulnerable between years 3 and 7-8. Before year 3, Burr Knot development is minimal in most cases and after year 8 primordial root initials in the knot area are hardened and appear less attractive to DWB larvae. Some growers would question the recommendation and plant deeper to avoid the borer. However, the trees are just as vulnerable to scion rooting, which can be a more difficult problem to address and correct.

A shallow planted tree can be easily corrected later in tree life, compared to the task of trying to correct an insurmountable problem of a deep planted tree. Using a mechanical planter, growers should be advised that someone should follow up and check each newly planted tree to insure proper planting depth. While the soil is still loose, pull trees up that are too deep and push those down that are too shallow. When setting planting depth for mechanical planters, stay on the shallow side. If you error, do it on the side of shallow planting. The last thing you need 5 years down the road is to have trees planted 5 feet apart in a high density planting that should have a spacing of 15 by 20 feet! Because of the problem with infestation by Dogwood Borer on exposed rootstock shanks in North America, unions at planting time should not exceed 10 to 12 inches above the soil line. Secondly, expect progressive decline in vigor for each inch that the rootstock shank is vertically exposed above the soil line. Depending on the soil type and scion, you may see as much as a 6-12 inch reduction in vigor in the canopy (height) for each inch the union is above soil line. Many growers use this knowledge in attempting to match scion and rootstock vigor with the soil. If they are too high, growers are advised to cover a large part of the exposed shank with a berm or mound of soil. This remedy works well to correct a shallow planted tree, and may need to follow up attention annually or biannually.

Stone Fruit Trees

For stone fruit, scion rooting is less of a problem when deep planted. None-the-less, experience has taught us that planting so that the original union is slightly above soil line is still a good policy. While the union can be buried on cherries, plums and peaches without fear of scion rooting, excessively deep planting, can place roots in an oxygen starved soil environment, lending to a slow regeneration of new roots and subsequent overall growth. We have found that in stone fruit, the depth of the upper most lateral roots can be the best index of optimum planting depth. That depth should be so that the first lateral roots are 1.5 to 2 inches. Often (varies according to nursery budding height), for stone fruit, the union will end up being close to 1-2 inches above soil line (thickness of the 2"X4 or 6" board) below the soil line). The budding height in commercial nurseries can vary for stone fruit and thus the depth of first lateral roots makes a better gauge for planting depth. Mound (berm) soil up on the tree shank (trunk), where the budding height in the nursery was low, and thus in close proximity to the upper lateral roots.

Mounding

We began a project sponsored by GREEN funding in 1998 to assess the impact of soil mounding on Dogwood Borer infestation. The final report on the research was published in 2005 in HortScience (Gut, L.J., P.H. McGhee and R. Perry. 2005. Soil Mounding as a Control for Dogwood Borer in Apple. HortScienc. HortScience 40(7):2066-2070 and was awarded the top extension paper in the American Society for Horticulture Science that year. Infestation rates were found to be highly correlated with trunks (exposed rootstock shanks) covered by Burr Knots. In our rootstock trials, we found that the rootstocks that produce the largest area covered by Burr Knots are Mark and M.26. The rootstocks M.26 and M.9, which also has a tendency to produce Burr Knots at a high rate, depending on the clone, make up more than 50% of new trees being planted today in North America. Therefore, for newly established orchards in Michigan, we recommend that trees be mounded (bermed) within one year following planting to avoid Dogwood Borers. Mounding can also help trees avoid Phytophthora infection in finer textured soils by encouraging water to drain away from the trunk/ground interface. Some growers have started mounding soil on tree trunks where trees are weak as in apple on Mark rootstock or in some cases, where trees are planted on M.9 with a weak growing scion or in a droughty soil. Generally it takes a few years before the adventitious roots from the scion begin to influence scion vigor. Unfortunately, this strategy can yield unpredictable results, depending on the rate and intensity of root development and on the soil conditions. Plum growers have had some success in mounding soil on the trunk of “Stanley” and encouraging scion rooting. Eventually scion roots take over and provide a bypass around occluded unions in cases of Brown Line disease caused by Tomato Ringspot Virus. I have recently noticed in field plots that trees that canopy vigor is slightly increased where they were mounded on dwarfing rootstocks and generated roots from the rootstock shank with further extension into the soil. This may be helpful in weak vigor scion varieties like Honeycrisp.

Generally, if you error, be less concerned with shallow planted trees and more concerned with deep planted trees.

After Care

The most important after care for young trees with limited and shallow root systems is to keep moisture levels as high as possible without excessive wetness. Once planted, if a trickle system is not ready to apply water, tank water individual trees. Basins may be necessary to hold water near the backfilled area. A light irrigation or tanking with 3-5 gallons of water is recommended. This will eliminate the air pockets around the roots. Subsequent irrigation should not be applied until after new growth has started; trees can be killed when too much water is applied. If the trees have settled after the first introduction of water, they should be pulled up immediately, rather than after they have started to grow. Then, re-tank with minimal water to settle soil around be too wet so that the hole walls are glazed over by mechanical auger bits.