**Planting of Fruit Trees**

**Time of year for planting**

Bare-rooted fruit trees should be planted from November to March before they come into leaf. Container trees can be planted all year round but require regular and heavy watering if planted during the summer. Planting should be avoided during droughts, hard frosts (most likely in January and February) or particularly cold and/or windy periods.

Generally it is best to plant in late autumn/early winter while the soil still has some warmth. This

allows the tree to become established before spring. In wet areas early spring planting may be preferable to minimise the risk of soil compaction, waterlogging and uprooting in winter-gales.

**Storing the tree**

Once acquired you should keep your trees in a shady place out of sunlight and frost. If they can't be

planted straight away, the roots should be watered thoroughly and wrapped with a plastic sheet to prevent them drying out – old fertiliser bags are ideal. The fine root fibres must be kept moist at all times as bare roots can be killed by even a few minutes of exposure to air.

If trees need to be stored for longer than a couple of days they should be heeled into a trench, where they can be safely left through the dormant period. If the tree roots are dry they should be pruned by a third and stood in a bucket of water for 15 minutes before planting.

**Preparing the ground**

Avoid planting in heavily shaded or boggy areas. All grass and weeds should be removed in a 1 m diameter circle around each tree station prior to planting, either by physical stripping or spraying with a suitable non-residual herbicide.

**Planting**

**Planting larger trees**

Pit planting is preferable if planting big trees with larger root systems or if the soil is poor. The hole should be no more than 50 cm deep and just wide enough to accommodate the roots without bending them. It can be dug mechanically but back-filling should be done by hand to avoid root damage. The hole should be dug as soon before planting as possible and covered, if necessary, to prevent it filling with water. Do not be tempted to dig all your holes the day before planting – the likelihood is that by next morning it will be full of water. If this does happen the hole must be allowed to drain thoroughly and the bottom dug over before planting.

The removed soil should be put in separate piles, one for the turf, one for the topsoil and one for any subsoil. Removing large stones and breaking up the bottom and sides of the pit will allow better drainage and root penetration. A stake should be driven vertically into the bottom of the hole before planting so the tree's roots can be arranged around it. To prevent stake and tree rubbing, the stake should be put on the upwind (usually the south-west) side of the tree so the prevailing wind blows the tree away from it. This also helps to promote better root growth as the tree is able to sway more. The stake should extend 30 cm above ground level and allow for the stem of the tree to be about 10-15 cm away from it. Some topsoil (not the removed turf) should be placed in the bottom of the hole to bed the roots on. The tree should be placed in the hole so the root collar (the original soil mark on the trunk) is level with the top of the hole.

The tree should be rotated to obtain the best fit ensuring the roots are spread out, at the correct depth and the tips not pointing upwards. Damaged or excessively long roots should be trimmed to fit the hole rather than twirled round the sides. The hole can then be backfilled with the remaining soil, whilst shaking the tree gently and ensuring it stays vertical. Organic matter should not be added as this can damage soil structure and create drainage sumps. Slow-release fertiliser should only be added to the topsoil on very poor soils as over-fertilising discourages the roots from spreading

beyond the planting pit into the surrounding soil. It may also prevent the young trees establishing

a relationship with beneficial mycorrhizal fungi in the soil. If the site is on recently cultivated or fertilised ground some leaf mould or soil from land unaffected by agri-chemicals should be added to the planting pit to ensure the tree is inoculated with mycorrhizal fungi. The soil needs to be gently firmed in as it is added, to remove any air pockets and firmly anchor the roots, taking care not to compact it. Overfilling the hole by 3-6 cm will allow for the soil compressing and settling slightly, so the final soil level in the hole is not below the surrounding ground level. The final soil level should be at the root collar. Shallow planted trees may dry out or be loosened by the wind while those planted too deeply may rot. To avoid disease and prevent the scion from rooting the graft point should be kept a minimum of 75 mm above ground level and clear of any mulching material.

**Planting small trees**

These are known as maidens and whips. If the soil has a suitable structure and small bare-rooted

trees are being planted the soil disturbance can be restricted to relieving compaction and removing large stones. It should be sufficient to cut a 'T' or 'X'-shaped notch into the ground with a spade, insert the tree and then firm the soil back around the roots.

**Planting container trees**

Like larger trees these should be pit planted. They also need to be well watered before planting. This is best achieved by submersing the pot in a bucket of water for 10-15 minutes. Any roots circling the pot need to be teased out and spread out into the hole.

**Staking**

Maidens can be established successfully without staking but standards and half standards require a low stake. This protects the root collar and grafting union from excessive shaking until the root system becomes established. A low stake, no more than 30 cm high, allows the whole tree to sway in the wind. This stimulates the entire stem to thicken from the root collar upwards and encourages the roots to spread out and anchor the tree. Over time this will create a stout trunk that tapers evenly from base to crown and can flex under the force of wind or vandalism. Trees staked at the top of the stem just beneath the crown so that the trunk cannot move develop thin, weak stems, which may actually thicken above the tie in response to the crown swaying. Trees with a stem-builder may need a tall stake initially however, to prevent the tree splitting at the higher grafting union. The stake should be fastened to the tree above the grafting union with a suitably flexible tie that holds the tree firmly upright but allows some movement. If the tie does not have a separate

piece to prevent rubbing, it can be passed around the tree to form a 'figure of eight'.

**Guards**

Most livestock will rub against fruit trees and browse the leaves and twigs. Horses, sheep and goats will also strip and eat the bark. When creating a new orchard it may be preferable to cut the orchard rather than graze it for the first few years until vulnerable young growth and shoot tips are beyond the reach of stock. However, if trees are adequately protected new orchards can be grazed from the

outset. Cutting may not be a viable option when planting within established orchards. Even if grazing is not introduced young trees may still be damaged by wild animals. Deer may visit orchards if there is woodland nearby and will eat young leaves and shoots. Males may also break the branches of young trees when trying to rub the velvet from their newly developing antlers. Rabbits, hares and particularly voles can also eat shoots and strip bark. Consequently tree guards are usually necessary from the outset to protect newly planted trees from damage. Guards can also protect trees from machinery and vandalism and prevent poaching around the base. Guards should not be fastened to the tree or rub against, constrict or damage it in any way. They should be durable and of the correct height and width to prevent damage. The specification will vary depending on the stock type. Neighbouring stock should be considered if boundary fences are not stock-proof (i.e. there is little point erecting sheep-proof guards if the neighbouring cattle can get into the orchard). If the tree threatens to rub against the top of the guard as it moves in the wind, flexible rubber strips or a similar elastic material (bicycle inner tubes or old tights are ideal) can be tied round the top of the trunk and fixed to each side of the top of the stake. These should allow the trunk to move, but not enough to touch the side of the guard. The same method can be used to support trees with a stem-builder. Alternatively, on narrow guards a strip of rubber tubing can be fastened around the top edge of the guard. Guards should allow access to the tree to carry out formative pruning, apply mulch or clear vegetation around the base. Depending on the type of guard it may be possible to allow access by attaching one side of the netting or barbed wire using hooks rather than nailing down, so that it can be unfastened when necessary.

**Cattle-proof guards**

These should have four corner posts 2 m high or more with 5 cm diameter top and middle rails. A third rail at the bottom is also preferable, to prevent stock getting underneath the guard. The posts should be placed far enough apart to protect a minimum of 1 m radius around the trunk at the top. The posts should be driven firmly into the ground to keep the guards stable and may be canted slightly outwards, to allow stock to graze closer to the base of the tree. Alternatively the bottom rail can be raised far enough above the ground to allow stock to graze underneath it. In either instance stock should not be able to reach the stem of the tree. At least three strands of barbed wire should be strung between the middle and top rails, and again between the middle rail and the bottom rail, pulled taut and securely fastened to the corner posts. Barbed wire should also be put along the top rail to stop cattle rubbing against the guard. Sheep netting can be hung between the middle rail and the bottom rail in place of the barbed wire so that sheep can also graze the orchard. Weld mesh guards are not strong enough to prevent mature cattle pushing them over if they rub against them. They may be used successfully in orchards grazed with young calves or where there are mature trees present for cattle to rub against. The weld mesh needs to be at least two metres high to prevent browsing damage, which increases the problems with the tree rubbing against the guard. Sheep netting or plain wire may also be substituted for the barbed wire between the top and middle rails if horses graze the orchard. If so the guards may need to be increased in height and width to prevent the horses damaging the trees.

**Sheep-proof guards**

Due to the smaller size and weight of sheep these are smaller, cheaper and less robust than cattle-proof guards. However, they limit the choice of grazing animals to sheep. A smaller square or triangular version of the cattle proof guard should be used, without a middle rail and sheep netting should be hung between the rails.

**Smaller sheep-proof guard**

Alternatively a guard consisting of two stakes placed at least 50 cm apart, may be used. One stake should be at least 1.5 m high, the other should be at least 50 cm high. Strong weld mesh wire netting at least 1.5 m high should be wrapped around and securely fastened to both stakes in a circle to maintain a distance of at least 25 cm between fencing and trunk. Two strands of barbed wire can be wrapped spirally around the guard to prevent the sheep rubbing against it. These guards are narrow so there may be issues with the tree rubbing against the top of the wire and damaging itself as it moves in the wind. There are a number of ways to prevent or reduce this. The weld mesh can be turned round the other way so that the vertical pieces face outward and don’t rub the trunk, the top of the weld mesh can be bent outwards so the tree has more room to flex without touching it, or a piece of rubber tubing can be slit lengthways and pushed over the top of the guard to prevent the tree rubbing against the metal. Staking the tree higher up should be avoided as this will reduce the movement to the detriment of strong root development.

**Deer**

Either style of guard will also be adequate to exclude deer, as long as it is at least 2 m high.

**Rabbits, hares and voles**

Trees can be protected from these by securely fixing rabbit fencing around the base of the guard or placing a spiral sleeve guard around the tree trunk, ensuring the base is gently bedded into the soil.

**Weed control**

To reduce competition for water and nutrients while the tree is establishing itself a 1 m diameter circle should be kept clear of all vegetation and maintained for at least the first 3 years after planting. This can be achieved by careful use of an appropriate herbicide (making sure to avoid the trunk), by hoeing (taking care not to damage the roots), by using weed-suppressing membranes or mats, or by mulching. Mulching (again avoiding the trunk) is preferable. As well as suppressing weeds it helps retain soil moisture, raises soil temperature in the spring and breaks down to provide a slow release of nutrients. Straw, wood chippings or well-rotted farm yard manure can be used. Previously composted mulch is preferable as fresh wood chippings or straw will temporarily lock up nitrogen as they start to decay. This can be alleviated by applying the mulch in the autumn so it begins to break down while the tree is dormant. Mulch should be replenished as necessary maintaining a layer 5 cm deep. Commercially available mulch mats are also a good and easy option.

**Watering**

Newly planted trees may need watering when planted, and regularly in the first weeks after, with the ground thoroughly wetted to ensure the water reaches the roots. Depending on soil and weather conditions further watering may be necessary during the first few summers. Failure to water may lead to poor growth, smaller and fewer fruit or even the death of the tree.However watering will often not be possible or practical and in these circumstances it is important to plant in the autumn/early winter when the soil has reached field capacity and to use mulching techniques.

**On-going management**

The level of care in the first five years after planting is important in helping the tree become established. Most problems with establishing young fruit trees are caused by neglect and lack of management. Regular attention early on will help identify any problems as soon as they arise, when they will be easier to address.

**Stakes**

While in place the stake should be checked at least every six months and the tie loosened if it starts digging into the tree bark. By 1-2 years after planting, provided soil and weather conditions have not impeded them, the roots should have grown enough to anchor the tree and the stem strengthened sufficiently for the stake to be removed. If the site has shallow or sandy soil or the tree has developed poorly, the stake may need to be left in place for longer. To check if a stake is still needed the tie should be released and the tree pushed gently to one side. If it does not return to an upright position the tie should be refastened and the same tried again the next year. If the tree does return to upright the stake should be removed carefully without being shaken as this may damage the tree roots. The resulting hole should be filled in with soil. Alternatively the stake can be cut off at ground level. Where stakes have been fastened high up the trunk it may be preferable to refasten the tie lower down the trunk for a year (reducing the height of the stake as well if the tree is likely to rub against the stake) to allow the trunk to flex and prepare the tree gradually for the stake’s removal. This will also apply to trees that have been staked above the stem-builder.

**Guards**

When stock are present guards should be checked as regularly as possible to make sure the animals have not moved them to reach the tree. Trees can be seriously damaged or killed very quickly. Guards should protect the trees from grazing animals for a minimum of 10 years after which it may be safe to remove them. However, even mature trees can be pushed over, have their lower branches stripped by cattle, or have the bark stripped from the trunk or branches by sheep or horses. They may therefore need long-term protection.

**Orchard grassland**

**Protecting trees from livestock damage**

**Sheep**

It is easier to protect young trees from sheep than it is to protect them from cattle or horses. Mature trees may require protecting from sheep, as they can strip the bark. This is a particular problem in late winter as the sap begins to rise. Mature trees may be protected from bark stripping using chicken wire wrapped around the trunk, allowing some overlap. The wire should be fastened in a manner that allows it to be adjusted, to allow for the increasing girth of the tree as it grows. Where there are many trees in an orchard it may be more practical to exclude sheep from mature orchards at this time of year. Alternatively, mineral blocks or supplementary feed can be provided to discourage bark-stripping.

**Cattle**

Cattle require stronger and more extensive guards. As they can browse at a greater height, they should be introduced to orchards that have traditionally been grazed by sheep with caution, as the lower branches may not have been established high enough to be out of their reach.

**Horses**

Horse grazing should be avoided if at all possible, as their height and reach makes it extremely hard to prevent them browsing trees. It may be possible to graze them in mature orchards where the branches are high enough, but they may still strip bark. If this is the case the trunk can be protected using chicken wire, similar to that described for sheep, although two widths of chicken wire will be needed.

**Pigs and poultry**

Pigs (e.g. Gloucester Old Spots) have sometimes been turned out in orchards, particularly on smallholdings, in autumn to clear up the fallen fruit. This practice should only be carried out with care and keeping pigs in orchards for long periods should be avoided. This is because pigs can churn up the ground as they feed, which damages the sward and fruit tree roots. They can also push over young trees. Poultry and geese are sometimes grazed in orchards and may be particularly suitable in new orchards with young trees. They not should be allowed where there is any botanical interest in the sward.

**Weed Control**

Once the trees are well established the sward can be allowed to grow up to the trunk, although tall weeds, bramble and ivy should be removed from around the trees. If using strimmers or mowers take care to avoid damaging trees.



**Tree Planting Schematic**



**Sheep-proof/small Cattle-proof Guard**

****

**Small & cheap Sheep-proof guard**

****

**Cattle-proof guard**

**Appendix - The Myth of Beneficial Bone Meal.**

From Linda Chalker-Scott, Ph.D., Extension Horticulturist and Associate Professor,

Puyallup Research and Extension Center, Washington State University – who knows what she’s talking about.

***"Add a handful of bone meal to holes before planting shrubs and trees”***

**The Myth**

Of all the soil improvers on the market, bone meal seems to be everyone’s darling. Credited with

stimulating root production and improving flowering, thousands of web sites promote its use during transplanting and as a regular fertilizer throughout the year. We are assured that bone meal is “one of the indispensable soil amendments all gardeners should have on hand” and that usage of bone meal is “good for reducing transplant shock and promoting extensive and healthy root systems.” Bone meal, as the name suggests, is made from animal bones and is favored by organic gardeners and landscapers as a natural source of calcium and phosphorus. There are nearly 10,000 commercial web sites advertising various formulations of bone meal. How does one decide which is best?

**The Reality**

Bone meal is primarily calcium and phosphorus, two elements which are usually adequate in **non-agricultural** soils and in many agricultural soils also. The NPK analyses of bone meal preparations vary, but are generally in the range of 0-12-0 to 3-20-0. Both calcium and phosphorus are required for plant growth, but both (and especially phosphorus) can cause problems if they occur in high concentrations. It is important to understand that neither element, nor any other mineral, will “stimulate” plant growth beyond what is normal for a particular plant. Why does the myth of phosphorus-induced root stimulation persist? The answer probably lies in the effect phosphorus fertilizers have on mycorrhizal relationships. When plant roots are in low phosphorus environments, they exude organic acids from their root tips. These acids allow mycorrhizal fungi to penetrate the roots and form the networks that assist plant roots in taking up water and nutrients. Mycorrhizae are particularly adept at extracting phosphorus from the soil. If phosphorus levels are too high, however, the roots do not exude the organic acids and mycorrhizal connections do not form. This forces the plant to put more resources into root growth to compensate for the lack of mycorrhizae. So in a sense phosphorus will increase root growth – but at an added cost to the plant. The resources expended by the plant in growing additional roots to take the place of mycorrhizae are not available for other plant needs. Shrub and tree species that are mycorrhizae-dependent have a difficult time surviving in soils where mycorrhizae cannot develop. In particular, seedlings and newly transplanted materials are less efficient in absorbing water and minerals from the soil and are more likely to suffer transplant shock than plants where mycorrhizae are present. Adding mycorrhizal spores to soils where phosphorus is too high is ineffective – the spores will remain dormant. Interestingly, bone meal (and other phosphorus sources) is toxic to members of the *Protea* family. These plants, and others adapted to nutrient-poor soils, easily scavenge necessary minerals. This natural ability is compromised when fertilizers are over-applied. What can you do if you have added too much phosphorus over the years? If your soil test indicates that phosphorus levels are high, you may be able to tie up excess phosphorus by adding a mixture of other mineral fertilizers. I’ve not had to do this myself, but various web sites recommend concoctions of ammonium sulfate, magnesium sulfate (Epsom salts), iron sulfate and zinc sulfate. In any case, levels of soil phosphorus will eventually decrease if phosphorus-containing fertilizers are discontinued.

**The Bottom Line**

• Bone meal supplies high levels of phosphorus and calcium, elements that are rarely limiting in

non-agricultural soils.

• Phosphorus, from bone meal or other sources, does not “stimulate” plant growth; it is only a

mineral, not a plant growth regulator.

• High levels of phosphorus, from bone meal /other sources, inhibit growth of mycorrhizal fungi.

• Without mycorrhizal partners, plants must put additional resources into root growth at the

expense of other tissues and functions.

• Before you add any supplementary nutrients to your landscape, do a complete soil test first.

For more information, visit Dr. Chalker-Scott’s web page at http://www.theinformedgardener.com.