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The supply, planting, and aftercare of woody plants
Unit Code: A/602/3936
UNIT GUIDE 2023-24

LO 3 Understand methods of planting woody plants

3.1. Describe a suitable method of planting:

- **Cell-grown tree**

In contrast to bare-root trees, cell-grown trees are grown inside a compost plug or cell. Plantings of cell-grown stock can be done all year round. A seed is first planted, either manually or automatically, into seed trays in the polytunnel or trays of compost cells.
Trees cultivated in cells offer numerous benefits compared to bareroot and container-grown varieties, including the following: Planting season: Cell-grown trees can be planted throughout the year, except periods when the ground is frozen or excessively wet. This differs from bareroot and container-grown plants, which are restricted to planting during the dormant season in colder climates. Roots: The roots of cell-grown trees are safeguarded by compost, which helps retain moisture before planting. Additionally, the roots are fully enclosed, minimizing the risk of damage during the planting process. Cost: Generally, cell-grown trees are more affordable than container-grown plants and are only marginally more expensive than bareroot options. Establishment: These trees exhibit a high rate of establishment and experience minimal transplant shock. Handling: Cell-grown trees are convenient to handle, transport, and store. They can also be kept outdoors before planting, alleviating any urgency to plant them immediately. Survival rate: The survival rate of cell-grown trees is commendable. Flexibility: These trees can be planted in warmer soil conditions and during favourable weather. Environmental consciousness: Cell-grown trees are free from pests and diseases, adhering to biosecurity regulations.

When your trees arrive, they should be handled with care, kept upright, and ideally kept by a north-facing wall away from strong sunlight and out of the wind. And make sure you protect plants from mice and other animals who may like to eat them. Ensure your trees are kept moist. If the weather is dry or windy, water them using a normal rose on a watering can or hose. The best way to judge how damp plants should be kept is to see how wet they are when they arrive and use this as a reference. It is best to plant your trees within a week or two weeks of their arrival. Assuming you are using tree guards and stakes to protect your plants, first mark out where you are going to plant each of your trees. Use the tip of the stake or bamboo to push lightly into the ground, then once you have marked out the whole area and you are happy with your plan, you can move on to planting out your trees. Next, grab a bucket and fill it with an amount of soil. Then, lay 10–15 of your trees out at a time; make sure you do not expose the tree cells to bright sunshine or wind for too long, as they will dry out and could die. To plant out, it is best done with a planting spear, as it is quicker and more effective than using a regular digging spade. So, assuming you are using a planting spear, place the spade into the ground, push or tread the point to 1 cm more than the depth of the cell, wiggle forward and backwards, then turn the spade 180 degrees; you should now have a perfectly round hole in which you can plant your tree cell. The cell should be at least 1 cm below the top of the soil level, then just use the soil left on the spear to cover the top of the cell. The cell needs to be in the ground enough that it cannot be pulled out or fall over; to ensure this does not happen, put the spear back in the ground 50 mm from the nearest side of the cell and then lever it against your boot to squeeze the soil onto the cell. You should have no air gaps around the cell, and roots do not grow in air. If you are using tree guards to protect against pests, then suggest fitting a guard to each tree whip as you go along; that way, you will not be in danger of missing one out. Finally, consider weed control; newly planted tree whips should be kept free of weeds, as these can suppress the growth of a plant and even cause it to die off.

Suggest fitting bio mulch mats around the base of a whip after you have fitted your tree guard (if you are not using tree guards, you can still fit a mulch mat), and secure the mat in place with bamboo pegs.

3.1. Describe a suitable method of planting:

- **Bare-rooted whip tree**

To successfully plant your tree, you will require a spade, a rabbit guard, a cane, and some mulch.

Before planting, a bare-rooted whip tree must be carefully stored to prevent its roots from drying up. This is because it will be delivered to the planting site without any soil or compost on them.
Bare-rooted whips can be planted in two different ways: in a pit or a notch.

It is essential to ensure that the tree's roots remain adequately hydrated. If you need to store the tree for a few days, it can be kept in a cool environment within a plastic bag. For longer storage, it is advisable to heel it in by covering the roots with soil.

Small whips with few roots do well with notch planting. Create a notch in the ground with a spade by pressing it in and then moving it forward and backwards to widen the "notch." To create a "T" shape, a second notch can be added if necessary. Next, insert the whip's roots into the notch spaces, making sure to pull the stem up slightly so that they all point downward. Then, to eliminate the air pockets, walk carefully around the tree.

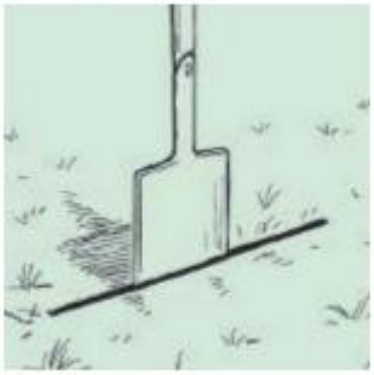
Prepare a pit that is sufficiently large to allow the roots to spread evenly, ideally slightly wider than the root system itself. When backfilling, gently shake the tree up and down to help compact the soil around the roots by applying pressure with your heel. Firmly insert a bamboo cane into the ground near the base of the tree. Ensure that the rabbit guard is free of gaps by wrapping it around the tree and cane, starting from the base. After applying mulch to suppress weed growth at the base, you can look forward to observing the tree's growth.

When planting hedges, the spacing between the whips is vital. The planting method for hedges is like that of any other whip. A common practice is to plant a double row with four plants per meter. As previously mentioned, maintain 50 cm between trees in the same row and 40–45 cm between the two parallel rows when arranging them in a zigzag pattern. If space permits only a single row, plant the whips 30 cm apart.

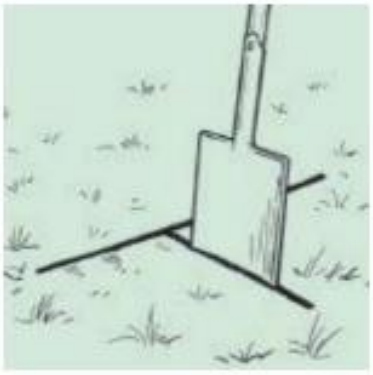
3.1. Describe a suitable method of planting:

- **Standard tree**

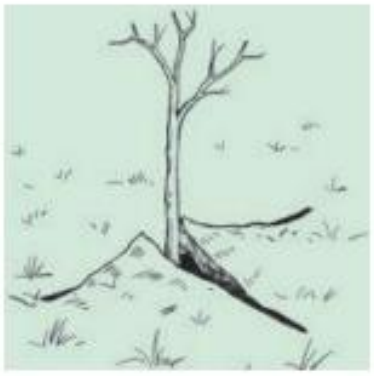
Notch planting (also known as slit planting) using a garden spade is the quickest method for planting small trees. You should avoid this method if the soil is wet or if you're planting a larger or more expensive tree.



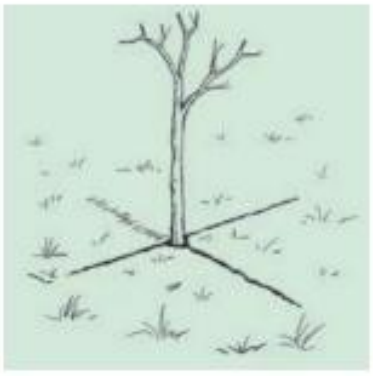
1. Clear a bare patch of soil about half a metre in diameter by scraping off any vegetation and the top inch or so of soil with your spade.



2. Use the spade to cut through the turf into the soil. Go as deep as the roots of the tree you're planting.



3. Push the spade backwards and forwards in the slot to create a hole big enough for the roots.

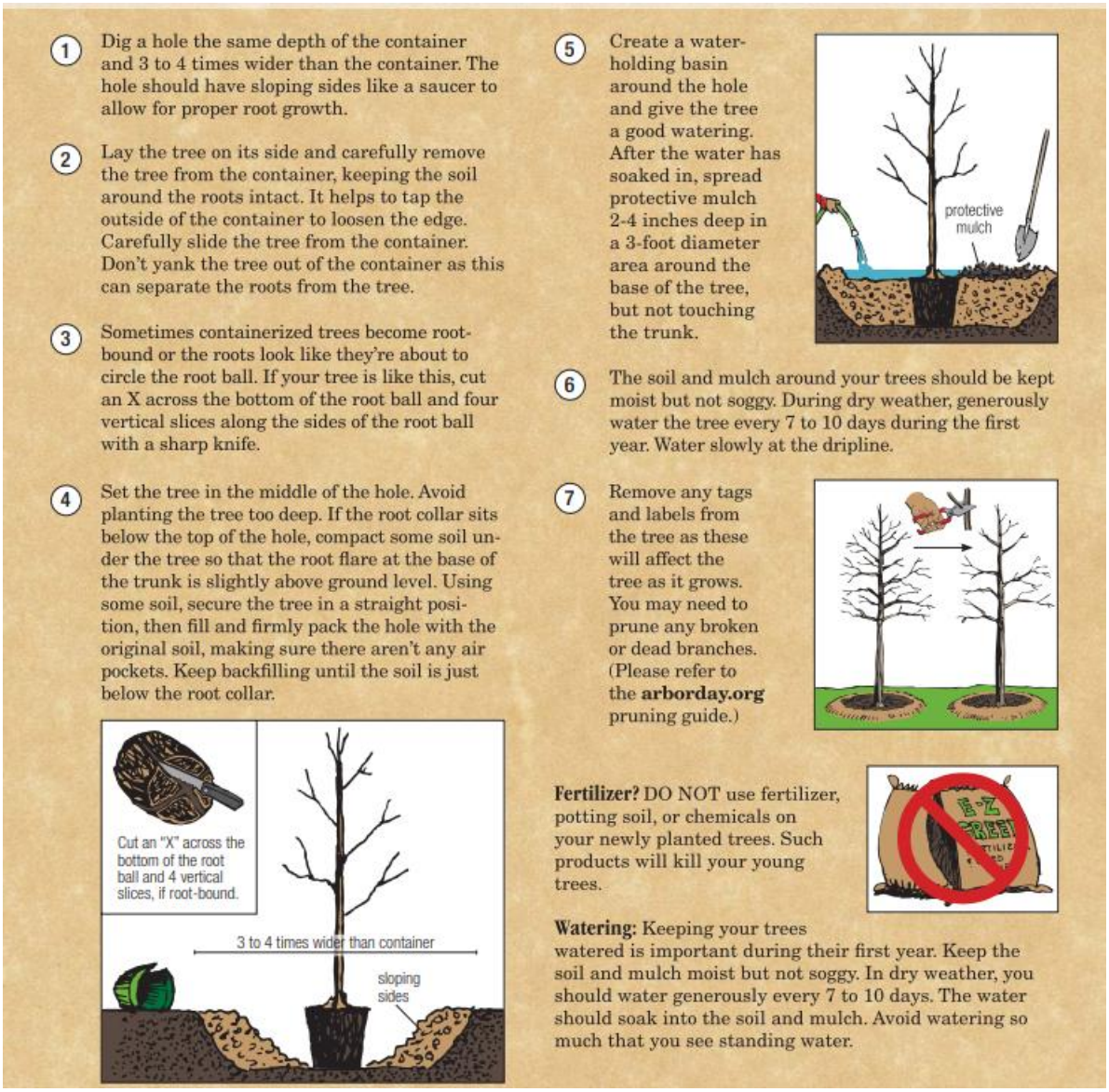


4. Hold the tree in place and firm the soil around the tree's stem with your heel. Make sure the roots are covered, that there are no air pockets and that the root collar is visible and level with the soil's surface.

https://treecouncil.org.uk/wp-content/uploads/2019/12/Tree-planting-guide-2019-updates_1.pdf

3.1. Describe a suitable method of planting:

- **Container-grown shrub**



Planting a shrub in a container requires digging a hole that is two to three times wider and a little deeper than the pot. Take the shrub out of the pot and set it in the middle of the opening. Till the root collar, backfill the hole with soil. This serves as a water basin to retain water close to the shrub as it flows down, even though it will be somewhat below the level of the surrounding soil.

https://www.arborday.org/trees/planting/documents/containerized.pdf

3.2. Describe a suitable method of staking and tying:

Whether newly planted trees require tying and staking will depend on three criteria, either separately or in combination. They are as follows:
- Size and type of planting material for trees
- Planting location's exposure, particularly to wind
- Slope or gradient at the planting location

How we secure our trees: 1: **Staking** 2: **Anchoring** or 3: **Guying** (Model by Al Tuner)

Staking and tying are typically not necessary for very small stock, such as whips, trees under a meter in height, and trees that are planted into slots or notches with a planting spear or spade. Because the minimal quantity of above-ground growth presents a comparably low wind resistance and because the rate and volume of root formation necessary to produce such little trees are likewise small, such stock will not considerably benefit from staking and tying.

Staking and tying is a contentious topic since, when left in place for an extended period, they can strangle a tree at the tie's point, prevent a tree from growing roots, and be used as a tool for vandalism.

https://extension.umn.edu/planting-and-growing-guides/staking-and-guying-trees#staking-materials-2020260

https://www.mcmdforestryboard.org/staking-goying

There are multiple uses for stakes and ties:
- Preventing the tree from toppling over in severe winds
- Maintaining the roots' stability to prevent cracking
- To prevent tree trunk damage caused by strimmer

Staking and tying are necessary for trees planted in exposed, windy areas like hillsides and embankments, as well as in urban areas where the wind is directed between buildings. As do trees that are planted in areas that are sloping, have shallow or extremely sandy topsoil, or both. Because of soil erosion and runoff, the gradient-prone ground is more likely to have thin and sandy topsoil.
Additional potential locations for tree staking and tying include areas with a lot of foot and vehicle traffic, such as grass-cutting teams and ground maintenance staff. Trees can be kept stable in the face of vibrations that are transmitted through the ground by being staked and tied.

Any newly planted large tree, including fruit trees and common shrubs, needs to be staked. As soon as trees are planted, stake them, and replace the stakes if necessary. To prevent tight tree ties from injuring the stems, check the stakes and ties annually. Replace any ties that have frayed or snapped. Take out the stakes after the tree can stand on its own without bending or moving on the ground. Typically, it takes between eighteen months and three years, but for semi-mature plants or those with weak rootstocks, like

dwarf apple trees, it could take longer. Various staking techniques exist, contingent on the kind of tree, its dimensions, and the planting technique. Every stake needs to pierce the ground at least 60 centimetres (2 feet) deep. The stake will not anchor the plant if it moves in the earth.

- **A bare root standard tree**

Single stake
This is the conventional technique for anchoring trees that are bare-root; the stake is inserted before planting.
The stake should be one-third the height of the tree for most trees. This stabilises the roots and permits the stem to grow thicker and swing.
Use a long, vertical stake for trees with long or flexible stems, then cut it shorter in the second year. A space of 2.5–3 cm, or around an inch, should separate the stem from the stake.
To ensure that the tree is blown away from the stake, stakes should be positioned on the side facing the predominant wind.

3.2. Describe a suitable method of staking and tying:

- **A container-grown heavy standard tree**

For trees planted in containers, double or triple staking is more suitable because the stakes can cross the root ball. To prevent sharp-ended stakes from chopping off roots, it is advisable to place and insert stakes after the root ball has been lowered into the planting hole. Cross-boards provide an additional source of support.

3.2. Describe a suitable method of staking and tying:

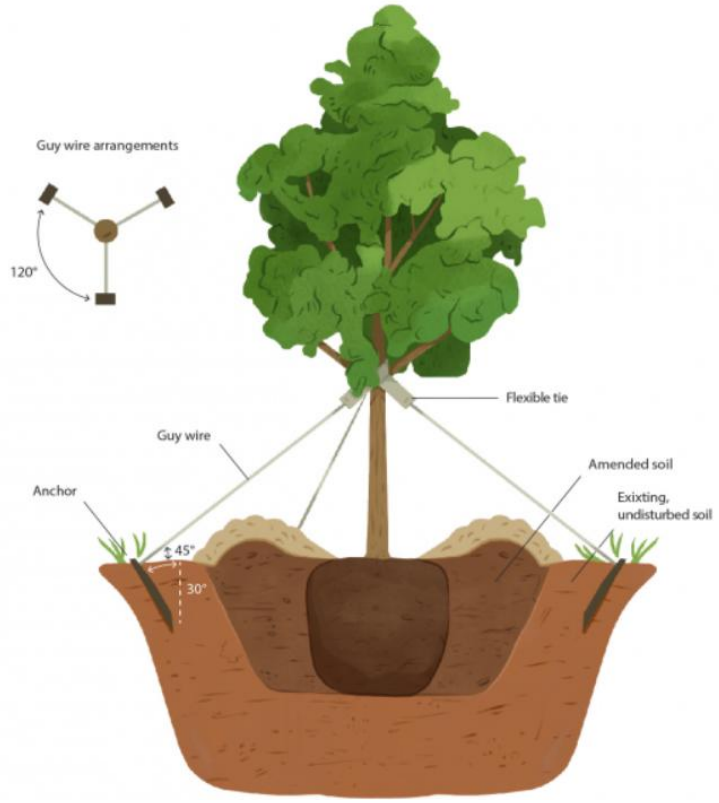
- **An extra heavy standard tree**

Guying proves to be particularly beneficial when transplanting large trees. To implement this technique, secure a robust wire to short stakes positioned at a 45-degree angle from the tree. To prevent friction, it is advisable to encase the wire that wraps around the tree's trunk or branches with a rubber hose. There are specialised tree ties available that feature adjustable and fastening buckles, made from durable, long-lasting plastic.

Typically, guying is utilised for stabilising transplanted trees with a diameter of four inches or greater. The guying anchors are driven deep into the ground, with only a few inches remaining above the soil, which enhances their strength and reduces their height. Common types of anchors include duck-billed earth anchors, sturdy hardwood stakes measuring at least 3 inches by 3 inches by 24 inches, or reinforcement rods with a minimum diameter of 5/8 inches.

Before planting a tree purchased from a nursery, it is essential to remove any poles or bamboo sticks that were used to support or stabilise the stem. Prolonged retention of these supports can lead to damage or girdling of the tree.

Using guy wires to stake a tree



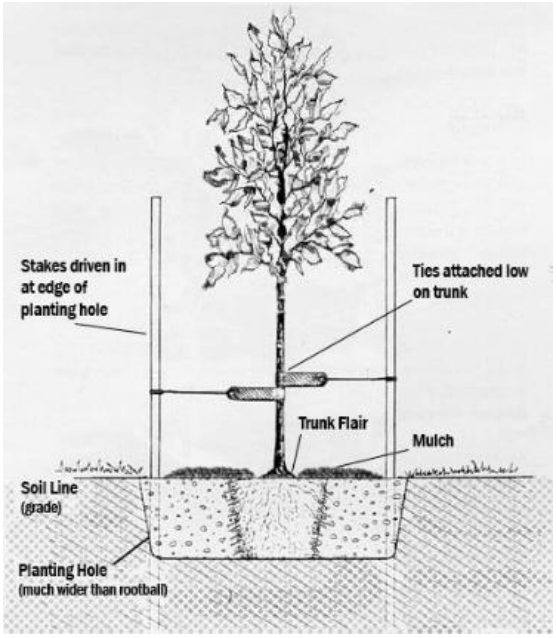
Tree ties

There are tree ties with buckles for fastening and adjusting that are specifically manufactured from strong, long-lasting plastic.

When the tree's girth increases, these connections can be relaxed.

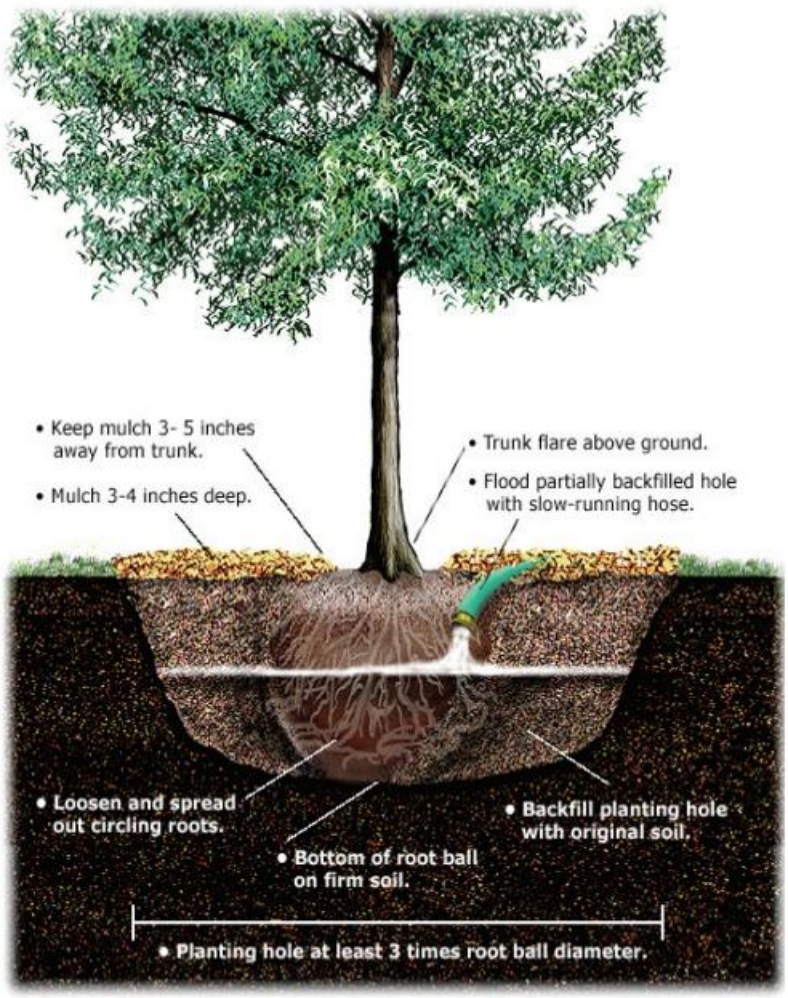
Make a figure of eight to hold the tree to the stake, place the spacer between the tree and the stake, and fasten the tie with a nail to keep the stem and stake from rubbing against one another.

An old pair of tights can be a crude and ready-to-wear tree tie in an emergency.



Damage tree trunk

3.3. Describe a suitable method of backfilling a planting hole



The soil removed from the planting hole should be used to backfill it, as this allows the tree to acclimate to its new environment. Excessive addition of nutrients to enhance the soil can prevent the roots from extending beyond the planting pit, which is detrimental to the tree's stability. Exceptions to this guideline occur when the existing soil is predominantly clay, in which case the incorporation of sand or humus is necessary to improve aeration and water retention. Additionally, for trees that have a symbiotic relationship with mycorrhizal fungi, such as birch trees and Amanita muscaria, the inclusion of these fungi in the backfill can promote better growth. It is important to tamp down the backfilled soil without compacting it, as maintaining small air and water pockets is essential for the health of the roots. Consider whether you need to add stakes or a water line for irrigation while backfilling a hole.

3.4. Describe a suitable method of mulching a newly planted tree

The roots of trees in a natural forest ecosystem are anchored in rich, well-aerated soil that is teeming with soil microbes and vital nutrients. Fallen leaves and other organic debris cover the soil, where they are broken down by microbes to release nutrients. This is the ideal habitat for the intake of minerals and root growth. On the other hand, urban landscapes and recent constructions are usually harsher conditions with low-quality soil, less organic matter, and significant variations in soil moisture and temperature. By applying organic mulch, many of the advantages of the natural world can be duplicated while maintaining a more formal appearance.
To keep the soil moist and enhance its qualities, mulches are spread on the soil's surface. Mulch, however, may not have much of an effect on trees if it is applied incorrectly, if at all.

Categories of Mulch

Organic Mulch

• This category encompasses materials such as wood chips, pine needles, bark from both hardwood and softwood, cocoa hulls, leaves, compost blends, and a range of other plant-derived products.
• The decomposition rate of these materials varies based on factors such as the specific type of mulch, climatic conditions, and the presence of soil microorganisms.
• The need for replenishment is greater, contingent upon the speed of decomposition.

Inorganic Mulch

• This type includes an assortment of materials such as various stones, lava rock, shredded rubber, and other non-organic substances.
• Inorganic mulch does not undergo decomposition and therefore requires infrequent replenishment.
• It does not enhance soil structure or contribute nutrients to the soil.

Advantages of Adequate Mulching

- minimises the loss of soil moisture through evaporation.
- regulates the growth and germination of weeds.
- shields roots from bitter summer and winter temperatures by insulating the soil.
- enhances drainage, aeration, structure (particle aggregation), and soil biology over time.
- increases soil fertility when specific forms of mulch break down.
- prevents some plant diseases.
- lessens the possibility that lawnmowers and string trimmers will harm trees.
- gives planting beds a consistent, well-kept appearance.

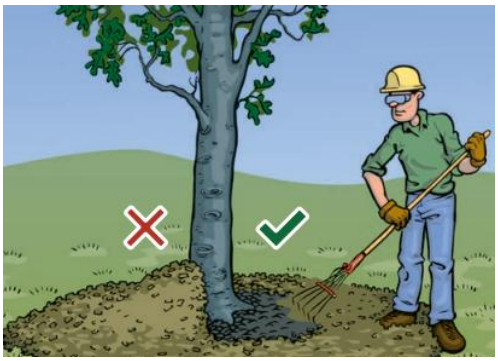
Issues Related to Improper Mulching

• Placing mulch directly against the trunks or stems of plants can weaken their tissues, increasing their vulnerability to pests and diseases.
• Mulch in contact with the trunk may encourage the formation of girdling roots, which can hinder tree growth or ultimately result in the tree's demise.
• Dense layers of fine mulch can become compacted, potentially obstructing the flow of water and air.
• In saturated soils, applying more than 2 inches (5 cm) of organic mulch can impede soil drying, leading to excessive moisture in the root zone, which may stress the plant and promote root rot. In such situations, it may be advisable to leave the ground bare or to apply a thin layer of inorganic mulch.
• Certain mulches, particularly those made from fresh grass clippings, can alter soil pH, and may eventually result in nutrient deficiencies or toxic accumulations. Anaerobic "sour" mulch can emit strong odours, and the accumulation of alcohols and organic acids may be harmful to young plants.

Recommendations for Mulch Application

Selecting the appropriate type of mulch and employing effective application methods are crucial for the vitality of landscape plants. The following recommendations should be considered when applying mulch:
• In well-drained areas, a mulch layer of 2–4 inches (5–10 cm) is advisable. Fine mulches, such as composted materials, should be applied at a thickness of 2–3 inches, while coarse mulches, like arborist wood chips, should be layered at 3–4 inches.
• Position the mulch close to, but not in direct contact with, the trunk, extending it to the drip line whenever feasible. If reaching the drip line is impractical, apply the mulch as far outward as possible. Typically, a minimum radius of 3 feet (1 meter) is recommended for most trees.
• For species exhibiting symptoms indicative of pH imbalances, choose a mulch that can assist in rectifying the issue.
• If mulch is already in place, assess its depth. If the existing mulch is adequate, break apart any compacted layers and rejuvenate its appearance using a rake. Some landscape maintenance services enhance the colour of faded mulch by applying a water-soluble, vegetable-based dye.
• If mulch is heaped against the stems or trunks of trees, it is important to pull it back several inches or centimetres to expose the base of the trunk (refer to the figure in the top right).

• Fresh arborist wood chips, particularly those containing bark and leaves, serve as an excellent material for application around trees and large shrubs.



https://extension.unl.edu/statewide/dodge/mulch-volcanoes-a-harmful-practice-for-trees/#:~:text=A%20%E2%80%9Cmulch%20volcano%E2%80%9D%20is%20the,ill%2Dadvised%20practice%20is%20everywhere.

3.5. Identify a minimum of two suitable mulch materials

Mulch comes in a wide variety of forms and can be divided into two groups:

Biomaterials:
Wood chippings
Compost
Bark
Leaf mould
Well-rotted manure
Straw
Seaweed
Cardboard

Non-biomaterials:
Carpet
Slate Image:
Gravel
Rubber
Textiles

3.6. Identify a minimum of two reasons for mulching a newly planted tree

The primary purposes of applying mulch around a tree include:
1. Retaining moisture. Mulch acts as a barrier to evaporation after watering, helping to maintain a cool environment by trapping moisture within its structure.
2. Reducing weed proliferation. Weeds compete with trees for essential nutrients and water; therefore, maintaining a weed-free zone fosters healthy tree growth. The mulch obstructs sunlight, thereby inhibiting weed development. If the mulch decomposes and the soil is exposed to sunlight, weed growth may occur. It is crucial to replenish the mulch regularly while the tree is establishing itself.
3. Enhancing visual appeal. In landscaped areas, mulch can contribute to the overall aesthetic, with materials such as gravel, slate, or pebbles often utilised for this purpose.
4. Enriching the soil. Organic mulch will gradually break down and be incorporated into the soil by earthworms, benefiting the worms, enhancing soil quality, and supporting the tree's health.

3.7. Identify appropriate measures required when planting trees of a given size into an unfavourable site condition

When planting a substantial standard tree in a root ball at a site with unfavourable conditions, several factors must be considered. The primary consideration is the species of the tree. Certain species have adapted to thrive in challenging environments, making the selection of the appropriate tree species crucial in each of the scenarios outlined below.

Transporting a heavy tree to the planting location can pose challenges, particularly if the site is on a slope or in a wet area. In such cases, manual transportation may be necessary, requiring several individuals to lift the tree if vehicle access is not feasible.

For sloped areas, careful attention must be given to staking the tree, and it may be beneficial to create a slight terrace to facilitate planting. In wet locations, it may be necessary to implement drainage solutions, such as drainage ditches or the incorporation of humus and gravel, depending on the size of the area. Planting trees in mounds can also elevate them above the natural soil level.

In contrast, if the area is arid, irrigation systems must be established, which could include a field-wide system or the use of water bags or pipes. Over time, trees will contribute to increasing moisture in the area, so phased planting may be advantageous, starting with faster-growing species to modify the microclimate by providing shade.

In windy locations, establishing a shelter belt of trees can serve to mitigate wind impact, thereby protecting other trees. Smaller trees and shrubs are likely to fare better in such conditions, as they are less susceptible to being uprooted by strong winds. Additionally, staking or guying may be necessary, with annual inspections to ensure stability.

Certain soil types may also present challenges for tree growth, such as being excessively acidic or alkaline, which can be amended with soil additives. In cases where the soil is contaminated, particularly at brownfield sites, it may be essential to remove debris and hazardous chemicals.