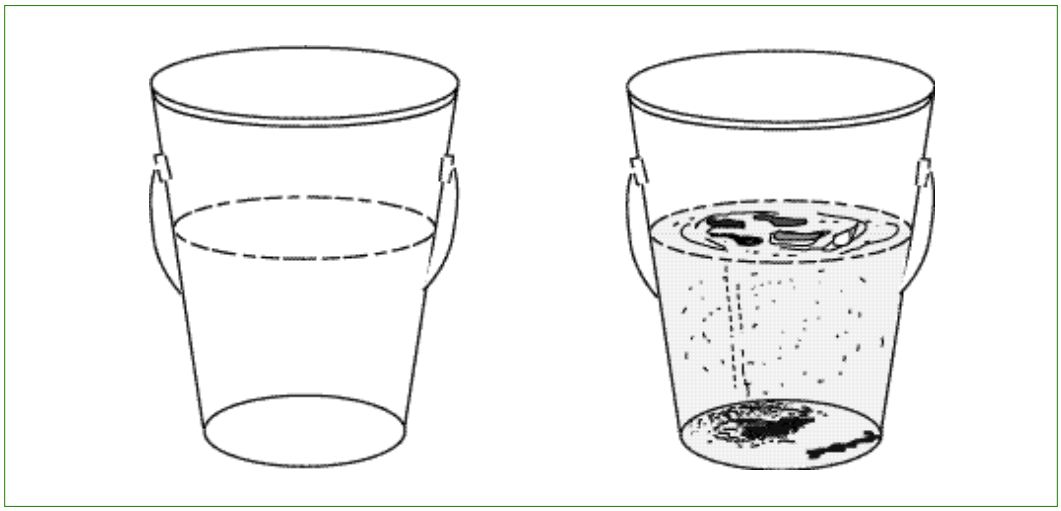
Water is life

The regular supply of clean water is essential to plant growth. Plants are made out of more than 90% water. When grown in containers, nursery plants have only a limited volume of substrate and do not have the ability of mature trees to search for water from far below the soil surface. The amount of water seedlings require depends upon:

- seedling age
- amount of sunlight
- soil type.



Use clean water. Dirty water contains many plant diseases. Occasionally clean the water tank and disinfect with clorox to remove plant diseases.

A reliable supply of clean, 'sweet' water is essential in the nursery. Water that is saline (salty), has high concentrations of dissolved minerals including possibly toxic elements from natural deposits, contains oil, or is contaminated with pesticides from local agriculture should be avoided. Water which is very acidic or very alkaline should also be avoided.

When to water

A ***good nursery practice*** is to regularly check the water status (turgidity) of the leaves to determine when to water. Leaves should be firm. A strict schedule of 'watering every two days', for example, is not recommended. It is better to monitor the plants and water them

when they need it. It is okay for the substrate to dry out a bit between waterings.

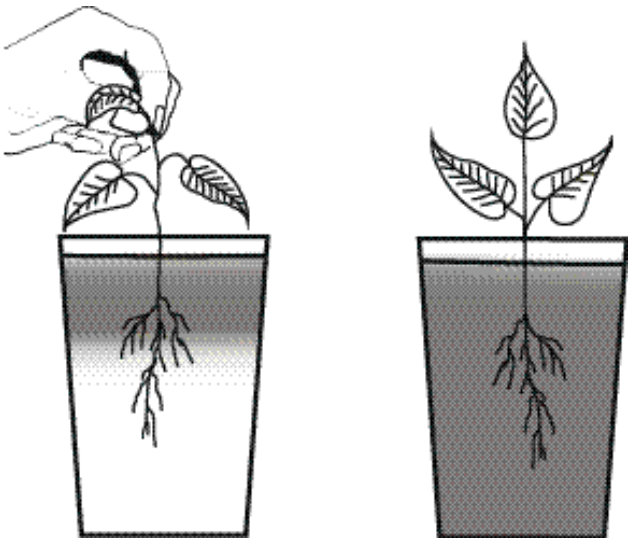
Regularly check the water status (turgidity) of the leaves to determine when to water.

Water in the early morning or late afternoon, when the sun is cooler.

A ***good nursery practice*** is to water in the early morning or late afternoon, when the sun is cooler. It may be necessary to change the schedule of workers to accommodate the needs of plants. For example, workers may come very early in the morning or in the evenings, and have a long break during mid-day. When plants are watered in the hot sun, they lose more water by evaporation or transpiration than they gain from watering. This heavy water loss stresses the plants. Water drops on the leaves can also magnify the sunlight causing the leaves to burn.

A sandy soil loses water faster than a soil with a high clay content, so watering is needed more frequently. However, when a soil high in clay content dries out, it often becomes very hard and will crack. This can tear the plant's roots and slow its growth or even kill it.

If the area is very sunny, more water is needed. If the area is very shady, less water should be applied. A ***poor, but unfortunately common nursery practice*** is to keep an area shady too long in order to reduce water use. As we discuss in chapter 6, shade should be regulated as the plants grow and not simply to save water.

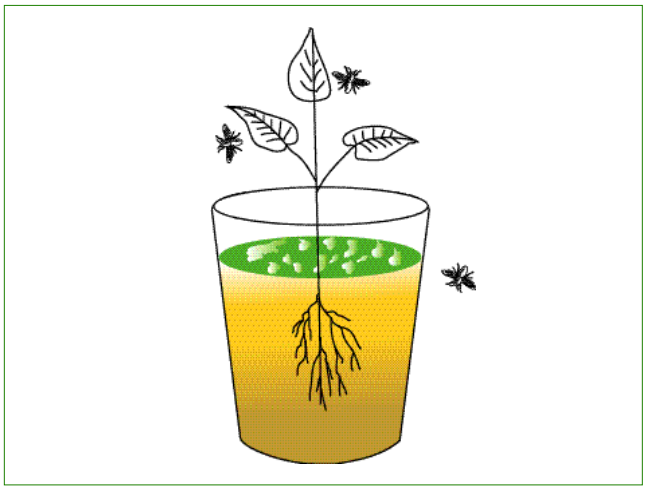


Check the leaves and the soil to determine if the plant needs water.

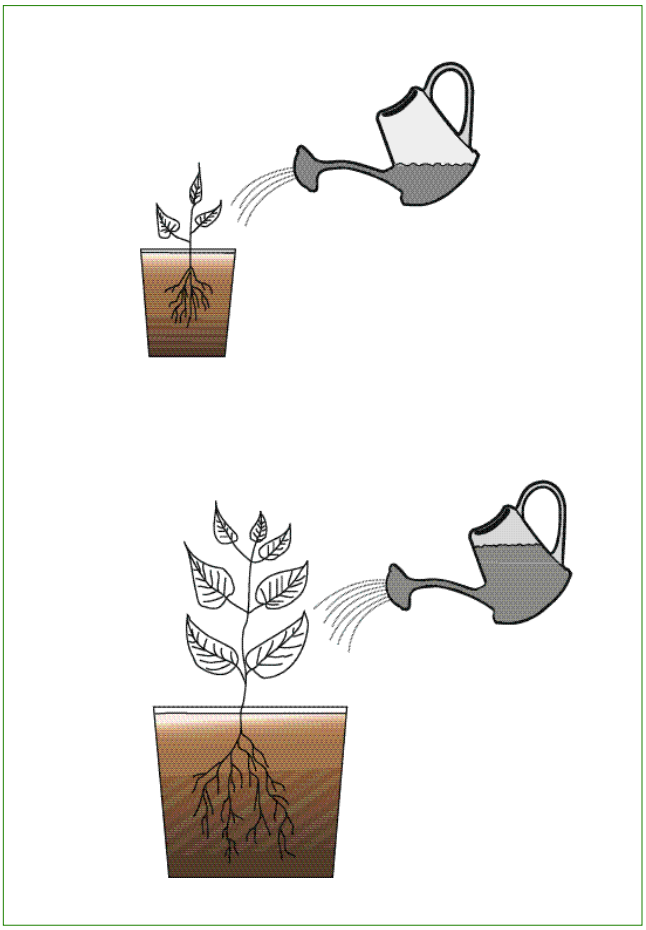
Too much water can damage the plants just as much as not enough water. The root system needs a balance of water and oxygen for optimal development. If bags do not have sufficient and large enough holes for drainage, the substrate will become waterlogged and the roots cannot breathe. When the area is too wet, the plants are also more susceptible to fungus attack. If you can see brown patches or loose bark at the soil level, this is a sign that the stem is rotting, probably due to over-watering. Also, if the substrate is too wet, the seedlings are more susceptible to the attack of soil dwelling insect larvae such as those of sciarid flies.

Overwatering weakens plants and causes many diseases.

If the soil is covered with green moss or algae, you are watering too often.



Water small seedlings with small amounts of water. Water large plants with large amounts of water. Direct the water to the substrate, not the leaves!



How to water

A ***good nursery practice*** is to water the substrate thoroughly. A ***poor, but unfortunately common nursery practice*** is to direct the water to the leaves and not the soil. Although it is good to occasionally wash the leaves in a dusty environment, roots absorb the water, not the leaves.

Most nurseries water plants manually with a hose or a watering can. This system is more affordable and easier to maintain than an automatic

Water slowly

and check that the water penetrates to

irrigation system. However, plants are generally not watered evenly when watered manually. Some plants receive too much water, while other plants do not receive enough. Frequently, the plants on the ends of rows, or along the sides do not receive adequate water, while those in the middle receive too much. You can often see from growth patterns within a bed that some plants thrive or are stunted as a result of uneven watering.

Low water pressure is better for watering than high pressure. When the water pressure is too high, the soil and/or seeds can be washed out from the bag or bed. Similarly, if the plants are in a bed that is not level, always stand at the bottom of the slope when watering to minimize the loss of soil by erosion. A ***good nursery practice*** is to water slowly and check that the water penetrates to the bottom of the container A ***poor, but unfortunately common nursery practice*** is to water quickly whereby only the surface of the soil is wetted.

Provide the workers with the best equipment and working conditions for maximum labour efficiency.

If at all possible, buy a sprayer nozzle for the hose with an on/off valve. This reduces water loss, an adjustable sprayer allows better distribution and control of the water, and it is easier for the person who is watering. An even better buy is a watering lance (like a wand with a shower nozzle). Water can be directed accurately into the tops of the bags from a standing position. It isn't a good idea to control water flow by holding your finger or thumb over the hose: this results in uneven water distribution and quickly leads to tired and uncomfortably hands. A ***good nursery practice*** is to provide the workers with the best equipment and working conditions for maximum labour efficiency.

Hardening off and transport

Reduce the amount of water four weeks before the seedlings are planted out. At this stage it is advisable to allow the soil to completely dry out and the plants to wilt for a day. This process should be repeated several times. This hardening-off helps prepare the plants for the new conditions in the field where water might be limiting. Water plants well the day or night before they are taken from the nursery. This will reduce water stress during transport to the planting site, from high temperatures, wind and mechanical damage. If trees are transported in a truck, cover the seedlings with a plastic sheet to provide protection from the wind and sun.

Summary of watering

It is essential to supply seedlings regularly with clean water. The amount of water needed by the plants changes with plant age.

Good nursery practices

- regularly check the water status of the leaves to determine when to water
- water in the early morning or late afternoon
- water the substrate — not the leaves — thoroughly
- water slowly and check that the water penetrates to the bottom of the container
- use a spray nozzle
- reduce the amount of water the seedlings receive four weeks before planting out
- water well the day before transporting and planting out
- cover the seedlings with a plastic sheet to avoid drying out on transport

Poor, but unfortunately common nursery practices

- watering according to a fixed schedule
- directing the water to the leaves and not the soil
- watering during midday
- watering quickly and only wetting the soil surface
- using your thumb to regulate water flow