

# Propagating Plants: What Do You Need?

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**Agriculture Academy**  
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Propagating plants from cuttings is a wonderful way to exploit the natural growth response from plants to get a whole new generation for a fraction of the price it would cost to buy these plants as mature specimens. There are a few conditions you will need to meet to not only ensure cutting survival, but to induce the root and vegetative growth required if those cuttings are to mature and survive the outdoor environment.

In this guide we are going to take a look at the propagation environment, focussing on what your plants require to survive, why cuttings sometimes fail, and how you can master the techniques of cutting propagation to maximise production in your nursery.

Let's get started.

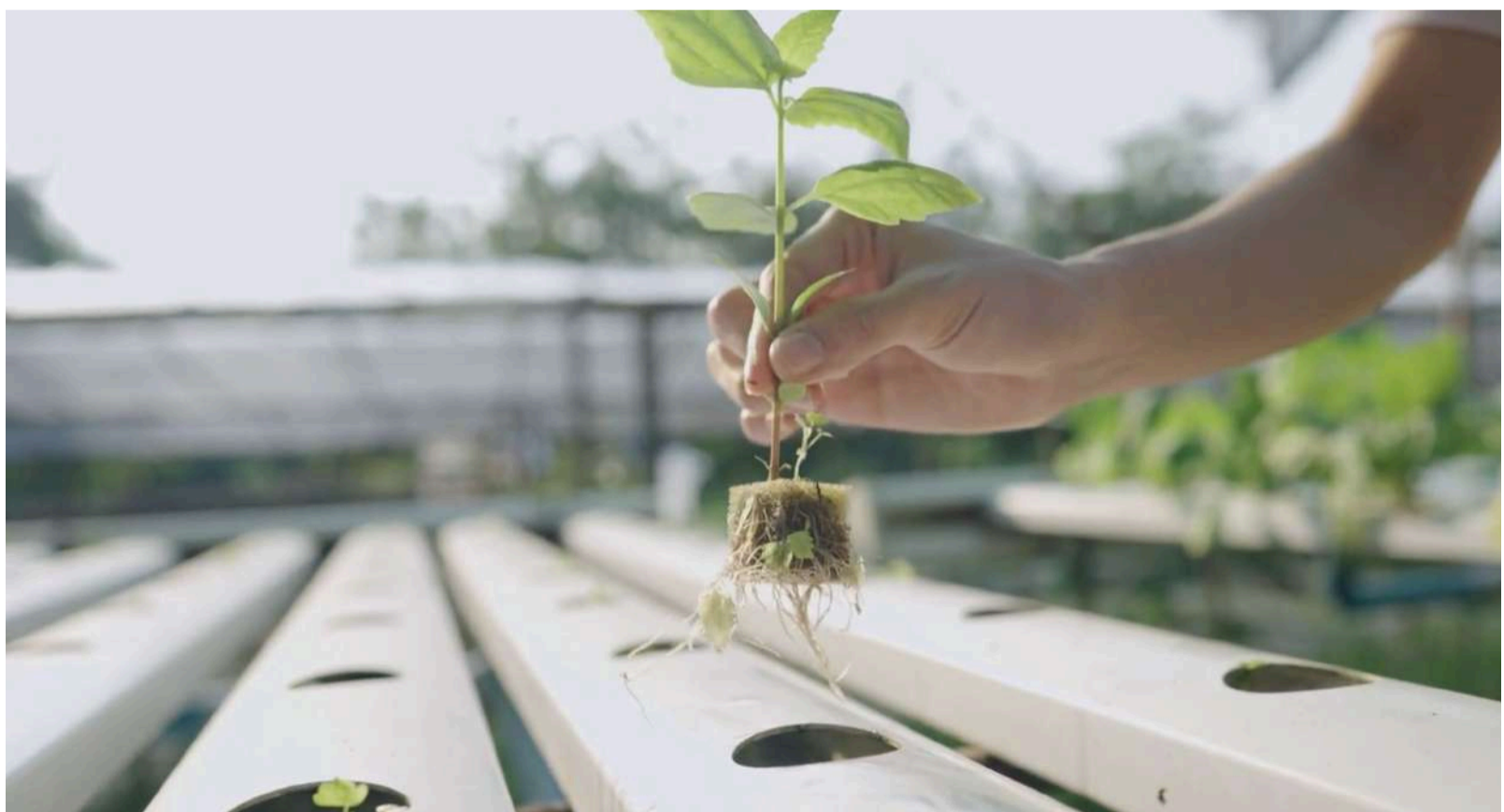


# Environmental Considerations

There are 3 environmental factors that growers can manipulate to illicit the desired response in their cuttings, these are

- 1) The **microclimate**, which includes the amount of light, humidity, and temperature of the propagation unit.
- 2) The **soil or rooting medium**, different media will retain water and nutrients in distinct ways.
- 3) **Biota**, which includes pests, diseases and other living organisms that can affect the cuttings in positive or negative ways.

As with any profitable business, the costs associated with heating, irrigation, ventilation, rooting media, and pest control must be justified by the ultimate price the grower will receive for their plants. Generally, most growers will compromise between the optimal conditions, and the most cost-effective conditions. This also extends to finding the ideal conditions that suit a wide range of plants as many different species will likely be cultivated in the same propagation unit.



When constructing a propagation unit, a grower must consider the abiotic (non-living), environmental conditions that affect cutting success in addition to the biotic (living) organisms.

Environmental factors include light, water, temperature, humidity, and rooting medium.

## Light

Light is important for plants to photosynthesise. The carbohydrates produced through photosynthesis allows the plant to develop roots and



leaves, both of which are essential to ensure ultimate cutting success. This is why cuttings retain some leaves in most cases, but winter cuttings must rely on their food reserves in their stems to generate new roots and leaves. The amount of light, and the quality of that light, are both important. Longer days provide the plants with more energy to photosynthesise, allowing roots to develop quicker. The quality, or colour, of the light can also influence root development. Red shade nets change the light quality towards the blue and green wavelengths, which has been shown to increase root development. Generally, higher light levels will lead to faster rooting. Unfortunately, higher light

levels can also increase the ambient temperature, which can put severe stress on the cuttings. Growers must therefore compromise to find the highest light level, without putting temperature stress on the cuttings.

## Temperature

Temperature influences not only the rate of root development, but also overall plant stress. Warmer temperatures will encourage rapid root growth, with many plants benefitting from warm feet and cool heads. The propagation unit itself will help to retain heat, but in very cold environments bottom heating (heat pads) could be considered.

## Gasses

Root development is dependent on the availability of gasses, both around the leaves of the cuttings and in the rooting medium as well. Carbon dioxide is necessary for photosynthesis, and over-saturation of the rooting medium will exclude the necessary gasses required for root development. In some areas, carbon dioxide and other gases can be pumped into the propagation unit, but open vents can often achieve the same result with little extra cost.



## The Rooting Medium

The following are prerequisites for rooting media:

- 1) The media must retain sufficient water
- 2) The media must be aerated to allow roots to grow
- 3) The media must be cost-effective against the price of the eventual mature plants



For more information on the different rooting media you can use in your propagation unit, check out this video <https://www.youtube.com/watch?v=2Q39WMmToAM>. Some media can also contain small amounts of nutrients, which can supplement the young cuttings before they are transplanted into nutrient-rich soil. Fertigation and slow-release fertilisers can also be used to supplement nutrient levels.

# **The influence of biotic (living) organisms**

It is all good and well to provide your plants with the best conditions possible, but the downside is that these conditions will often encourage pest and pathogen infestation too. Control of these organisms should begin with the mother plants from which the cuttings are taken. Any pest, fungal, bacterial, or viral problem afflicting the mother stock will be passed onto the daughter cuttings. Scouting should be done regularly to prevent any serious problems. Sanitation efforts such as regular disinfection, ventilation, and cutting disinfection can help limit pest and pathogen problems.

## **Why do cuttings fail?**

All these factors are considered by growers to maximise cutting success. But as with any living organism, 100% success is rarely ever achieved. So, what are some of the most common reasons for cutting failure.

Firstly, the environmental conditions may not have been optimal. As we mentioned, not all plants have the same requirements and growers may need to compromise the perfect conditions for a few species to allow for overall success with the rest of the plants. For example, lavender cuttings benefit from a slight breeze, but many other cuttings prefer a higher humidity. Therefore, a trade off must be made by sacrificing the optimum requirements of one plant (like lavender) to the next best conditions that will promote survival of the other cuttings too. Wilting cuttings due to a lack of water and high temperatures are often the prime environmental cause for cutting failure, this can be diagnosed by

shrivelled, brown leaves. Make sure your medium retains water, and do not take your cuttings during the heat of the day- rather stick to the early mornings or late evenings and stick the cuttings as soon as possible.

Diseased cuttings will also fail. If cuttings do succumb to pathogens, it will usually only occur a few days after the cuttings were started. If your cuttings look decayed and soft, then fungi, bacteria or viruses may be the causes. You can prevent this by taking cuttings from healthy mother plants and disinfecting the cuttings in diluted bleach solutions prior to planting.

Another reason for cutting failure may be due to them being taken in the incorrect growing season or from the wrong part of the mother plant. Generally, younger, softer growth roots easier than older, woody cuttings. Different plants will root better if the cuttings are taken at different stages in the life cycle. Rooting hormones can be used to encourage rapid and even root development. These hormones contain growth regulators called auxins, which signals the plant to start growing roots. Low concentrations can be used for herbaceous plants like geraniums while high concentrations are suitable for woody plants like pecans.



***Powdered rooting hormone promotes rooting in lavender***