



# AGRIFUTURES

REGENERATIVE FOODSCAPES

## Plant Propagation





# Asexual Reproduction in Plants

Many plants are able to propagate themselves using asexual reproduction. This method does not require the investment required to produce a flower, attract pollinators, or find a means of seed dispersal. Asexual reproduction produces plants that are genetically identical to the parent plant because no mixing of male and female gametes takes place. Traditionally, these plants survive well under stable environmental conditions when compared with plants produced from sexual reproduction because they carry genes identical to those of their parents.

There are advantages and disadvantages of asexual propagation. Advantages of asexual propagation include: the new plants are exactly the same as the parent plant, many plants can be grown from one parent plant, the new plant will grow faster and flower at an earlier age than those grown from seed, there is a risk of transferring disease from the parent plant to the new plant.

Disadvantages of asexual propagation include: cutting material is often bulky and perishable, some of the propagation methods are difficult, time consuming and more expensive than growing from seeds.



# Plant Propagation

In grafting, part of a plant is attached to the root system of another plant; the two unite to form a new plant containing the roots of one and the stem and leaf structure of the other. Cutting is the process in which the stem of a plant is placed in moist soil or water to generate a new root system. In layering, part of the plant's stem is bent down and covered with soil; this stem can generate a new root system and, therefore, an entirely new plant. Micropropagation is the process in which part of a plant is placed in plant culture medium and provided with all the hormones and nutrients it needs in order to generate new plants.



# Cuttings

Propagating new plants by taking cuttings is one of the most satisfying and inexpensive ways to increase the number of plants in your garden. For new gardener's the process can often seem daunting, especially if previous attempts have failed. However, it is well worth persevering and once you have learned the basics the rewards can be great!

When propagating new plants from stem cuttings, adventitious roots (roots that have formed in an unusual place) are produced from either the stem itself or from the callus, the tissue that forms around the cutting wound.

Adventitious roots tend to form from cambium cells. These are the cells that surround the water and nutrient carrying vessels in the stem and cause the stem to thicken during growth. As a result, the new roots are perfectly positioned for accessing these nutrients as they develop.

The actual growth of the new roots is triggered by auxins (growth hormones). All gardeners should be familiar with auxins as they are the cause of root and shoot growth in all plants. Natural auxins accumulate at the site of the cutting and cause the development of new roots from the cambium cells.

For the majority of cuttings, it helps to use a rooting powder to help stimulate the development of adventitious roots. These powders are inexpensive and available from all garden centres. They contain synthetic auxins that work alongside the natural auxins in the plant to trigger root development.



## Stem cuttings

Stem cuttings can be taken all year round however the timing does determine how the cuttings should be treated.

In spring, it is possible to take cuttings from new growth, either from the tips of new shoots or from basal growth near the foot of the plant. Cuttings taken from new growth at the start of the season are normally referred to as softwood cuttings and usually develop roots more easily than cuttings taken later in the season.

However, although it is normally easier to start softwood cuttings off, they do require a lot of care to prevent them from wilting. The cuttings will need to be propagated in either a greenhouse or a propagator.

You will need to provide some form of shading to ensure that the plants are protected from extremes of temperature and you will also need to ensure that there is adequate ventilation. However, bear in mind that as the cuttings don't yet have their own root systems it is very difficult for them to take up water and you'll need to ensure that their environment is kept humid to help reduce water loss. The key is to maintain a balance between adequate air movement and humidity, while trying to keep the environment as constant as possible.

Greenwood cuttings are taken from early to mid-summer as growth starts to slow. They don't produce roots as easily as softwood cuttings but do tend to survive better. You will still need to propagate them within the controlled environment of a greenhouse or propagator though!



# How to take and prepare stem cuttings

Stem cuttings are normally taken just underneath a node (leaf joint) on the plant stem. This is because the nodes are the sites where the cambium cells are most active and will produce the best adventitious roots. Where leaves are densely crowded on the stem you can take the cutting between two nodes (internodal cutting).

Ideally you should leave five or six nodes along each cutting. The actual length will therefore vary according to the variety, but generally this will be around 5 to 12cm (2 to 5 inches). The lower leaves of the cutting should be stripped to leave a length of stem that can be inserted into the growing medium. Remember to add rooting powder to the exposed stem before planting.

If you are planting semi-ripe or hardwood stems, it is worth removing a sliver of bark from the bottom of the cutting to expose more cambium cells. Make a diagonal cut around 2.5cm (1 inch) long. More of the cambium helps the formation of adventitious roots. A similar effect can be achieved by pulling away side shoots from ornamental shrubs, leaving a 'heel' with exposed cambium cells.

Hardwood cuttings have sufficient food reserves from previous season's growth to sustain the plant until roots are formed. However younger cuttings will still need to produce energy via photosynthesis. For this reason, you will need to keep some leaves on your cuttings, however the drawback of this is that water is lost mainly through the leaves by transpiration. To help reduce this water loss, you will need to remove as many leaves as possible, leaving a minimum of three full sized leaves.