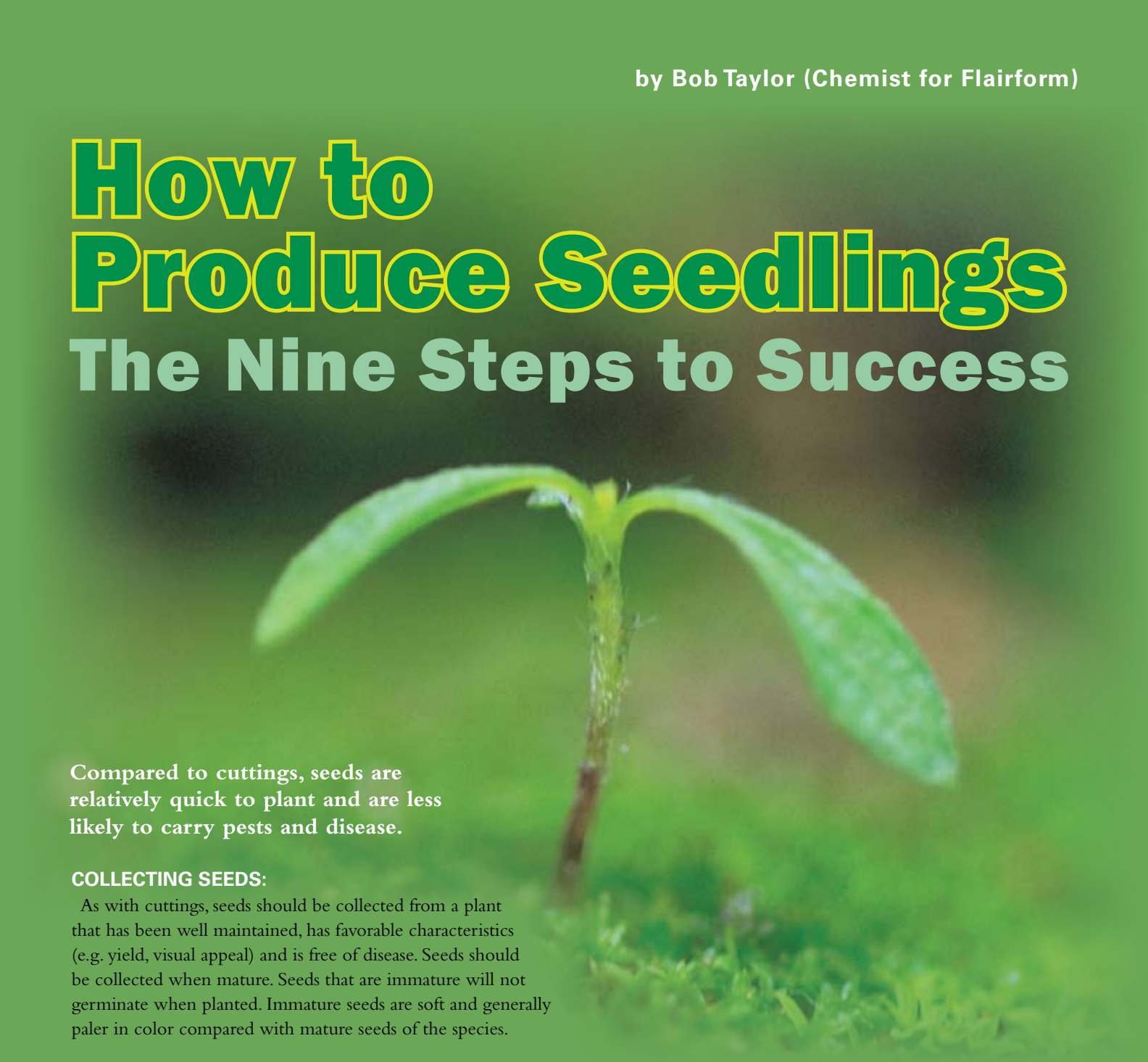
by Bob Taylor (Chemist for Flairform)

How to Produce Seedlings

The Nine Steps to Success



Compared to cuttings, seeds are relatively quick to plant and are less likely to carry pests and disease.

COLLECTING SEEDS:

As with cuttings, seeds should be collected from a plant that has been well maintained, has favorable characteristics (e.g. yield, visual appeal) and is free of disease. Seeds should be collected when mature. Seeds that are immature will not germinate when planted. Immature seeds are soft and generally paler in color compared with mature seeds of the species.

SEED STORAGE:

It is important to note that a seed is living. To suppress germination but maintain the seed in a dormant state, storage conditions should be maintained as follows:

- Cool (36 to 46°F)
- Dry conditions with limited oxygen supply – via screw topped glass jar
- Darkness

Medium: The choice of growing medium is essential. It should provide high oxygen and water levels and good drainage.

Disease: Sterilization of hardware and media before and during the propagation process is paramount. Maintaining adequate ventilation is also essential for minimizing the threat of disease outbreak.

PROCEDURE:

Step 1.

Thoroughly wash and sterilize all hardware and areas that are likely to contact seedlings and cause disease contamination.

Step 2.

To increase the success rate of seedlings, use a heat mat and propagation lid (vents closed) to maintain root and air temperature at 68 to 77°F and relative humidity at 80 per cent *(Figure 1)*. Note that cool conditions delay the germination of most seeds making them more susceptible to fungal attack.

Step 3.

Pre-soak medium with a highly pH buffered seedling nutrient. This ensures excess alkalinity is removed (lowers the pH) and the medium is bedded down. Allow medium to drain.

Step 4.

Option 1.

It can be beneficial to pre-germinate seeds prior to planting in the medium. To do this, place them between moist tissues on a plate. Cover this with an up-turned plate (i.e. seeds must be kept in dark). Check every few days, ensuring that the tissue does not become dry and sprinkle with water as necessary. Once the root or radical becomes exposed, place upright (root pointing downwards) in medium ⅛ inch below the surface.

Option 2.

Sow seeds at a depth equal to 2 ½ times their diameter. Cover the seed with medium and gently tamp down.

Step 5.

Immediately after planting, lightly re-water using water or dilute seedling nutrient (EC ~0.8mS). Continue to water the medium as required, typically every two or three days. Ensure to maintain root and air temperature at 68 to 77°F and relative humidity at 80 per cent. Diligently remove any dead leaves or seedlings as these are an ideal host for fungi.

Note: Some plant varieties (or mediums) may require little or no nutrient until the first few true leaves appear *(Figure 2a)*. Hence, if the success rate is poor, try feeding with just water.

Step 6.

Remove the propagation lid once the first shoot appears *(Figure 2a)*. Continued high humidity and poor ventilation will encourage fungal diseases.

Step 7.

Light is not required during the actual germination process. However, once the first shoot ('plumule') begins to appear the seedlings need good light to begin photosynthesizing and prevent the plumule from becoming spindly or etiolating. Use low intensity lighting for the first few weeks of growth. Preferably use cool white fluorescent lights and position four inches above the plants.

Step 8.

Gradually expose the seedlings to their proposed environment - depending on the plant variety this may take only a few days or many months. As such, begin to gradually increase light intensity and nutrient strength to EC 1.2mS. Ensure these changes are gradual as a sudden change might kill them.

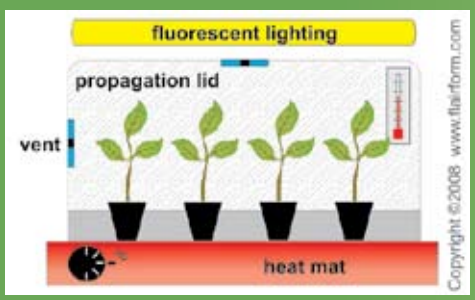


Figure 1: Heat mat, propagation lid and artificial lighting are beneficial for maximizing the success rate of cuttings and seedlings.

Figure 2
Seedings - stages of growth.

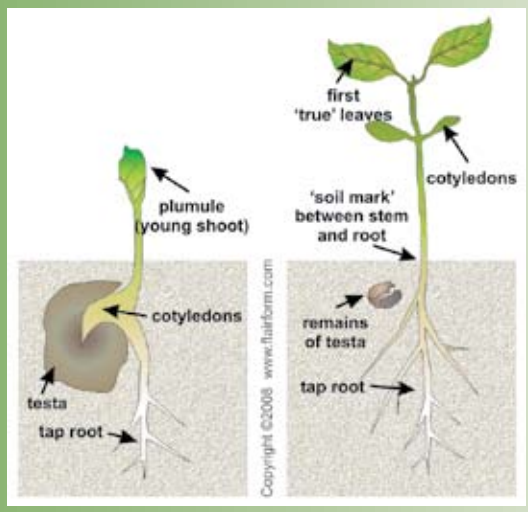


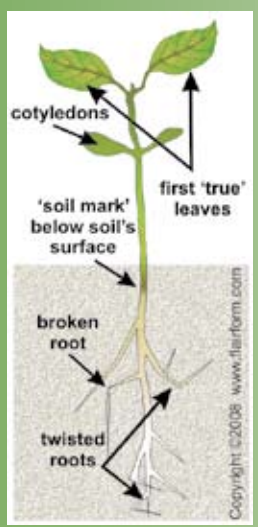
Figure 2a: Initial stage of growth - 'colydens' remain below the soil's surface.

Figure 2b: Later stage of growth - 'colydens' are carried above the soil's surface.

Step 9.

Healthy seedlings grow quickly and it is essential to transplant them into a bigger system (or container) that provides adequate room for further root and shoot growth. Do this only after a minimum of two true leaves have formed *(Figure 2b)*. If the seedling is left in its current position for too long the roots may grow long enough to become tangled.

When transplanting, avoid disturbing roots. Simply plant the entire root block and medium. If it is necessary to remove the seedling from the propagation medium, ensure to be extremely gentle with the roots during the transplanting process:



1. Allow the roots to settle naturally into the new medium. Do not allow the roots to become twisted or bent upwards *(Figure 3)*.
2. Plant the seedling to the same depth as it was before.

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Figure 3: Seedlings are usually due to be transplanted once the first 'true leaves' have formed. When transplanting do not allow the roots to become twisted or bent upwards and plant at the same depth as before.

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