

The Art of Germinating Seeds®

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We take it all for granted that seeds are obtainable from a seed merchant or that they can even be collected by ourselves in gardens and in the field. Very few of us think of how seeds are grown and what it all entails to be able to sow good and viable seeds. It is made easy for us by the seed breeders and seed distributors. We just have to go to the seed merchant and obtain what we require, be it vegetables or flowers, annuals or perennials.

In nature plants have to do their utmost to attract insects, birds, and bees to pollinate the flowers born on the plants. Brightly coloured and heavily scented, they display their flowers, just like our ladies do, to get the pollen onto their styles so that seeds can be produced to ensure survival.

Humankind has interfered with the process of seed production and started producing hybrids by means of a sort of artificial insemination, emasculating the flowers by taking the stamen away and artificially put pollen of other selected plants onto the styles. We are aiming to produce seeds of high quality with better germination, disease resistance, quicker flowering, and uniform heights when flowering. In vegetables the aim is to get a quicker, uniform crop of high quality and good taste.

All this hybridising and breeding costs money and has to be paid for. Hence the high prices of F1 hybrid vegetable and flower seeds. In the days when we only used open-pollinated varieties, where nature did the work, the input cost of seeds to produce a seedling was very low and the urgency to provide controlled germination conditions did not really exist. Just sow thickly enough in an open tray and there would be lots of seedlings to prick out, even if the germination percentage was only 50% and even less, people did not complain. How things have changed, we now have machines sowing into cavity trays and these trays are put in germination chambers to assist with the germination. We just cannot afford to have bad germination anymore.

The main factors, which determine the success of germination, are:

- 1) Soil or growing medium.
- 2) Availability of moisture (water).
- 3) Temperature.
- 4) Light or darkness.
- 5) Lastly but not least, seeds with good germination and viability.

SOIL OR GROWING MEDIA

In our country, South Africa, the commercial growers are not having it too easy as far as soil is concerned. Most seedling mediums are based on composted bark, a product which is readily available. Composted bark is usually mixed with other products such as soil, sand, South African black peat moss, imported peat, as well as coir peat. The problem is that bark is seldom consistent in structure. Every batch of bark is different depending on the areas of production, methods of composting, the pH, and EC quite often differs with every batch. One has to check out every batch before you use the material, unless one uses a very reliable seedling soil supplier who does this for his customers.

In Europe and North America most seedling mixes are based on brown peat which is thousands of years old, consisting of decomposed plant material, safely packed away by layers of ice and soil for centuries. This type of peat is clean, consistent, and very easily adjustable to the correct pH; usually the EC is not a problem.

A definition of a good sowing medium is:

- 1) It must be clean and free from diseases.
- 2) It must have the correct structure with good water-holding capacity and at the same time with excellent air porosity.

In other words it can be made out of any material provided it conforms to the above definition.

AVAILABILITY OF MOISTURE

I specifically do not mention "the availability of water" because too much water will actually inhibit germination and will suffocate the germ.

Germination requires a constant supply of moisture as well as oxygen; hence the importance of a good soil or growing medium.

A growing medium in which seeds are sown may never dry out, especially the top layer in which the seeds are sown. Once a seed has started to germinate and it is subjected to a lack of moisture, the germination process will stop and the seed will die, never to start up again.

It is therefore imperative that the watering of seed trays or seed beds is spot on. In our nurseries we quite often just take any labourer and put a housepipe or watering can in his hand. All he/she has to do is keep the soil wet!

How wrong we are! In my views watering is the most important factor determining failure or success in seed germination. We must train our water "boys" or "girls". They must be taught how to handle a hosepipe and watering can and not wash away precious seeds. They must also know how much water to give each taxon and stage of growth. This is most critical with the cavity tray situation as these contain small amounts of medium, which dry out rapidly. In the case of open trays or seedbeds where large quantities of soil provide a good buffer, watering is less critical although the top layer in which the seed is sown must always remain damp.

TEMPERATURE

Correct germination temperatures are critical for success. These temperatures vary from species to species and in nature you will find that species will only germinate when the temperatures are correct, for example on the west coast of the Cape the spring flowers germinate when the temperatures and the moisture is correct and in a short while burst into bloom. God, our creator, thus creating a colour paradise for a short while, provides the correct moisture and temperatures. In the seedling business we want to provide plants out of season and have to artificially create the correct germination conditions.

These days most seedling growers have installed germination chambers where the temperature (as well as humidity) can be controlled. Actually one requires more than one chamber because of the different temperature and light requirements.

The main germination temperature regions are from 18 to 19°C for cool germinators and then from 24 to 25°C for taxa which prefer higher temperatures.

It is relatively easy to control temperatures inside the chambers but what do we do when the trays are taken out into the open? Are our greenhouses properly

equipped to provide optimum conditions to our very small seedlings? Certain protection and shading must be provided; also control over the temperature and humidity is essential.

LIGHT OR DARKNESS

Certain species require light for proper germination, in other words, these seeds are not to be covered by soil and the trays are to be put into well-lit germination chamber or outside exposed to normal daylight. A very good example is the most popular seedling grown plant in the world, the *Impatiens walleriana*. I have noticed it so often in our germination chamber that the top tray of *Impatiens* germinates in about three days but that the trays below are taking at least 3 or 4 days longer. Also the germination percentage is much higher when the seeds are exposed to light. *Petunia* also responds well to light, so does *Ageratum*.

On the other hand pansies and violas do best in the dark, thus a covering over the seeds after sowing is recommended.

Do we train our people to know all these requirements?

SEEDS WITH GOOD GERMINATION AND ABOVE ALL VIABILITY

With modern technology the seed breeders are constantly improving seed quality. They breed cultivars, which produce a seed with higher viability, and they have new methods of scanning seed lots for better germination. Their cleaning facilities are ultra modern thus cleaning out any malformed, lightweight, and infertile seeds. These days we get *Impatiens* with guaranteed 95%* germination and *Petunia* with a 90%* guarantee (*provided we supply the correct germination conditions).

A long way off from the early days where seed lots with 75% were regarded as normal good lots. These days we would, with a few exceptions, not be happy with a germination of fewer than 80%. The exception is for example *Verbena*, which gives us still a lot of headaches.

THE ART AND FUN OF GERMINATING UNKNOWN SEEDS

I have told you about the commercial growing of seeds such as petunias, pansies, poppies, ageratum, etc. But the real fun and art starts when we try to germinate unknown, open-pollinated, sometimes wild flower seeds.

Here we must do some homework and study the origin of the seed and provide the best conditions possible to make seeds germinate, without the help of fancy germinating chambers and other equipment. It is a challenge to germinate unknown taxa, and make them grow under sometimes unfavourable conditions.

There are many interesting seed catalogues, which offer very interesting taxa of seeds. Take up the challenge and try something different. You have guidelines on general techniques. Look up where a species grows in the wild, study the climatic conditions of that area and try and imitate this when sowing.

Use your mother's fridge when cold is required for germination. If cool growing-on conditions are required, use the shade of a tree or a shrub. Put up a mini tunnel with a piece of plastic if heat is required. Mix your own seedling soil, with materials you have available in you own garden — soil and compost. "Sterilize" the soil mix with Jeyes fluid. Grow organically, where possible without the use of harmful chemicals.

Growing unknown and difficult-to-germinate plants is a challenge and when successful you will think you have mastered the art of germinating seeds. However, do

not think that you will ever become a real master because there will always be taxa which will give you a hard time. It is like a game of golf, and that makes gardening and especially the art of germinating seed so fantastically interesting and it will keep you humble!

Optimising Productivity in a Bedding Plant Nursery in South Africa®

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WHAT IS PRODUCTIVITY AND WHY IS OPTIMISING PRODUCTIVITY IMPORTANT?

Productivity is the ratio of output to input and the key determinant of value. Productivity is closely related to all the factors that influence value, quality, service, price, and so on.

Productivity improvement increases value and the well being of an organisation. The effectiveness of an organisation as a whole determines its level of productivity.

HOW DOES ONE OPTIMISE PRODUCTIVITY?

Optimising productivity means increasing the output value without increasing the resource input.

Management needs to focus on issues such as:

- Goal setting.
- Planning.
- Organising.
- Monitoring.
- Controlling.

Productivity can be improved by:

- Improved manufacturing processes and procedures.
- Increased capital investment to improve manufacturing and delivery procedures.
- Increased labour performance to reduce manufacturing/delivery costs.
- Increased levels of labour participation to assist in the improvement of quality and labour performance.
- More effective research and development to increase output by providing better products and services, and processes.

WHAT ARE WE DOING AT SITTIGS' TO OPTIMISE PRODUCTIVITY?

1) Management issues:

- Regular management meetings.
- Accurate and up to date financial information.
- Accurate production planning and monitoring.