TERRA InfoPaper

Everything you ever wanted to know about potting mixes

100% Natural

Potting mix for your crop

Easy to use

No residues

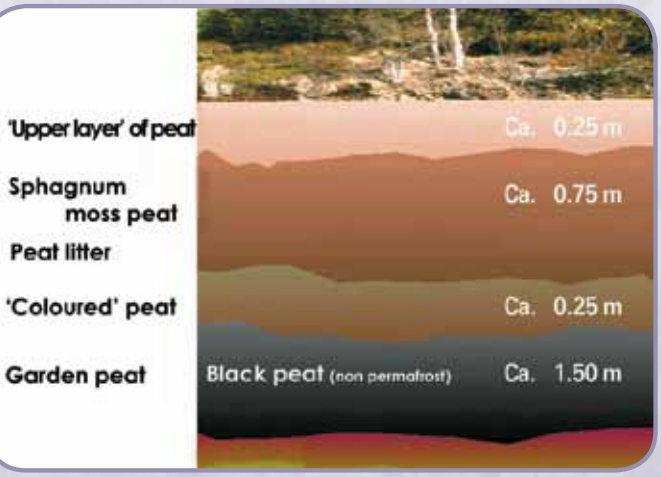
CANNA

Thé solution for growth and bloom

Not all potting mixes are suitable for cultivating short cycle crops!

Not all potting mixes are suitable for cultivating short cycle crops. The three most important factors that should be taken into consideration are structure, pre-fertilising and pH.
Good pre-fertilising and pH are of vital importance for a successful harvest. Potting mix, rockwool and coco are the three most important growing media for fast growing plants. The big advantage that potting mix has is that it is an easy medium to work with.

Potting mix is principally biological and natural which accounts for its great popularity with organic growers. As well as this, when it is used in combination with CANNA nutrients there are almost no residues left in the growing medium which means that it can be used as a improver in an environmentally friendly way without any problems at all. Peat based potting mixes have the reputation for being 'organic' and 'natural' however is not, entirely justified since it often contains elements such as perlite and mineral nutrients that have been processed. Perlite is an inorganic material produced by an industrial process.



History

Approximately 12,000 years BC, the glacial tongues from the last ice age retreated northwards, they left a barren, sandy terrain behind. The first vegetation developed, died off and formed the first thin layer of peat, and this can still be found in what is known as the 'dark' layer.

A long formative period interrupted by short ice ages around 6,000 and 3,000 BC followed during which the black peat layer formed. This marked the beginning of a new formative period during which the white peat layer was able to form. The intermediate layer between the white peat and the black peat is called 'grey' peat. The growth or 'upper' layer forms the profile's top layer.

A lot of knowledge available

Peat is the basis for any good potting mix. Peat mainly comes from areas in which the rainwater has a low mineral content and therefore contains few nutrients. Because of this it is necessary to add all the nutrients that are needed for growth to the potting mix. This can be achieved by using specially prepared potting mix nutrients or biological ingredients such as algae granulate, blood meal, fish emulsion, dried cow manure, horn meal, bone meal and worm casts. Because peat can also take up trace elements, in particular copper, it is important that these should also be added. The amount of trace elements that the peat absorbs depends on its type, sphagnum moss absorbs less than garden peat for example. Most potting mixes that are available in the shops already contain nutrients and a healthy level of acidity. This provides a stable root environment and reduces the chance of problems with nutrition. The big advantage that potting mix has is that it is an easy medium to work with. Another reason that makes many people choose potting mix is that, in comparison with rockwool and coco, for example, there is a tradition of using this medium and more knowledge and experience is available.

Structure of potting mix

The structure of potting mix determines how much water and air are available to the roots. Air is important for the roots' oxygen supply and for the micro-organisms in the root environment. Roots need oxygen to grow, maintain the root system and the intake of water and nutrients. For fast growing plants, the provision of a good supply of air is of vital importance for obtaining a good final result. A shortage of air in the early stages of cultivation leads to a poorly developed root system, which hampers growth resulting in a smaller yield. In order to ensure that the root environment has sufficient air it is necessary for oxygen to be taken from the air in the growing room, which happens, by diffusion.
The structure of the potting mix that has to be prepared is principally dependent on the quality of the raw materials in it. In order to get good potting mix it is necessary to start with virgin peat that has stable structural characteristics.

Vertically cut or shaved peat?

Two different methods can be used to exploit peat deposits: the cheapest but least efficient method consists of "shaving off" the top layer of peat. The disadvantage of this technique is that the structure becomes less coarse which has an undesirable effect on the air/water relationship. The second method consists of cutting the peat vertically. This is the most well known method from times gone by. The peat blocks that were previously used for fuel for cooking and heating houses were cut in this way. This is an expensive way of extracting peat. When peat is cut into blocks it has to be turned by hand to dry out. The coarser that peat is the better will be the balance between the water and air that it contains and this will ensure that the roots will develop better in the medium, that the plants are healthier and that the tendency of the potting mix to compress will be reduced.

High and low

One of potting mixes main ingredients is peat. This is a centuries old, natural material that is formed from old vegetation. Peat originates from regions where climatic circumstances caused new plant material to form faster than the dead vegetation could rot. Slowly but surely this process has built up a layer of organic material that could become several metres deep.
Two different types of peat can be differentiated: high peat and low peat. Low peat is formed in regions where groundwater levels are high and there are plenty of nutrients. Low peat typically contains a high proportion of rotten material and can have high levels of silt; sand and harmful salts which make it an unsuitable basis for good potting mix. High peat is formed under the influence of rainwater in low nutrient regions and its principal ingredient is sphagnum moss. This is a small plant that dies off from below while continuing to grow above on its own remains. The remains of other plants can also be found, cotton grass for example.

Sphagnum moss

Sphagnum moss is particularly suitable for use as a growing substrate because it is natural, light, clean and easy to work with. It has a low nutritional content; a pH that ranges from 3.5 to 4.5 and it has good water retention properties (up to 20 times its own weight). The profile of the high peat in the flat peat region in the Northwest of Germany contains different layers that have been formed in different periods.

Different types of high peat!

There are many different types and qualities of high peat available. The characteristics of peat depend among other things on the depth from which it is extracted, the method of extraction and climatic circumstances in the peat region. Working through the peat profile from the top down we will find the following types:

'Upper layer' of peat

The 'upper layer' is the top feet of the peat profile. According to German peat cutting regulations this layer should be laid on the sandy bed after the white and black peat have been dug out. When this was changed to agricultural land this remaining peat is deeply ploughed into the sandy bed to mix it. At present, permission may well be given to use the 'upper layer' of peat in potting mix. A disadvantage of the 'upper layer' of peat is that it does not always have a homogenous composition.

Sphagnum moss peat

Sphagnum moss peat is young, partially decomposed sphagnum moss that can retain between 10 to 12 times its own weight in water. It has a light colour and is made up almost entirely of different types of sphagnum moss. Because sphagnum moss peat is a relatively young organic material, it breaks down more quickly than older types of peat. Originating in Northern Europe sphagnum moss peat is mainly used in the expensive sorts of potting mix at present.

Garden peat

Garden peat is an important source for the potting mix industry. It is produced by allowing wet black peat to freeze. The quality of the garden peat depends on the extent to which it has been frozen. Freezing black peat improves its water retention qualities and reduces shrinkage. After drying garden peat can take up at least 4 times its own weight in water. Garden peat is dark brown, which is a good indication that it has already reached an advanced stage of decomposition. It consists of very fine particles, which gives it a relatively low air content.

Peat litter

Peat litter or peat dust is extracted from the top layer of the peat profile. The product is light brown and only slightly decomposed. Peat litter can retain at least 8 times its own weight in water. Water uptake and release are slower processes than in sphagnum moss peat. Peat litter is available as fine, normal and coarse the grade depending on the method used for extraction.

The fine grade is extracted horizontally with the peat being cut out layer by layer and then dried and harvested. This is easily the cheapest method. In order to produce a larger coarse grade, the more expensive vertical pitch method of extraction has to be used.

Black peat (non permafrost)

Non permafrost black peat, which is also known as old peat, champ peat or casing soil peat, is not suitable for potting mix because it shrinks a lot when it dries and thereafter has low water retention levels. If it is thoroughly dried it becomes very hard peat (pressed peat) that can be used as fuel.

'Coloured' peat

'Coloured' peat is extracted from the layer between the white and black peat layers. This layer has decomposed further than the white layer and its colour lies between the white and black peat. 'Coloured' peat can retain less water than peat litter and sphagnum moss peat.

CANNA TERRA Nutrients

Since they were launched, Terra Vega and Terra Flores have become the most used nutrients worldwide for cultivating short cycle and fast growing plants in potting mix. CANNA TERRA's composition has been adjusted to suit these type of plants needs. Terra Vega and Terra Flores contain all the nutrients needed in a form that can be absorbed directly ensuring that optimal intake is guaranteed from the start of cultivation. When the TERRA nutrients were in development considerable attention was given to the interactive processes that exist between the feeding and the growing medium and because of this you should have no worries about the quality of CANNA nutrients throughout the entire process of cultivation.

CANNA Terra Vega

The development of vital, young side shoots and good root development is characterised by healthy, fast growth. This is the basis that's needed for achieving top results. Terra Vega contains all the nutritional elements that the plants need during this phase. Terra Vega works universal and is suitable for use with all types of potting mixes.

CANNA Terra Flores

It is certainly desirable that all the nutritional elements that the plants need should be directly available in the correct proportions during their exuberant flowering phase. It is for this reason that Terra Flores contains all the nutritional elements that the plants need during the flowering phase. The plants' need for nitrogen reduces just as their need for potassium and phosphate greatly increases during the growing phase. In order to accommodate these changing circumstances Terra Flores contains the correct quantities of all the trace elements that are needed to meet the plants' requirements and so to ensure superb flowering.

CANNA TERRA potting mixes

Do you want the best of the best? Then you should choose CANNA's potting mixes as well as their TERRA nutrients. Three mixes are available: CANNA Terra Seedmix for seeds and cuttings, CANNA Terra Professional for the new grower and CANNA Professional Plus for the biggest harvests possible. These mixes are absolutely ideal as far as their structure and the pre-fertilisation, are concerned. Using them in combination with specially developed nutrients such as Terra Vega and Terra Flores will give the best results.

Terra Seedmix

Germination Revolution.
Only the best is good enough to germinate seeds. That's why CANNA developed a special seedmix.
CANNA Terra Seedmix has a homogeneous structure, which ensures it can hold large quantities of water. This means seeds will get the chance to germinate in the most ideal circumstances. The soil in CANNA Terra Seedmix has been mixed with very clean coco coir to ensure that germinated seeds can develop faster then on any other growing substrate. That's why CANNA Terra Seedmix is excellent for rooting cuttings!

Terra Professional

CANNA Terra Professional is an enriched growing medium that conforms to the strictest RHP standards. It distinguishes itself from other substrates through its use of first class raw materials, its fine structure and its purity. CANNA Terra Professional is an organic product that has a homogeneous structure, is 100% natural and is free from damaging viruses and potting mix diseases. It has a complex water/air system, which creates the ideal conditions for almost every method of cultivation, and after use it makes an excellent potting mix improver.

Terra Professional Plus

CANNA Terra Professional Plus is made up from 100% organic raw materials each of which is of the highest possible quality. Top quality white peat is one of the first class ingredients used and tree bark, which is used as a substitute for perlite, is also added. CANNA Terra Professional Plus contains trace elements and chelates, which ensure that the plants are protected as they grow. CANNA Terra Professional Plus is enriched with special feeding mixes that contain all the elements that the plants need for their first week so no extra feeding has to be given. Out of the bag CANNA Terra Professional Plus are preset at an EC of ±1.3 and a pH ±5.8.) As well as this CANNA Terra Professional Plus accelerates growth and root development putting the plants in top condition and enabling them to resist disease and attacks from pests.

CANNA
The solution for growth and bloom

Prevent damage!

Peat is naturally quite acidic (pH 3.5-4.5) so lime must be added to raise the pH. Off the shelf potting soil always contains lime. The amount of lime that must be added depends on the composition of the peat. For example, garden peat always needs more lime than peat litter to raise the pH. On average potting soil needs 5 – 6 kg of lime per m^3 (1,000 litre) to increase the pH. After adding the lime it will take a few weeks for the pH to stabilise. If no lime is added, or not enough, high concentrations of elements such as manganese, iron and phosphate will be absorbed and this may lead to signs of over feeding being seen. The concentration of aluminium can rise to toxic levels for the plant, causing root thickening, which will restrict food intake. If your potting soil's pH is too low the addition of 20 grammes of lime (Dolocal) per 10 litres will raise the pH one point. The correct degree of acidity for potting soil is between 5.8 and 6.2. Values higher than 6.2 can lead to phosphate being deposited in the form of calcium phosphate making it less accessible to the plant.

What is the RHP?

Potting mixes that are available on the market can vary greatly in quality from one to the other. In the Netherlands the RHP foundation focuses on quality maintenance and control of peat products, soil components, potting mixes and substrates such as coco, perlite, pumice stone etc. Substrates and substrate components that have the RHP quality mark are safe mixes (few weeds and free of disease) but they do not offer any guarantee of a successful harvest. In fact, the RHP quality mark does not say anything about the precise structure and chemical make up of the potting soil. Potting mixes can vary a lot in price. Potting mixes based on garden peat are generally cheaper than mixes based on airy white peat, and it is also true to say that the coarser grades of white peat are many times more expensive than the fine grades.

Reliable measuring method

The most reliable way of measuring the nutrients present in the potting mix is to use the 1:1.5 extraction method, which can be used to determine the root environment's EC and pH. The EC and the pH of the drainage water will normally vary because potting mix is capable of holding back a number of elements or even refusing them. It is best to carry out a 1:1.5 analysis after three to five weeks. The easiest way to make this analysis is to follow the plan given below step by step:

1. Take a potting mix sample. This can be done with a ground drill or a spoon. Take the potting mix from a large number of different places to ensure that the sample is representative.
2. Put the sample in a bowl and determine if it is moist enough. This is done by squeezing some potting mix in your hand; if moisture comes out it is OK. To increase the sample's moisture content add distilled water. Mix the potting mix well after adding water.
3. Take a 250ml measuring jug and fill it with 150ml of distilled water. Add potting mix to bring it to 250ml, mix it well and leave it for at least 2 hours.
4. Mix it well once again and measure the pH. Filter the mixture that you now have and measure the EC. Target values for the EC are between 1.1 and 1.3 and for the pH between 5.8 and 6.2.

Better results

As a result of previous research into the proportional balance of water and air in CANNA substrates, CANNA has set up practical tests using potting mixes based on high quality porous basic materials. These mixes were compared with the popular potting mixes containing perlite that are available on the market. In different growing rooms half of the plants were set in a potting soil mix containing perlite and the other half was set in the airier mix. Climate and feeding was the same for all the plants. After three weeks clear differences could be seen. The plants on the airy mix showed significantly better growth, on average 5cm more development in the length and they had more robust stems. There were fewer limp hanging leaves during the night indicating that the plant was also receiving sufficient water in the dark, a prerequisite for optimal growth and flowering. The results of these tests show the importance of making abundant air available to the root environment.

A good start is half the work!

A good start is essential in achieving a good harvest. Take extra care to ensure that you buy seeds that are suitable for the type of cultivation you have chosen: indoors or outdoors. Germinating your seeds can best be done by following the plan given below step by step.

1. Place the seeds in a glass of water. Renew the water every day if necessary. A seed is viable when it opens and a small root emerges.
2. Do not allow the roots to become too long since they can be easily broken off during planting which will make it impossible for a plant to form.
3. Remove the germinated seeds from the water and plant them carefully in individual pots in a hole that is about two to three centimetres deep and carefully cover them with a little potting mix. After a week or so the first plants will emerge from the ground and if everything goes all right 80-90% will actually produce plants.
4. Plant the small plants in a good quality potting mix such as CANNA Terra Professional or CANNA Terra Professional Plus. Press the potting mix lightly. Airiness is very important for the development of a good root system.
5. Never sow too deep since this will prevent the germinated seed from emerging from the ground and the plants will not develop. Generally speaking a sowing depth of around 1.5 cm is sufficient.
6. In order to stimulate better root growth and to assist the plants in establishing themselves it is recommended that you give RHIZOTONIC 2 or 3 times during the first week.
7. Give your plants CANNA Terra Vega in the growing phase and change to CANNA Terra Flores in the flowering phase. The flowering phase begins when the first flowers appear.

100% vegetable

RHIZOTONIC is a powerful, vegetable based root stimulator. It causes extra root growth and in this way helps the plants to become established more quickly. For this reason RHIZOTONIC is an ideal product for cuttings and plants that have to be potted or for plants that have developed badly after being in a state of shock. As well as this RHIZOTONIC contains a wide variety of trace elements that are advantageous for the plants. The first 2 or 3 times that you use RHIZOTONIC you should add it to the feeding water in the ratio of 1:250 or spray it on the leaves.

Prevent stress!

In a root system that is functioning properly some roots will die off and new ones will form. The dead roots form an ideal food source for pathogens. Once pathogenic fungi have multiplied in the dead root material they form a threat to the healthy roots, which can be easily attacked causing a sharp decline in the roots functioning. As a result of this the entire plant will be put in a stress situation and growth will be stunted. CANNAZYM can best be used to prevent this. The enzymes in CANNAZYM ensure that dead root material is quickly converted into minerals and sugars. This is important because these elements form an important nutritional source for the plants and the soil environment. Also, rotting produces poisonous materials, which will be counteracted, and the chance of infection arising caused by pathogenic fungi is reduced considerably. As well as this, a number of easily absorbable vitamins have been added to CANNAZYM, which will stimulate the plants to produce new roots. For these reasons CANNAZYM should be continually added to the feeding solution from the second week of cultivation diluted at the ratio of 1:400.

Higher yields

PK 13/14 is a pure, high value mix of phosphorus and potassium that is given frequently during flowering. It is given to the plants along with the feeding 3 to 4 weeks prior to harvesting. During flowering the plants need extra phosphate (P) and potassium (K) and giving PK 13/14 will satisfy this need. PK 13/14 dissolves very easily and is consequently immediately available to the plants. To get the most out of this product use it along side CANNABOOST. This truly optimize your results!

Growing Tips

Very high EC values increase the chance of burning particularly for plants that are directly under the lamp. In order to reduce the risk of burning the potting soil can be rinsed with CANNAZYM (pH 5.8 acidify with CANNA pH- Growth)

Do you have problems with potting mix that becomes compressed and then absorbs water with difficulty? This can be easily overcome by mixing COCO with the potting mix, which will ensure that it can absorb water easily again.

To ensure good root development the feeding water must have a temperature that lies between 20 - 25°C. At temperatures lower than 15°C the roots' capacity to absorb decreases quickly, which will result in a smaller harvest. If the feeding solution is mixed using cold water then the pH will rise when the water is heated. In this instance, a high pH can be avoided by setting the pH a little lower in the beginning.

Change from CANNA Terra Vega to CANNA Terra Flores when the flowers begin to develop. Normally speaking this will be after the plants have been lit for 12 hours per day, for between 1 and 3 weeks.

Never dilute more CANNAZYM than will be used within 10 days.

Take your time diluting and adjusting your nutrient tank! This is essential for the growth, flowering and development of the plants and will yield the best results.

Foliar feeding with RHIZOTONIC is most efficient when this is carried out around the time that the lights go out when cultivating inside, or just before sunset when cultivating outside.

CANNAZYM can be given continually and this is most easily achieved by mixing it with the feeding in the proportion of 2,5 ml/litre; 1:400, or it can be given once a week in the proportion of 10 ml/litre; 1:100.

A further possibility is to add the CANNAZYM to the nutrient tank when it is just 25% full at 10 ml/litre; 1:100. CANNAZYM also makes the potting mix more suitable for reuse.

Do you want to raise or lower the pH by using pH+ or pH-? Then dilute a small amount of pH+ or pH- in a cup to make judging the dosage easier. Try to get the pH right the first time. Using a lot of pH+ or pH- one after the other will disrupt the concentration of bicarbonate in the water and affect its buffering capacities negatively.

The more nutrients that have been added to the potting mix in advance, the more difficult it will be for cuttings to take. This problem can be avoided by using CANNA potting mixes.

Prevent the accumulation of phosphate and potassium by using PK 13/14 no more than one week.

Growing Guide

CANNA TERRA

	Cultivation period in weeks	Light / Day in hours	Terra Vega ml/ 10 litres	Terra Flores ml/ 10 litres	RHIZOTONIC ml/ 10 litres	CANNAZYM ml/ 10 litres	CANNABOOST ml/ 10 litres	PK 13/14 ml/ 10 litres	EC + in mS/cm	EC Total in mS/cm
VEGETATIVE PHASE										
GROWTH — **Start / rooting (3 –5 days)** - Make the substrate wet	<1	18	15-35	-	40	-	-	-	0.4-0.8	0.8-1.2
GROWTH — **Vegetative phase I** Plant develops in volume	0-3[1]	18	30-50	-	20	25	-	-	0.7-1.1	1.1-1.5
FLOWERING — **Vegetative phase II** - Up to growth stagnation after fructification or appearance of the formation of flowers	2-4[2]	12	35-55	-	20	25	20[5]	-	0.9-1.3	1.3-1.7
GENERATIVE PHASE										
FLOWERING — **Generative Period I** - Flowers or fruits develop in length. Growth in height achieved	2-3	12	-	50-70	5	25	20-40	-	1.2-1.6	1.6-2.0
FLOWERING — **Generative period II** - Development of the volume (breadth) of flowers or fruit	1	12	-	50-70	5	25	20-40	15	1.5-1.9	1.9-2.3
FLOWERING — **Generative Period III** - Development of the mass (weight) of flowers or fruit	2-3	12	-	40-60	5	25	20-40	-	1.0-1.4	1.4-1.8
FLOWERING — **Generative Period IV** - Flowers or fruit ripening process	1-2	10-12[3]	-	-	-	25-50[4]	20-40	-	0.0	0.4

CANNA, a source of information

If this leaflet has been of use to you, you may also find the other sources of information interesting: CANNA General Brochure and the CANNA product leaflets for CANNA TERRA, RHIZOTONIC, CANNAZYM, PK 13/14 and CANNABOOST. Also available online.