CANNAtalk®
MAGAZINE FOR SERIOUS GROWERS
ISSUE 11 2010

## COCO
Ins and outs

## CANNA Calendar
The making of

## MINI TOMATO
Mini-Grow

And more:

# HQ Talk:

Only a couple of weeks till the end of the year. The streets are nicely decorated with many lights and shops are open longer for you to do your Christmas shopping. Millions of pounds are spent on presents for the ones we love. In the Netherlands Christmas is becoming a real hype. But you are probably not aware of the fact that here in the Netherlands Sinterklaas is also a big happening. Every year at the beginning of December a good holy man arrives from Spain and gives all the children in the country presents. So here we can choose between these two celebrations. Most of the time people with children celebrate Sinterklaas and people without choose for Christmas.

Speaking about making decisions. In the last edition of the CANNAtalk we told you that you would be able to read an article about tattoos. But I think we have something much nicer for you. We will give you an exclusive look at the making of the CANNA Calendar 2011. The tattoo article will be published in a later issue. Further in the magazine you can find research articles on coco, a mini grow section on tomatoes, a grower's talk and of course a tip. New this issue is the puzzle. To keep you sharp we have changed the puzzle. Have a close look and hopefully you will be able to find the differences.
Rest me only one thing to say....

Happy holidays!

Karin

# Contents

# What does ‘QUALITY COCO MEDIUM’ REALLY MEAN?

“The effects of steam sterilization and other production processes on coco medium”

Figure 1: Coco drying on location

**THERE ARE VERY MANY DIFFERENT TYPES OF COCO MEDIUM AVAILABLE ON THE MARKET TODAY, FROM MANY DIFFERENT MANUFACTURERS, AND THAT NUMBER IS CONSTANTLY GROWING. OF COURSE, ALL OF THEM CLAIM QUALITY, BUT WHAT CONSTITUTES A ‘QUALITY’ COCO MEDIUM PRODUCT?**

By Geary Coogler, CANNA Research

For any mediums used in container or bed gardening, the primary concern is consistency, from batch to batch, and from year to year. The medium must be free from weed seeds and pathogens that may stop the grower from achieving the best possible results. It also should have a stable physical structure and chemical composition.

There is no difference between coco and any other medium in this regard, but achieving quality coco is a whole different issue.
Every medium has its own characteristics and qualities, and these need to be borne in mind when using them. Peat, for example, has a naturally low pH which inhibits most pathogen activity; but this changes when it is limed. Once the pH is raised, any micro-organisms in the peat, such as fungal spores, are primed for growth. Mineral soils – such as sand, clay or humus – usually contain pathogens and weed seeds. This means that they must be sterilized before use, either chemically (never the best option) or thermally (the easier and better option). Other items such as coco or rice hulls (the by-products of other industries) must be broken down first to make them suitable for use as a growing medium (in order for them to fulfil the requirements of any medium: water retention, adaptable environment in the root zone, and plant support). So bearing in mind all these different requirements, how do we make a quality coco medium? The answer is from the moment the nut drops from the tree.

## Benchmarks

The benchmarks for quality coco medium are: 1. physical structure; 2. chemical stability; 3. free of weed seeds and pathogens; and 4. consistency. Coco for the market is basically a mixture of three main components, which are differentiated according to their size – namely, chips, fibres, and grit (also dust or coco peat). The size of each particle, and its functions, will determine the aggregate structure of the medium. By ‘structure’, we not only mean the size of the particles, but also the amount and size of the pores that result in the mixture. There is an ideal structure that will produce the best conditions for any given plant. Where there are many small aggregates (pieces or particles), this leads to lots of small pores, so the soil will hold a lot of water but retain less air. Conversely, if the pores are large, there will be a lot of air, but less water. Coco grit is actually made up of many little ‘sponges’ that hold a lot of water but no air. Using different size fractions of grit enables large pore spaces between grit particles. Adding fibres can also have an impact in the same way.
All organic materials will decompose, and of course this includes coco husks. The husks, which are the source of coco medium, are soaked in water for a long time and then the big and thicker fibres are removed. The smaller or broken fibres are left over, along with lots of grit or dust. This mixture is then left to decompose for a certain amount of time until it becomes usable. Coconut plants are able to use extremely salty water. To do this, the salt level inside the plant has to be greater than the salt level

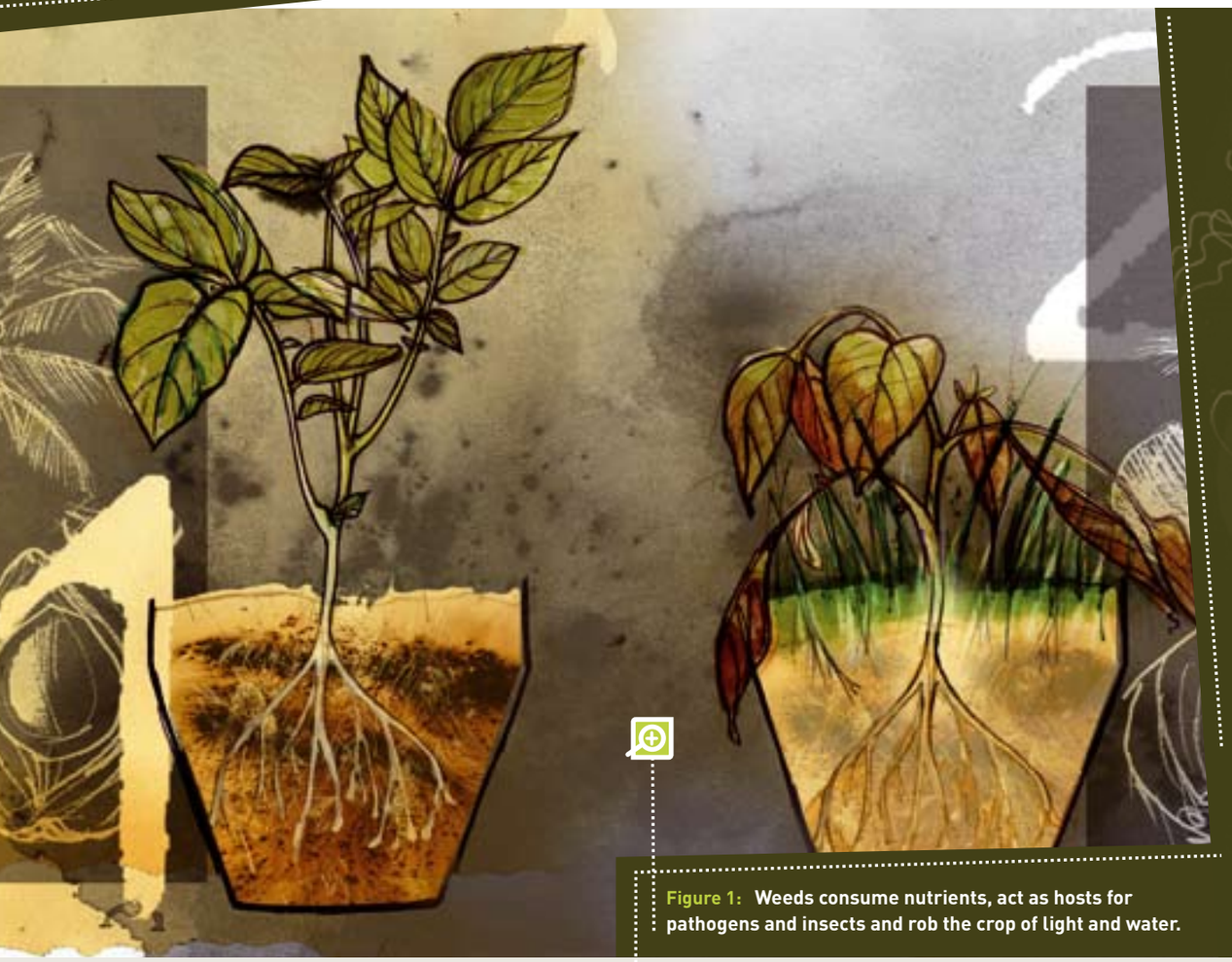

Figure 1: **Weeds consume nutrients, act as hosts for pathogens and insects and rob the crop of light and water.**

of the salty water, so that the water will be taken up by the plant cells through osmosis. However, high salt levels inside cells would kill the cell, so the plant concentrates the salts in the spaces between cells. As the coco plant matter decomposes, these salts are released. The amount of salts released is greatest when the material is freshest and slows with decomposition; however, decomposition should not be allowed to proceed too far because as the particles get smaller, they may become too small to be of use. So the coco material must be aged to the right point, then washed with fresh water to remove the very high salt levels. Potassium is one of the salts that is released in the greatest quantity, so this needs to be adjusted using a component that will also rebalance the ratio of potassium to other elements, such as calcium, so that those other elements will be plant-available too.

## Buffering

In order to permanently stabilize both the chemistry of the medium and its pH, an adjusting component (known as buffering) must be added prior to use. If the coco is to be mixed with peat or soil, this can be done when the initial fertilizer charge is mixed with the medium prior to planting, in order to fix the ratio of nutrients. If the coco is used in its pure form, this is best done before planting in the pure coco. The nutrients used for crop production are supplied in a unique formulation or ratio, which is designed for the chemistry of that coco. This will ensure that the coco medium provides the optimum amount of nutrients. The grower must also remember to allow for some leaching (minimum 20%) when watering and only to water the crops with the nutrient formulation ('constant feed'). This will provide the right conditions for growth, as long as the weeds do not take over.

A weed is any plant that grows where people do not want it to grow. Weeds introduce variables into the growing equations that are not welcome. Weeds consume nutrients, act as hosts for pathogens and insects and rob the crop of light and water. Clean coco medium (or indeed any other medium) should never be a source of different plant species, nor should it be a source of pathogens. However, when coco is thrown into giant piles, left to rot for a time and then packaged for use, this is a real opportunity for weeds and pathogens. Fungal spores are not affected by the use of gas and heat alone is not economically feasible, so there are only two ways to clean coco for use in growing: one is to sterilize the material by steaming it before packaging, and the other is simply to ensure that the decomposing coco is not exposed to these issues and remains free of pathogens to start with. Steam sterilizing is much cheaper but, for coco, is not the optimum method.

## Steam sterilizing

Several things occur in coco when steam is used to sterilize the medium. The structure of the coco changes, the fibres become shorter and as a result it retains much more water, which is not a good thing. The coco particles also become smaller and softer leading to a decrease in larger pore space even with the addition of a separate component such as perlite. We can picture this like dried noodles: when they are dry, they retain their shape and there is space between them. After 'steaming' or cooking, they stick to each other even when you put a fork between them. There is almost no space left for air.

But the particles are not the only thing to be damaged by this 'cooking process'. Any existing plant-available nitrates (NO3-) are converted into plant toxic nitrites (NO2-). Nitrites can also be taken up by the plant and consumed, but they are known carcinogens and can cause a condition in animals which changes the chemistry of the blood, rendering it unable to carry oxygen. Steaming also impacts on the availability of many micro-nutrients, particularly manganese, which sometimes becomes available to the plant at toxic levels. Steam sterilizing, dry heating, fumigation, or chemical drenches (which also leave behind a chemical residue) all have one very negative effect on coco: they totally clean the medium.


Figure 2: **All the microbes in steam sterilized coco are destroyed and have to re-colonize from the top down as food substrates become available and move down the soil profile. Un-steamed coco will have active colonies at all levels and food substrate availability at all those levels.**

Cleaning the medium disrupts the natural ecological balance of the decomposing medium. Healthy medium has the correct concentrations of micro-life to continue breaking down organic matter in the right way while not affecting the nutrients applied for the plant. If all micro-life has been killed, on the other hand, general decomposers take over, stripping the medium of all its nutrients and out-competing the plants for the available nutrients. Maintaining a balance is critical to the health of the medium and the crop. Simply dumping a heterogeneous mixture of 'beneficial' organisms into the medium does not work. One organism begins to break down fresh organic matter a little and then excretes the substrate for the next organism, a process which continues until the organic component changes completely. Unless a second-step food source is available from the activity of the first organism, the second-step organism will starve and die. General decomposers use up most of the nutrient pool in the medium. Of course, the plants also derive their sustenance from these pools but they are much slower to take up nutrients. The decomposers use up the nutrients before the plants get a chance. The best approach is therefore to control the crop from the beginning and prevent these types of problems before they happen. Sterilized coco medium is best avoided.

Finally, consistency is critical to any grower. It ensures that there are no surprises for the grower when they start another crop. Any bag of coco medium should be the same as any other bag, at any time, now or in five years time. It should be the right age, have a known chemical and structural composition, and be free from unwanted pests and pathogens.

Coco medium is fairly easy to find, but quality coco medium is rather hard to find. Look for a coco medium that has not been sterilized (particularly with steam) and has been protected since it came off the tree. Find a coco medium that has stable structure and chemical properties because it has been treated appropriately. Ensure that the medium is free from unwanted pests and pathogens but has not been destroyed in the process. Most importantly, make sure it is consistent; the art of growing should not be a guessing game. •

# Questions & Answers

We receive a lot of questions from growers and even CANNAtalk readers through the website **www.canna-uk.com** requesting our help in resolving issues they are experiencing in growing their crops. As always, our R&D department is more than willing to answer them!

## Question

I was reading an article in CANNATALK no. 4 called THE INFLUENCE OF COLORS ON PLANTS - by: D. Kroeze MSc, CANNA Research. In the article it says: "The non-flowering period can be extended by exposing the plant to RED-containing light during the dark period." But I am currently reading another book by a author named Sam R. ZwcBgei, and his book says the opposite... His book says: "RED light during the dark period will encourage flowering... And that it is FAR-RED light that actually inhibits flowering." Is it a typo in CANNATALK? Or is the book I'm reading incorrect? Thank you for your time and any information you can find for me!

## Answer

Hello, well there is actually a little more involved than just the red light, since blue regulates the Circadian rhythms which also have to be right. The reality is that the plant wants to flower and is only "held back" by the saturation of the far-red phytochrome pigments which converts them into red phytochrome. This saturation then has to be corrected during the dark period with Pr (red) reverting back to Pfr (far red). Pfr is the physiologically active phytochrome. Far red light will change the Pr back to Pfr a little faster. The sequence is as follows. During the day the plant absorbs red light converting the available Pfr to Pr which blocks floral initiation. At night, the Pr slowly converts back to Pfr like grains in an hour glass. Once a certain level of Pfr is achieved, conversions begin to occur. As soon as red light is realized again, the process stops and the Pr begins to accumulate again. The secret is in converting Pr fast enough to Pfr that the plant has time to shift characteristics prior to being stopped again. Research suggests that it may be possible to affect this time with far red light, however, red light and blue light have effects on the overall cycle of the plant and everything must be in line to work. The most effective wavelength of red light is between 620-640 nm (660 maximum), whereas far red is most effective at 700- 725 nm maximum. Hope this answers your question.

## Question

I was told by the store where I purchase my CANNA products that I should not use the CANNAZYM product for the last two weeks in my garden, because I am growing outside in large beds. They explained that this dosage was designed more for container soil growing not really for field production since the soil outside is influenced by weather conditions, has complete drainage and worms, and cover crops are grown annually. They said too much enzyme would affect taste and colour if used during the "flush" cycle the last 1-2 weeks. I used the grow calculator with tank size and it says to use "CANNAZYM" during that period. One other plant store suggested I use it at half strength. I am also breeding worms in these beds and add micro-biologicals (worm/compost teas) as well as mycorrhiza so there is quite a bit of enzyme activity in the soil already. I am primarily concerned with soil health and quality of crop. Thanks for any help.

## Answer

Hello, CANNAZYM will not affect anything except cellulose, inside or out, containers or beds. These enzymes are the same ones found in natural conditions. The one thing we have noted is that the better levels of enzymes are found in less cultivated soils. Levels found are always higher under stable, older stands of forest and much less (sometimes almost none at all) in continuously cultivated farmland. What does this mean? Cultivation causes changes in the addition of fresh material for decomposition meaning that is available food for life forms. There is also a loss of physical characteristics that affect types as well as other pressures from different life forms. What does this mean? Well, if I were rotating my bed between crops or even yearly, I would continue the CANNAZYM. If the beds were left as they were, then I would not worry so much about using it. CANNAZYM is designed more for the sterile conditions of modern agriculture, containers or beds. It is made for cellulose only, and cellulose is not attacked directly except by some specific organisms. Mycorrhizal fungi do not do this. In fact few things do, and most of those are specific so they only take certain steps in the process of cellulose breakdown. Hope all this helps you decide on what to do.

## Question

I am using the CANNA COCO Gr grow block and am wondering why my reservoir is contaminated with a darker colour after only a couple of minutes of watering. Did I not flush the buffering agent out enough? Or is that just the way this particular system works, because I can't get an accurate PH with my test kit. I know I need a meter, but I can't afford one yet. Also, what is the best watering schedule for my medium-sized plants, in one grow block? How often do they need light and darkness? I am using a 66 gal per hour pump?

## Answer

Hello, the reservoir is a darker colour because you are returning the drain water to the tank and the organic acids and many other products are washing through and into the tank. With COGr and all COCO, we recommend running to waste, which means the solution should not be returned to the tank. Yes, this will affect the tank. The new COGr material is re-hydrated with buffer solution and allowed to sit for 24 hours, then drained and planted, and fertilizer solution is applied to run off. The slab or container is allowed to dry down to about 50% of what it holds before any other solution is applied. This is true at every watering. The solution is applied long enough to get about a 20% drain which goes down the drain. As the crop grows, the interval between water applications will shorten, however it is not unusual that new plantings go up to three days between watering. Never apply fresh water to the COCO or COGr medium as it will erase the buffer and cause problems. Photo-period times for light-on/light-off are dependent entirely on what crop you grow and your interior garden centre can give you the best advice about this.

## Question

Do you make a product for growing orchids?
Thank you, Ronald

## Answer

Yes, both the CANNA COCO line and the CANNA TERRA line work well. When using the medium, make sure to add anywhere from 30% to 50% clay pebbles to the mixes. Stay away from the RHIZOTONIC after the first week or so.

## Question

Hello, I was just wondering how many ml per gallon of RHIZOTONIC I should use when foliar feeding? Should I adjust the pH? And if so, what pH is best? I also would like to know which weeks are best to foliar feed and how often. I have three weeks of veg/growth and an eight-week flowering/bloom time. I would also like to know the same information for CANNABOOST Accelerator if it is not too much trouble... Thanks, I always appreciate your expert advice. -Jan B.

## Answer

Hi there Jan, the answer is approximately 1 ml/1 liter on the RHIZOTONIC, but can vary up or down based on the sensitivity of the plant to trans-laminar movement. If necessary you can go up, but the upper limit will be about half of the normal amount used for root feeding. This is a grower's choice. I would not apply it to flowers as a foliar for many reasons. You can adjust the pH but gently and aim for around pH7 or a little higher. You only have to be close. After about the second week after flower initiation I would not use it as a foliar anymore, but you should use it through the roots from the beginning. Apply about three times per week or every other day. CANNABOOST is a bit different; use it at the low rate, 20 ml/10 liter applied every other day. It has low EC and will not affect the plant excessively. Also, only adjust the pH if it is way out of bounds but if between 5.2 and 6.9 don't worry about it. Apply from the point of photoperiod change to about one week prior to harvest. If you begin to see residues – which you might – syringe the leaves with water to the point of dripping prior to re-applying the products. Only wet the leaves just before the lights come on when the room temp is cooler and there is enough time for the leaves to dry before dark. Avoid spraying flowers and fruit directly as this may change taste and encourage diseases to develop.

## Question

What exactly is Cal-Mag used for? We have got CANNA Hydro Vega A, and CANNA Hydro Vega B, CANNAZYM and RHIZOTONIC. Will we need Cal-mag?

## Answer

Hello, Cal-Mag is just that, a simple complex of calcium and magnesium. It is used primarily to supplement these two ions. These two ions are the primary ingredients in making water hard or soft. They also provide longer-term pH controls where we adjust tank pH with temporary controls like phosphoric acid as a down and potassium hydroxide as a pH up. When nutrients are matched to the system and Ca is allowed for, seldom does this become an issue. If you have soft water or RO water then you need make sure you use CANNA Hydro Soft Water version. If your water is hard then the HYDRO Hard Water version. You have the hard water version of Hydro so if your water is soft then you will have to add Cal-Mag to bring the tank water EC up to about 0.2 mS or somewhere between 120 ppm and 160 ppm before adding the nutrients. The hard water version has less Ca and Mg in it than the soft water version. If you use RO water then mix back tap water until these levels are reached before proceeding. Something else to consider: if you are using the HYDRO in bulk grade type mixes of peat and perlite but little fertility, you may experience a problem with calcium levels about 4 weeks after starting. This is because the lime used for bringing the pH of the peat up to a range you can grow in, runs out about then. Lime contains calcium and is the plant's usual source of calcium. Keep an eye on it, because you may need the Cal-Mag around that time. If it is a better mix like our CANNA Terra Professional Plus or a decent medium like Fox Farm, then this will be much less of an issue. Finally, do not forget to switch to Hydro Flores A and B when flowering starts. An InfoPaper is available for download online which is really helpful in understanding this process and includes tips addressing particular issues seen over the years with HYDRO.

# Mini TOMATO

**This is already the fourth article in this Mini Grow-series and this time, we put tomatoes in the spotlight. A lot of people love tomatoes, but not all tomato-lovers have tried growing tomatoes themselves!!**
**The tomato plant is a herb-like fruiting vegetable which can be grown as an annual plant. It is best known as a climbing plant, although the plant was originally a creeper. Tomatoes belong to the nightshade family or Solanaceae, just like cucumbers, peppers and potatoes.**

## Origin

The tomato originates from the Andes mountains in Peru, where they were cultivated as early as 700 B.C. Later, the conquistadores brought them to Europe. They called them 'golden apples' , and that is why in Italy tomatoes are still called pomodori. Because of their red colour and heart shape, tomatoes gained the reputation of being a love stimulant. The French consider them the ideal aphrodisiac, hence the name pommes d'amour. In Germany too, the tomato is known as the Liebesapfel.

## Growing

The space you have available for growing tomatoes will often be the determining factor when deciding which variety to grow. Indoor growing is fairly easy thanks to the range of mini tomato varieties. Here, one mini tomato plant only requires a 10 – 15 cm pot. In vegetable gardens, often several different varieties are grown. This is done so that tomatoes can be harvested and eaten practically all year round. Whether you are growing indoors or outdoors, tomatoes are easy to cultivate and harvest.

In general, tomatoes can be divided into two varieties: determinate (1) and indeterminate (2). Determinate tomato plants grow until they have reached a certain height and then stop growing of their own accord. They form one or more vines, which means they stay more compact. The vines of the indeterminate varieties just continue to grow and grow to fill the available space, and will need support.

Tomato plants love warmth, and they also need a lot of nutrients. The shape of the fruit often varies, as does the colour. There are red tomatoes of course, but also yellow, orange, salmon pink, striped and even green ones (even when ripe!).

When harvesting the tomatoes, please be aware that you should not store them in the fridge! Even after harvesting, they love warmth, so please keep them above 10°C!

## Cooking

Tomatoes do not need to be cooked of course. They are delicious eaten raw. However, you should know that slightly simmered tomatoes contain more lycopene than raw ones. So in fact, tomatoes are better for you eaten cooked than raw!


**Figure 1:** **Determinate tomato plants grow until they have reached a certain height and then stop growing of their own. The vines of the indeterminate varieties just continue to grow and grow to fill the available space, and will need support.**

# DO YOU know?

## Why are tomato stains so hard to shift?

**This is all thanks to lycopene! It is a powerful pigment which gives the tomato its red colour. Recent tomato stains in your clothes, can just be washed off, but when the stains are left before washing, they are harder to remove. You can pretreat the stains with water to which you have added some hydrogen peroxide.**

## Does lycopene decrease the risk of cancer?

**No one disputes the fact that your daily food should be rich in fruit and vegetables. They have a significant preventative effect against diseases like cancer. The results of different epidemiological studies have shown the positive effects of consuming tomatoes in general and the role of lycopene in particular. Lycopene is the carotenoid that makes tomatoes powerful antioxidants.**

## Is lycopene always good?

**Even the most beneficial substance has a limit beyond which it is excessive. An allergy is the most common sign that this limit has been reached.**

## Can you harvest tomatoes from a potato plant?

**Yes, both plants belong to the same family, that of the nightshades (Solanaceae). You can graft a tomato shoot onto a potato plant. However, you will need to remove all other growing tips from the potato plant. The vine of the tomato plant will produce tomatoes and potatoes will grow under the ground.**

**Figure 2:**
**"you can graft a tomato shoot onto a potato plant"**

# What's in a tomato?

## Benefits

Tomatoes have many positive qualities: they are low in calories and rich in various vitamins, and they contain anti-oxidants in the form of lycopene. Lycopene is said to protect against cardio-vascular disease and even cancer. As a tomato paste, lycopene can also delay ageing in cells, meaning fewer wrinkles!! Lycopene is similar to the colourants that give things like oranges, carrots, salmon, shrimps and flamingos their distinctive pink or orange colours.
Lycopene does not leave the body overnight, but sticks around for some time. If you drink a few litres of tomato juice every day for a long period, your skin can turn orange or pink, just like a shrimp or a flamingo! Carrot juice will have the same – harmless – effect.

**Tomatoes contain the following vitamins:**
Vitamin A – essential for the health of all body cells.
Vitamins B1, B2 and B6 – involved in cell metabolism, DNA-building and the formation of blood cells.
Vitamin C – essential for the transportation of oxygen and carbon dioxide in the blood.

## The down side

A famous Dutch footballer once said: "Every advantage has its disadvantage" (For those among you who do not have a clue who uttered those famous words, it was Johan Cruijff). The same goes for the tomato.
The negative nutritional characteristics of a tomato are:

- Tomatoes have been subjected to genetic modification for years and years. This has been done to improve flavour, enhance resistance to diseases, repel insects, prolong shelf life etc. Scientists still do not agree on whether genetic modification involves any risk to human health.
- Unripe tomatoes contain tomatine, which in large quantities can be toxic to humans. Tomatine can cause fever, weakness, lethargy, apathy, depression, stomach ache and diarrhoea. But tomatine disappears as the tomato ripens – you should therefore only eat ripe tomatoes.
- Tomatoes rot relatively quickly. The best (organic) tomatoes rot the fastest.
- Tomatoes can only be grown on the same piece of land once every 4 years. This is to prevent soil exhaustion and diseases. •

A word from A GROWER

# Grower's TALK

**It is now possible to submit your growing experience on the CANNA website. In the last few months, we have heard from many growers about their experiences. The most useful growing experiences can qualify for publication in CANNAtalk. The grower whose contribution is published in CANNAtalk will also receive a one-litre bottle of CANNABOOST. Below you can read a growing experience which is submitted through our website www.canna-uk.com from a guy named Bonzo.**

### Which CANNA products do you use?
CANNA Hydro Vega and Flores, A/B, CANNABOOST and PK13/14

### Why do you use CANNA products?
Proven results every time. Increase in all stages of plant cycle, nothing on the market I have tried in 5 years comes close to CANNA. Even the BIO products are superb. So often now in life you do not get what you pay for but with CANNA every penny you spend is measurable in terms of result.

### Are there any specific or unusual handlings you did during the growing process?
Plant training, pruning, light management are regular but with CANNA nutrient I need to do nothing else as I am confident in the product.

### Did you suffer from any problems while growing and how did you solve this?
I have flushed my system occasionally due to mis-handling or poor management and have never had to hack down a plant! PH problems and hard/soft water problems seem non-existent with CANNA products as all situations are compensated by the nutrients themselves.

**Without CANNA, growing for me would be a mine field!**

### What kind of mark would you give CANNA, and please explain why?
CANNA is the cutting edge of the grow world and in my experience and all others I know, only a very bored or not particularly serious grower would use anything else. YES, some of their products are expensive, but used correctly they will put a smile on your face time and time again.... Without CANNA, growing for me would be a mine field! Respect where respect is due, thank you for making all my growing experiences happy ones. 10 out of 10 every time. If you are serious about your horticulture then there is no other choice.

### Tell a little bit about your growing situation:
I have been a personal and professional grower for about 5 years and use a classic hydro system with clay pebbles. The results are always perfect and it is an easy system to manage. The CANNA HYDRO range is the only product on the market which I now use, and trust me I have tried them all. I have never suffered from burnt plants through over feeding etc. and have followed the guidelines provided by CANNA. I have occasionally deviated from these guidelines and had marginally better results but as any expert knows, if you are in touch with your green house and plants they tell you every day how they are feeling and you compensate accordingly.



# Product FLASH

## Adjust -**A- Wings** defenders

**After 3 years of trial and development, Hygro International have designed a new medium priced reflector that meets the current markets high standards of quality and performance. Our world renowned Adjust -A- Wings reflectors are now available with a cost saving Titanium White reflective surface, and we have branded them "Adjust -A- Wings DEFENDERS".**

**Hygro Internationals reflector range currently includes three mid priced Titanium White DEFENDER Models in addition to our two premium priced 97% Reflective Glass Coated "Silver" AVENGER Models. In Europe & The UK, all five Adjust -A-Wings Models are supplied with the performance enhancing Super Spreader included. The DEFENDER Models are matched with Titanium White Super spreaders and the AVENGER Models are matched with 97% reflective Glass Coated Silver Super Spreaders.**
**Adjust -A- Wings reflectors are sold throughout Europe, the UK, North America and Australasia. They are the reflector of choice for the majority of the worlds top growers due to their unmatched performance and versatility. Adjust -A- Wings reflectors consistently out yield all other competitive brands and they are by far the most power efficient on the market.**

**The secret behind the Adjust A- Wings success is in the unique design and the quality of the materials we use. The adjustable nature and even spread of the light foot print gives Adjust -A- Wings customers the unique ability to increase the size of their grow area without increasing the amount of lights, further it allows experienced gardeners to create seasonal (spring, summer, autumn) conditions indoors and naturally trigger their plants hormone cycles for faster growth, better health, even maturity, and major yield increases.**
**Whatever your budget... Adjust -A-Wings now has a superior reflector to suit your needs.**
**Please note: The Adjust -A- Wings novel design features are protected by a range of international patents registered, accepted & pending with the I.P.O.**

HYGRO INTERNATIONAL PTY LIMITED

# Evolution of Coco

## DID YOU **KNOW....?**

- Coconuts received their name from Portuguese explorers; the brown and hairy surface of coconuts reminded them of a ghost or witch called Coco?
- Coco trees have the unique ability to thrive on sandy soils and are highly tolerant of salinity?
- The first description of coco processing date's from Arabian traders in the 11th century?
- Marco polo described the process of extracting fibers from coconuts as early as the year 1290?
- For many centuries it was a waste product used to make sail ropes, chair seats and mattress fillings?
- Coco was first introduced as a growing medium to horticulture in 1862?
- Back then it still had many complications which caused a decline of the use in agriculture?
- It would take another 100 years to rediscover this medium?
- New techniques, analysis and research turned it into a valuable growing medium with unique characteristics?

# Grower's TIP #11

## Growing in coco: Nutrient - Water - Plant Interaction

Coco peat is an organic based growing medium similar to peat moss but with one clear distinction: it is not peat moss. Unlike mineral soil and peat moss, coco cannot retain nutritional elements which are then released back into the soil solution when the concentration falls. (a process is known as CEC or Cation Exchange Capacity). However, coco can affect the availability of some nutrients because of its natural pH or because of the complex relationships formed between certain elements that are produced during the decay process (antagonistic relationships that affect the availability of certain nutrients while other nutrients are in higher concentrations), colloquially known as 'binding'. The structure of coco peat is similar to that of a sponge. The fertilizer used in the water solution must allow for the decay nutrients and provide continuing pH control, while maintaining the correct ratio of nutrients. The fertilizer solution is absorbed by the spongy coco particles and, just like a wet sponge on a piece of paper, the coco releases the nutrient solution to the plant when needed. The sponge may appear slightly dry but in fact still be full of water forming a reservoir that holds a nutrient solution that mimics the original solution plus the decay elements. To avoid problems with this system, it is important to apply nutrient solution when the medium has lost about 50% of the water weight it is holding. It is critical to feed every time water is applied. It is also important to drain away at least 10 – 20% of the total volume that the container will hold (not back to the tank). Finally, for the best results the grower must use a nutrient blend that is designed specifically for the use with coco and the critical interaction between plant and medium...

## The grateful gardener


# What's HAPPENING

**Have you ever wondered how the CANNA Calendar is produced? Well, this article should satisfy your curiosity.**

## CANNA calendar

We are going to give you an exclusive look behind the scenes of our famous calendar and show you how it is created. As you will find out, with all those pictures of typical Dutch scenery... plus some dazzling, almost naked ladies... the calendar is not something that we put together in a fortnight. We really put our hearts into it. The calendar has been famous among our clients for many years now. There are always one or more copies hanging in shops or at home, and customers always look forward to obtaining their copy, long before we've finished printing them and long after all our stocks have been exhausted! We have even found out that many people have kept all the previous calendars and saved them. So the calendar has become a real collector's item! This is the best compliment for our work, so thank you for that!



The CANNA calendar is distributed every year and has become increasingly popular in recent years. The first issue was created in 1998 and only a small number were printed. It was reserved for CANNA's best clients mainly in the Netherlands, but also in the UK and Australia, for example. By 2011, the print run has grown to 11,000 copies and the calendar is being distributed to 17 countries. Yet still we are receiving requests for more! As you can imagine, this makes creating the calendar hard work, but it's also very rewarding.

## History

The idea for the calendar was born in 1998 when we were thinking of how we could reward our valued customers with a gift. The first calendar was printed on exactly the same kind of paper and in the same shape that it is printed in today. Why change a winning formula? The pictures had a beautiful, stylish, green but also edgy feel to them. The style of this first calendar remained the blueprint for all subsequent editions.

Throughout the years, the calendars retained their "naughty" appearance, but the 'green coloured' photos became more colourful with a touch of black and white. The calendar also kept the same number of pages with one photo for every two months.
Then came about the 10th edition of the calendar. Since it was the first milestone, we decided to celebrate this. We decided to create a calendar with thirteen images instead of the usual seven, in order to remind our dear customers of this milestone every month. Furthermore, the theme had to express the fact that it was the 10th anniversary of the CANNA calendar. So all the images were shot with the theme of celebration in mind. The calendar had images of birthday cakes, party girls and some party drinks, as well as the effects of partying too hard. There were more full-colour images and the calendar had a more "pin-up"-feel.

## Creating the calendar 2011

As mentioned before, creating the calendar can be a stressful job, especially since the calendar has become so popular in so many countries. Each successful issue set the bar a little higher for the next one, and we certainly do not like to disappoint our customers! So we decided to start working on the 2011 calendar in February 2010 with a team of five people. As you can see, working on the calendar is not something we like to leave to chance! Keeping the comments of our customers abroad in mind, it was time to brainstorm about a theme or style. As it turned out, some people preferred the earlier calendars, which were less explicit and left something to the imagination. We decided on some basic criteria for the calendar to meet. For example, we decided to aim for more contrast between the pictures and we also wanted stylish images that were not necessarily explicit. In fact, you'll find that some of these criteria were the same for the earlier versions of the calendar. So it's back to basics, you might say.

Finally, a new feature to the calendar has been added to the 2011 edition. We thought that it would be cool if people would see more than just the gorgeous ladies in a nice setting on the calendar. That's where our 'hidden theme' comes in. In some of our early editions, there were already some hidden messages, but this year's edition has an entirely hidden theme! The theme we have chosen has inspired all of the images in the new calendar, but it's up to you to figure out what this theme is!

## The actual photo shoot

For the 2011 edition, we went to two of the photo shoots to see how our photographer works, and of course we got to meet the CANNAlendar girls! How exiting that was!! We visited one of the outdoor shoots and an indoor shoot. The outdoor shoot was particularly interesting, because – and you may not realise when you look at some of the pictures – the photos were actually shot outside in broad daylight... in a public place... with naked ladies... As you can probably imagine, this requires some planning beforehand. A photo shoot can take one hour, but sometimes it can take a whole day to take the perfect photo!

During our visit the girls would be photographed for real outside, and we first watched them try out a few poses in the studio, as a kind of warm-up. Meanwhile, the photographer was already thinking of photos he might take while motivating the girls to keep changing their pose. After the warm-up, it was time for the real thing! The girls took off their clothes for the shoot and then covered up with a robe. We all got into the car (steamy windows!!) and drove to the outdoor location. In order not to expose the girls in public for too long, the photographer started taking pictures as soon as we arrived, while the models listened to his instructions. In the meantime, the two CANNA employees kept a look-out for people walking their dog, or elderly or very young passers-by. One of the photos on that shoot had to be taken again because some people kept walking past again and again to get a closer look and asked if they could help in some way!! Holland may have a reputation for being a very tolerant country, but there are still people who get offended by the sight of a beautiful, semi-nude girl. Even in the Netherlands it's illegal to expose yourself in public!

During one of the previous outdoor calendar shoots, a few policemen were passing by and spotted the photographer with the naked models. However, instead of fining the models for public nudity, they asked if they could be in one of the pictures! The photographer saw an interesting opportunity and indeed, in one of the 2009 photos you can actually see two real Dutch policemen!
All the parties involved are very proud to participate in the CANNAlendar. The photographer, of course, but also the models. They were very eager to pose and can't wait for the calendar to be printed! And we can say the same for the people waiting to hang the calendar on their wall! •

# GROWING WITH COCO

**COCO OR COIR IS THE OUTSIDE LAYER OF COCONUT HUSKS (OR MESOCARP) WHICH CONSISTS MAINLY OF COARSE FIBRES BUT ALSO FINER MATERIAL KNOWN AS `COIR DUST'. HARVESTED COCONUTS ARE FIRST SOAKED IN WATER, A PROCESS TERMED `RETTING' WHICH MAKES THE FIBRE EASIER TO REMOVE. USUALLY THE LONGER COARSER FIBRES ARE REMOVED FOR OTHER USES WHILE THE COIR PITH THEN UNDERGOES FURTHER PROCESSING AND DECOMPOSITION WHICH MAKES IT MORE SUITABLE AS A PLANT GROWTH MEDIUM. COIR PITH CONSISTS OF A MIXTURE OF SHORTER FIBRES AND CORKLIKE PARTICLES RANGING IN SIZE FROM GRANULES TO FINE DUST.**

**By Lynette Morgan – Suntec**

## Background to Horticultural coco

Coco was initially seen as a replacement for peat in greenhouse production – coco does not have the water repellence of dry peat, or the low pH values. However in the early days of experimentation with coco growing substrates many problems were found due to inconsistency of the product. Many coconut sources were retted in seawater and contaminated with very high levels of sodium and unpredictable levels of naturally occurring potassium. Often piles of coir dust were not left to decompose sufficiently and the resulting coco had a high nitrogen draw down index, this meant that under soilless cultivation, even with well balanced nutrients, nitrogen deficiencies in the early stages of growth were common. Coco substrates also had a high cation exchange capacity and retained calcium, phosphate and iron meaning these became unavailable for plant uptake until the coco had been in use for some time and had fully `conditioned'. As a result many soilless growers initially experienced problems with coco they didn't understand. Few growers understood the degree with which the coco media was affecting the composition of the nutrient solution in the root zone and the fact that the coco provided an almost ideal physical structure for plant growth was overlooked.

However, high quality horticultural coco is now recognised as a superior growth media for soilless crops on both a small and commercial scale and many of the initial problems have been overcome by correct processing of the raw product and adjustment or pre treatment before packaging. High quality coco substrates

**Figure 1: Loose coco can be used to fill grow bags of various sizes to suit the plants being produced.**

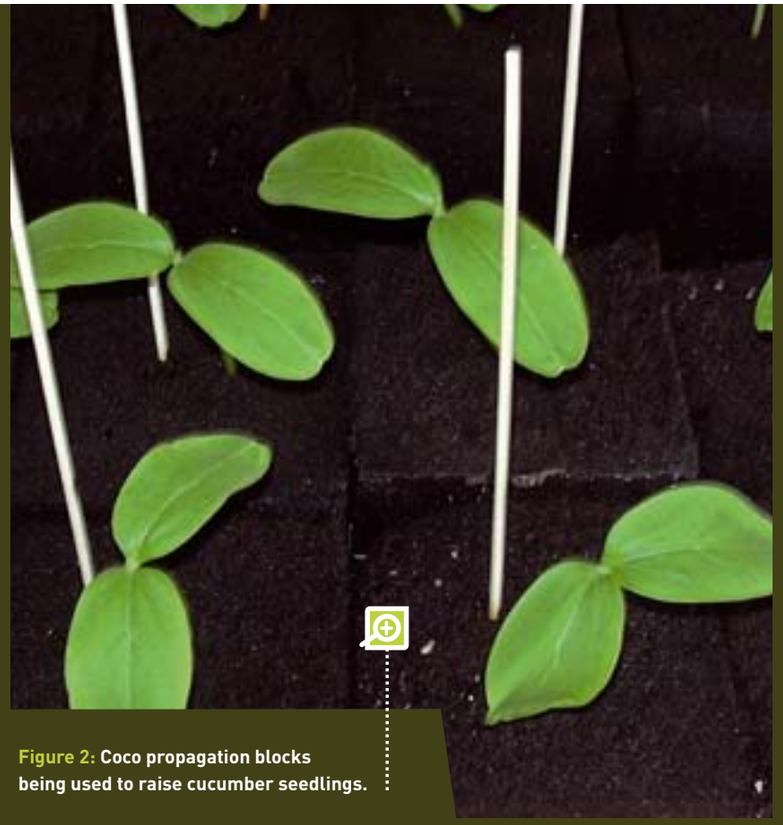

Figure 2: Coco propagation blocks being used to raise cucumber seedlings.

on the market for soilless cropping have often been specifically processed for this use right from the point of removal from the coconuts, through to preconditioning, buffering and pre treatment. This means that nitrogen draw down is no longer a major problem, sodium contamination from retting in seawater does not occur, the naturally occurring potassium levels are adjusted and treatment with calcium and other ions is carried out before the product is packaged. Suppliers of high grade coco also carry out regular testing of their product to check for any irregularities in supply and to correct for these. However while there are excellent brands of coco on the market, there are also still poor quality supplies still being sold as a growing medium and growers need to select and only use a reputable brand, preferably one which has an accompanying `coco nutrient' formulation designed to work with the cation exchange properties of the product. These days good quality coco has proven to be a superior growth substrate for a large number of different crops, with the advantage of being from a renewable and environmentally sound resource.

## Different types of coco products – uses, pros and cons

There are many different types of coco products on the market. The husk of coconuts yields not only very coarse long fibres which are used to make a wide range of products such as rope, carpets, mats, brushes, basket liners and others, but between these coarse fibres is a corky substance called coir pith, coir dust, coco peat or coir peat. Many grades of horticultural coco exist and some have been specifically designed for different plants and systems. The very fine particle size of coir dust retains a high level of moisture and this is suited to seed raising and for smaller seedlings and plants. While a high moisture holding content in fine coco dust is an advantage in some situations, it can create problems with over saturation of the root zone. Grades of coco often used in slabs may consist of larger particles or `flakes' of coco which allow a good degree of drainage and resist packing down over time as commonly occurs on substrates such as peat.

Coco fibre is also the term often used to refer to the general purpose grade of coco which is ideal for growing longer term crops under soilless cultivation. Worldwide coco is used for soilless crops such as tomatoes, peppers, cucumber, melons, aubergines, ornamentals, cut flowers and many others because the structure of the coco does not break down over the time frame these longer term crops are grown for. Thus high rates of root zone aeration and moisture retention are typical in both short and long term soilless crops and this results in high yields and good root health.

Coco also comes in a range of different products – from small to large compressed `bricks' to `grow slabs' to pre expanded ready to use, bagged product. Compressed bricks of coco fibre mean the cost of shipment can be kept to a minimum, a typical 5Kg block of compressed coco can be expanded in water to over 65 litres of ready to use growing substrate. Pre wrapped slabs of compressed coco can be less than one inch thick but when expanded with water within their plastic sleeve give a full sized growing slab comparable in volume to rockwool. The advantage of coco bricks is that once expanded the media can be used to fill any size or shape of growing bed, pot or bag, the disadvantage is that a time is required for the media to fully expand and some labour is needed to fill the growing plots. Loose coco placed into growing pots or containers can be easily inspected for moisture level by checking the appearance of the top of the substrate or by feeling the moisture level of the coco just below the surface, this is more difficult in wrapped coco grow slabs. The coco slab only needs to be placed in position, slits cut in the plastic sleeve and water poured in – the coco expands and can be planted out with no further effort. The disadvantage of slabs is that they need a very level surface to sit on so that drainage is even and they don't provide the depth of growing substrate that a planter bag or pot can for larger plants.

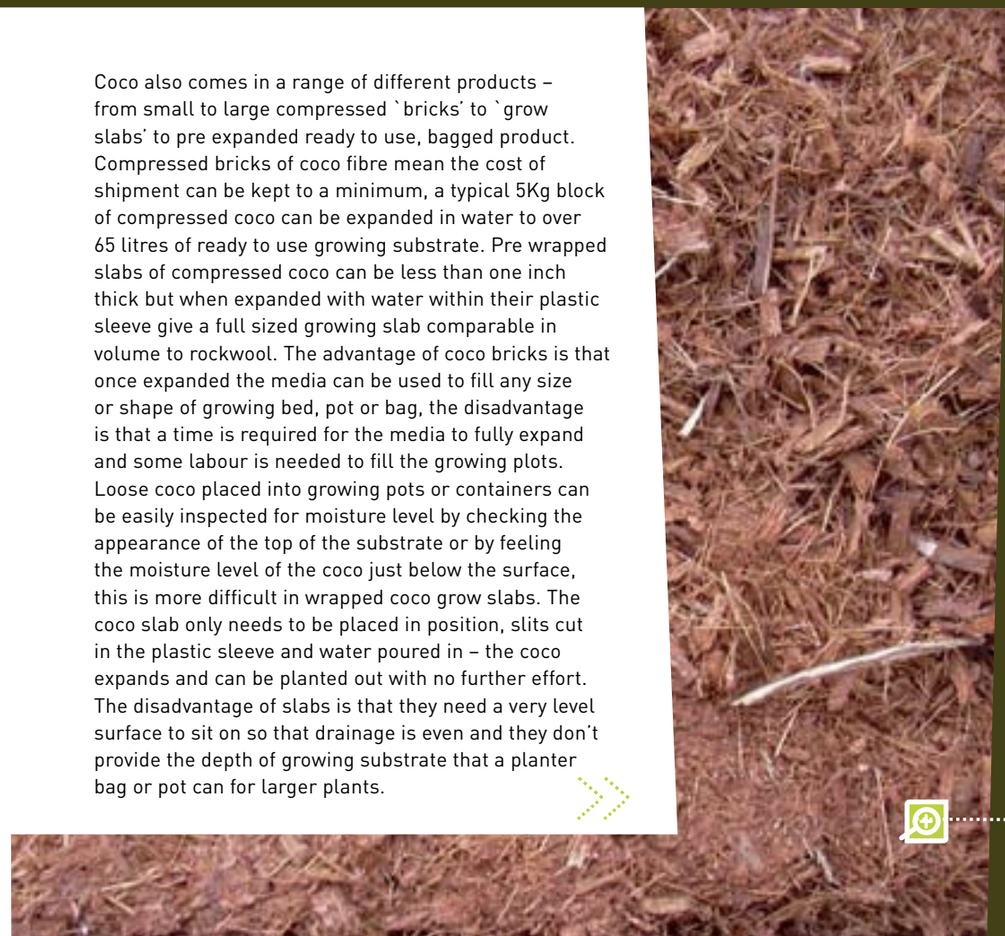

Figure 3: The optimum physical structure of coco means that crops are provided with high levels of oxygenation and moisture in the root zone.

Figure 4: Coco is available in a range of grades from very coarse `orchid fibre' seen here, to fine `coco dust'.

Figure 5: Loose coco can be used to fill grow bags of various sizes to suit the plants being produced.

Figure 6: Young cucumber crop being grown in high quality coco.

Figure 7: Finer grades of coco can be used to germinate seeds and raise seedlings.

## REFERENCES.


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## TIPS AND TRICKS WHEN USING COCO

**1**. Always invest in a good quality, well known brand of coco designed for soilless growing and don't be fooled by the many inferior quality products on the market. While coco from different sources may look similar, there can be large differences in the quality and this can have a negative impact on plant growth. Coco products sold in garden stores and hardware outlets often as inexpensive compressed bricks of `garden mulch' are not usually suitable for soilless growers – these types of coco are typically high in sodium (an unwanted element), high in total salt content, often have not been fully decomposed, and hence have a high nitrogen draw down which can result in nitrogen deficiency even when the full strength nutrient solution is applied. Inferior coco products are also not `buffered', `conditioned' or `pre-treated' to stabilise the potassium levels and boost calcium which is required to offset the tendency of coco to retain calcium. They may also contain weed seeds and pathogens. Buying a reputable brand of coco for soilless growing is an important investment in the nutrition and health of the plants and also simplifies the process of growing a great crop.

**2**. Select the right nutrient product (i.e a specific coco nutrient product) to use on coco substrates. Coco growing media is not like many other soilless substrates such as rockwool which arrive pre sterilised, chemically inert with a low CEC and with a very minimal effect on the composition of the nutrient. Coco contains naturally occurring potassium which since potassium is a major plant nutrient, is considered a bonus; however this needs to be allowed for in the nutritional program of the plants. Coco also has other effects on the composition of the nutrient solution applied and levels of nitrate, phosphate, calcium, magnesium and iron may need to be adjusted to allow for these properties. There are commercial brands of specific `coco nutrient' formulation products on the market, however it is always a good idea to select both the coco substrate and the coco nutrient of the same brand as it is likely they have been developed to work together and will give the best results. High quality coco products are likely to have been pre-treated and the accompanying coco nutrient will take this into account so that the ratio of elements in the root zone stays as optimal as possible.

**3**. Select the right type of coco product for the plants being grown. There are a large range of coco products on the market and many different grades with various horticultural uses. While orchids prefer a very coarse coco `chip', using coco for propagation and germination of small seeds requires a much finer grade which will hold sufficient moisture as well as oxygen. General purpose coco which consists of a range of particle sizes is considered ideal for many plants and is the most widely used grade for soilless production. The coarser particles help the coco substrate remain more `open' to aeration while the finer particles hold moisture between irrigations and the combination of both these, is what gives coco close to optimum physical structure for plant growth.

**4**. Remember that coco is a `living substrate' and it should be treated as an entire eco-system which consists of beneficial microbes who make their home in the coco particles. This beneficial microbial life plays an important role in soilless systems as many fungi have a protectant effect on the plant's root system and have been proven to suppress plant pathogens as well as other possible benefits with nutrient uptake and plant growth. While other growing substrates start out as sterile, coco is best left in its original state or even inoculated with populations of beneficial microbes such as Trichoderma. These populations of beneficial microbes in coco are to be encouraged and for that reason harsh sterilising chemicals such as chlorine bleach, hydrogen peroxide and even boiling water should not be used on coco substrates at any stage.

**5**. Coco usually maintains pH within an optimal range; however EC can build over time and should be checked from time to time, particularly under warm growing conditions where the plant may have been taking up a lot of water from the substrate, allowing the concentration of nutrients to climb. Because of the nature of coco growing media the EC around the plant's roots may be different to that in the leachate or the solution draining from the growing slabs, pots or bags. A quick and simple `extraction sample EC test' can be carried out on coco media to determine the actual EC around the root zone. For an extraction test, a small sample of coco is taken from the growing media, (several samples should be taken and combined to give a representative sample). Then 100ml of these combined samples is measured out (coco should be damp but not overly saturated). The 100ml sample of coco is placed in a jar and 150ml of deionised (or RO) water is added and the mixture shaken 50 times. This is allowed to sit overnight to allow extraction of nutrient ions in to the water. The resulting mix is then re shaken and filtered to remove particles and the pH and EC can be measured. The ideal pH range for the extract for most crops is between 5.5 – 6.2. Ideal EC levels vary depending on the stage of plant development, the growing environment and the crop being grown, however a general range is between EC 1.0 and 2.5 (tomatoes may be grown at much higher EC values, particularly with commercial crops). Larger scale growers and those in commercial production will often have the coco extract sent of to a lab for a complete nutrient analysis which determines the levels and ratios of each of the elements in the nutrient solution so that fine tuning adjustments can be made.

**6**. While coco is a great growing substrate it still needs to be monitored and just as with other substrates, it is possible to over water and saturate the root zone. Coco can look slightly dry on the surface and still be fully moist in the root zone, so checking the moisture a few inches below the surface is recommended. Moisture should be present when the coco is squeezed between the fingers but the surface of the growing media should not appear to be wet – over damp coco can also attract fungus gnats as well as reducing the level of oxygenation in the root zone.

**7**. Coco is an environmentally friendly substrate and a fully renewable resource which can be used for more than one crop. However once its usable life is over it still makes a valuable soil mulch or soil conditioner for outdoor plants, and can be added to vermiculture (worm farm) and compost systems. •

# Puzzle&WIN great prices

## It's puzzle time again!!

**For this edition we decided not to have the regular sudoku or futoshiki, but something completely different instead. This does not mean easier or harder, just different. The pictures below are practically the same, but there are ten subtle differences between them. It's up to you to find these differences and let us know what they are. You can win a set of COCO-fertiliser, consisting of 1 bottle of 1 litre CANNA Coco A and 1 bottle of 1 litre CANNA Coco B. You can send us your answers either by emailing us as info@cannatalk.com or by writing to the address on page 30. Enjoy!!**


## Winners puzzle#9

We randomly picked 2 winners from all entries received and we congratulate

**Mr Mclean** and **P.K. Campbell.**

**Congratulations!!**

We will contact you as soon as possible to send your prices over.



## WHAT'S NEXT

**In CANNAtalk's next issue we will inform you about water: about its quality and the difference between hard and soft water and why it is important to know the difference.**

**In the more light-hearted section of What's happening you can read about tattoos, for real this time!**

**CANNAtalk is your magazine, YOUR VOTE COUNTS!**

**Thanks for your feedback on the previous issues everybody. Overall most readers are happy with the content. Keep sending us your comments and suggestions by card (we'll refund the postage), surf to our website or send us an e-mail: info@CANNAtalk.com**

## Request information

- ☐ Aqua Fertilisers (Recirculating systems
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- ☐ Terra Fertilisers (potting mix)
- ☐ Additives (Optimizing your yields)
- ☐ List of shops in my area
- ☐ Send me a CANNA Calendar 2011I've secretly enclosed 10 pounds in this envelope to pay for it.

## Solution to the puzzle:

**# 11**

# CANNAtalk®

MAGAZINE FOR SERIOUS GROWERS


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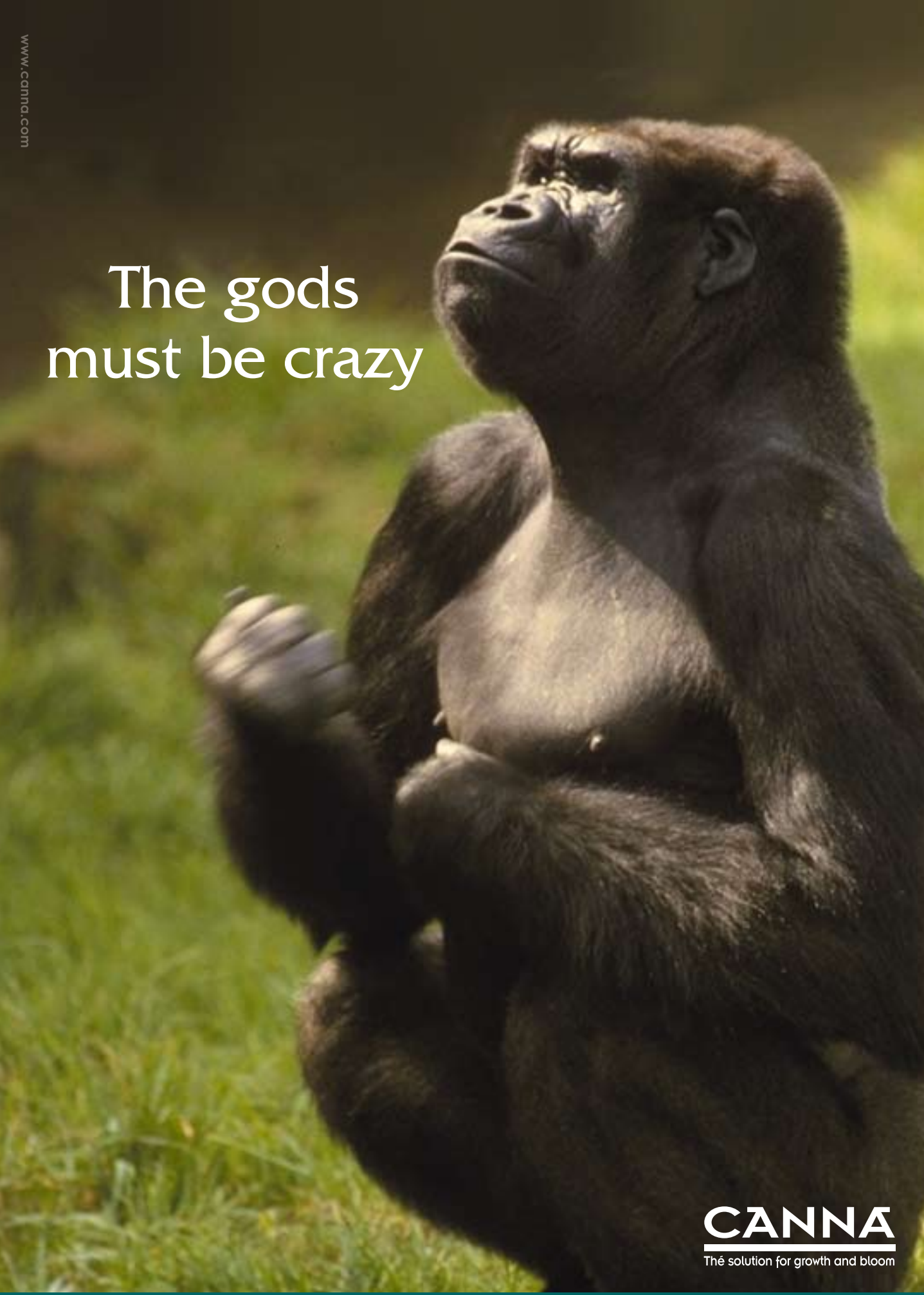
**#11**

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