CANNA Talk
Issue No. 7, Volume 2

Taking cuttings

The Basic Steps

Disasters Dissolved

Magnesium Deficiency

Research

Don't mix brands

What's New?

Website membership

THE EVOLUTION OF HYDROPONICS

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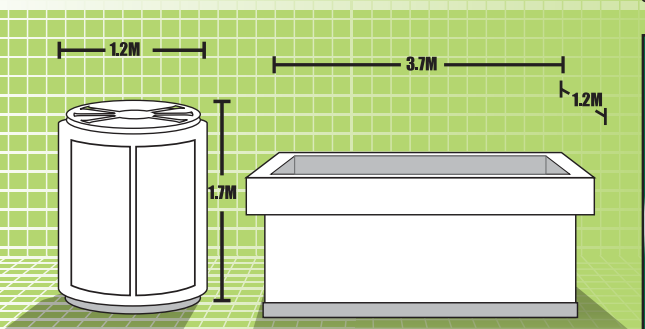

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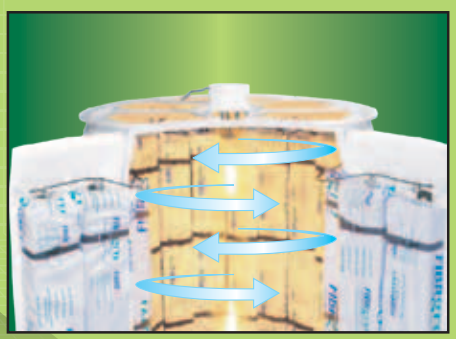

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Table of Contents

Returning Items:

HQ's Talk:

Here at HQ, it's been very busy over the past few months. There have been lots to do with many new insights resulting in yet another edition of CANNATALK. In a market where more and more magazines seem to appear, we are proud at our 7th edition, yet modestly, but it is both informative and interesting. Once again we grew in number of pages but that's not really the aim here. As we still believe it's all about quality not quantity……..hence, Quality proves itself!

So instead of inundating you with advertisements and useless chit chat, CANNATALK continues to bring you interesting articles based on scientific fact, research and tests done by CANNA Research; our own research department and laboratories. Yet we do not want to omit our collaboration with Cal Poly in California; America's leading Polytechnic University. On page 18 you can read about this collaboration. Professor Terry Fujimoto explains what this collaboration means and how both parties learn and advise each other. He raises the veil about a new project we're starting together where we will all work towards the ultimate feed chart designed especially for hothouse cucumbers.
If you think you're quite a scientist yourself and believe you can grow the biggest, greenest, tastiest hothouse cucumbers then please enter our contest on page 19
That's where you'll find 2 (more general) Feed Charts for growing this specific crop in either coco or an inert run-to-waste system. So please join, get growing and send your experience in a testimonial including a picture to editor@cannatalk.com. The best contribution will be rewarded with a 'hothouse cucumber package' including over $ 250 worth of nutrients and additives.

Since we get many positive responses to articles with a certain "how-to level" this issue offers an article on how to take cuttings. Even though this seems a simple procedure, this article explains why it is not, at least not as simple as one might think, if you wish to do it right that is. Then on page 12 you can read some of the questions (and their answers) that we received through our website. You might just find the answer to the question on your mind. If not, write to us yourself. In the member section of our website www.canna-hydroponics.com you'll find the question form. You'll always receive a personal answer to your question. Maybe it'll even get published in next CANNATALK. If you have questions about difficulties you ran into you might just find the answer in our returning item "Disasters Dissolved" which this time focuses on Magnesium deficiency. Then, CANNA Research contributed to this issue with quite an interesting article about not mixing nutrients from different manufacturers. This is not a marketing campaign focused only on promoting CANNA products (or those of the competition). It explains why it is simply better and logical to stick to one brand. Then we have 2 shorter articles; one about one of the prettier flowers on our planet; the Canna Lily. The other gives some info on growing wasabi, including a Feed Chart to help you grow it yourself along with 2 nice recipes. We hope you enjoy these, as well as all the rest of this latest edition of CANNATALK.
Please feel free to write us about anything at all.

Cheers,
Jeroen

What's New!

Improved pH advice for COCO and TERRA nutrients.

Our research department never sits idle. We aim to renew, detect, discover and be innovative. This keeps us on the edge and makes for us to continue learning every day. Of course we immediately share new or improved insights with you.
After doing some thorough testing CANNA Research fine tuned the advice we give for our COCO (including COGr) and TERRA nutrients. The range we used to give has always worked well. But it turned out that within the old range there's a more narrow range that would make for even better results.
We adjusted all of our communication regarding these products like Feed Charts, InfoPapers and Product Labels to this updated pH range. Since these are items that we can not prevent from circulating for a longer period of time you might still run into the older pH advice. This is not a problem at all as it covers the updated narrower range. But if you want the best, start using this new advice below. In case you forget you can always check it in the product section of our website.

What changed:	Old advice	New advice
COCO and COGr products	5.2 – 6.2	5.5 – 6.2
TERRA products	5.2 – 6.2	5.8 – 6.2

Website membership

In last edition (issue #6) the new and improved website with the new CANNA membership was introduced. Since then we made some changes to the membership to further improve it and serve our members better. We hope to satisfy most of your needs and wishes now (in case not, please write us!) and we'll continue improving it in future. When you're in need for any kind of help, as a member you'll be in front of line! Your questions that are submitted through the website will have priority. Next to that, as a member you'll gain full access to our website and can read all the latest news about trends, inside information on research & development matters and other grow-related subjects.

Please visit our website for more detailed information and become a CANNA family member today!
www.canna-hydroponics.com

In the Spotlight

Taking Cuttings: Basic Steps

Geary Coogler, B.Sc. Horticulture

Nothing could be simpler - take a pair of scissors, cut some tips off a plant, place the cut tips into the potting mix and away they go, right? Wrong. OK, then take a pair of scissors, cut some tips off a plant, place the tips in a propagator and away they go, right? Sorry, wrong again. While the steps are correct, there is much more to consider to ensure success with cuttings. Expensive equipment is not the answer, doing your homework is.

Plant cuttings are a reflection of their origin. Plant cuttings are a part of the original stock plant and they share the same balance of light, air, water, and nutrients as the stock plant. If the stock plant was deficient in Phosphorous, for example, then the cutting will also be deficient in Phosphorous. This problem is compounded by the fact that the cutting no longer has legs (roots) and therefore cannot get access to food or drink. The plant which grows from a cutting will show any problem (i.e. nutritional deficiency) rapidly and throughout its development.

Prepare the stock plant

The stock plant needs to be growing actively but not forced to grow too fast as we want to force the cutting to form roots and minimise the risk of it having a vegetative growth surge. Ensure the stock plant is being fed on a regular basis but do not give it too many nutrients (especially Nitrogen), as this will cause an imbalance in carbohydrate storage, resulting in soft cuttings that have little energy for rooting. Overfeeding will reduce the number, size and quality of the root initials. The fertiliser ratios that could be used are as varied as the number of plant species the cuttings can come from, so we won't make any recommendation here, other than to feed the stock plant according to how it is growing. If you are working only with terminal cuttings , they should be as tight as possible, so as to avoid too much internode stretch. Cut back on the amount of Nitrogen being fed to the stock plant if internode stretch becomes obvious.

You also want to avoid any other nutrient deficiencies - the plant should appear healthy with glossy green leaves and thick cuticles. Keep the light level up during growth periods, but reduce the amount of light the stock plants are exposed to by one third in the week before you take your cuttings. If you reduce the light level too much, you will induce internode stretch. Once you have taken the cuttings which can be as big a shock to the plant as loss of roots, transfer it into a reduced light environment. Make sure you water your stock plant the day before you take cuttings and it is best to take your cuttings during the first hours of light . It is also wise to make sure that the stock plant has been in a stable growth routine and has not dried out in the preceding two weeks. A stable, vigorous, healthy stock plant will yield cuttings of similar quality.

Prepare to take cuttings

Now that we have ensured that the stock plant is as healthy as it can be, it must be time to get out the scissors.....No! Taking a cutting requires care! Choosing the correct tip to keep is important, but equally it is important to know where to cut, how to cut, what to use to cut, and how to care for the cutting afterwards. Why? Because you want to make good use of every possible cutting, and so minimise the number of stock plants and the amount of space required for keeping up production. It also will result in even rooting between cuttings with a lower number of 'blind' cuttings ; blind cuttings don't readily form into new plants.

There are four different types of cuttings to consider; hardwood (deciduous species), hardwood (narrow leaf evergreen species), semi-hardwood, and softwood (greenwood) cuttings. There are also many ways to cut and treat cuttings depending on the type of cutting. These methods are based on the type of plant (woody to soft), production time (seasonal changes) and end-use. The softwood approach will be used to demonstrate the steps involved, as it is common to all types of wood, although it is confined to spring growth for woody plants.

Where to cut

The right location to take a cutting is a zone somewhere in the middle of the stem which is not too hard and not too soft. There is a zone on every plant stem that goes from low carbohydrates and high Nitrogen to high carbohydrates and low Nitrogen; you want the middle of this zone. How do you tell where this is? Most growers know this from experience, but new or less experienced growers might want to do the 'bend test'. You bend a tip

Use a propagation knife or bypass pruners to take your cuttings

still on the plant at a point where you want to take the cutting back on itself. There are three things that could happen: it bends (high Nitrogen and low carbohydrate), it snaps in half or nearly in half (low Nitrogen and high carbohydrates), or it partially breaks in one spot (just right). This spot is the cut zone. This is the section of the stem where roots will most readily form. Next we need to know where on the stem to cut.

How to cut

The internode is the section of the stem between leaf sets. Some plants form new roots from the node (where the leaves attach), some form them along the internode section. The key is to cut as close to the node as possible on those plants that form at the node and halfway for those that root along the internode. Now for the big news ... cut it straight, not angled ! Calluses form faster and seal off the stem quicker on a straight cut than on an angled cut, thereby reducing the incidence of disease. However, cut flowers such as roses should be cut on an angle to encourage the stem to absorb as much water as possible and the wound to stay open to transfer the water. But when taking cuttings, take care to avoid crushing the tissue at the cut. Use a very sharp knife or bypass pruners.

It is difficult to avoid crushing the tissue at the cut, but the impact can be reduced by selecting the correct cutting tool. The cut must be clean and crisp. It really depends on the material being cut. Herbaceous material and very thin woody material are best cut with a specialist knife, called a propagation or budding/grafting knife. The next best option is bypass pruners. Scissors, anvil pruners, and fingers should be avoided as they crush the stem and don't produce a clean cut.

Be kind to your cuttings

All cuttings need to go directly to an environment with 100% humidity after being cut. If the cuttings dry out, they will not do well. Keep them dark, cool and moist. If you are working in large areas, use wet cheesecloth or burlap to wrap the cuttings as you go along. Should we allow the cuts to dry out a little before sticking them in medium? No - while herbaceous cuttings are less likely to rot, they also root faster than woody plants because they contain less lignin in their stems. Don't give them time to dry out. Process them soon as possible to keep the auxins flowing down the stem since they need to work at the bottom. A word of caution here - if you, the grower, use a rooting chamber that sprays a mist onto the cutting stems but does not include top humidity control, it might be advisable to cut the cutting stems at an angle to allow for water penetration, since these propagation units depend on this to regulate the supply of water to a cutting.

Rooting medium

The media for rooting should be similar to the medium that will be used for growing the cuttings in later: use an inorganic medium for inorganic systems, and an organic medium for organic systems. You must match the properties. Plants develop new roots with characteristics suited to the particular medium and the subsequent job they must do. If you are growing in potting mixes or in a soilless mix, it makes little sense to induce roots on a cutting by using a water-based rooting system. Otherwise, the plant will have to devote time and energy to converting those roots to roots that will work in the new environment, where water is scarcer than minerals. If you intend to grow your cuttings in clay pebbles, then root them in water, rockwool, or floral blocks. This will insure root compatibility from the start. Avoid sticking the cuttings in too deep - while tomatoes can handle being transplanted deep, most plants cannot. For plants that root at the node - bury the node, for plants that don't root at the node - leave the node above the medium. Finally, make sure you water the cuttings when you've finished. This

Make sure you immediately water the cuttings when they are in the medium

ensures a seal develops on the stem and settles the cutting into place.

Growing conditions

Now what's the next step? Let's see, we fed the stock plant, took the cuttings, transferred the cuttings into suitable medium... now we need get them under 100% humidity. This can be achieved with a dome or a mist system. Some plants are not particular and can withstand drier conditions (e.g. cacti or succulents), others will benefit from this approach. Humidity reduces the water use and supplies water to the growing plant. Humidity is essential to keep the leaf turgid, the systems functioning, and the processes processing. Keeping the lights at a lower intensity will enhance rooting while decreasing leaf function to survival levels. It will slow transpiration while the necessary components are used at the root sites to build a new root structure. Keep the atmosphere around the cutting warm (not hot), keep the humidity relatively high (>90%), and keep the root zone temperature warm (at about 25o C). Maintain this humidity until you can see callus tissue or root initials , then you can allow the cuttings to grow at below 90% humidity but above 80% humidity in order to encourage root growth. When you can see roots in the surrounding medium, it is time to reduce to 80% humidity and stop spraying water on the leaves in order to limit risk of disease. When the roots reach the outside of the root cube or pot, transplant them.

When to transplant cuttings

The timing here is important. If you wait until the roots have grown into a root ball, the roots will be old, 'pot-tight', and likely to grow on with less branching. Don't wait until the roots have grown too much. Do not apply stimulants (hormones) until the cuttings are transplanted. If you are rooting your cuttings into a medium, then use stimulants as soon as you notice the roots (some stimulants can be supplied through the leaf earlier). A word of caution: never transplant freshly rooted cuttings into a container that is too large, use an intermediate size. For instance, do not transplant a 1 inch cube with a rooted cutting into a 20 litre container, use an intermediate size such as a 4 inch for root formation. The plant won't suffer and there is less risk of it being over-watered.

A critical point to make at this juncture: roots require 100% humidity to avoid damage. The longer the root tips are exposed to air, the greater the damage that is done. Minimise their exposure time to the air. Do not harvest hundreds of plugs in the morning then wait until the afternoon to plant them. Only harvest, or remove from the starter trays exposing the roots, enough material that you can deal with in 15 minutes. Once planted in the medium, ALWAYS water your transplants in, with or without feed, depending on the medium and ALWAYS adjusted to the bare minimum needed.

Transplant into a smaller container first before moving up to a bigger one to keep the climate under control

Transplanting Cuttings: Best Practice

A cutting that is being transplanted the first time should not be forced to swim in a huge pot that contains an ocean of media. It is not wise to place a 4-inch cutting directly into a 20 litre container, as it is not efficient use of space and it is difficult to keep the climate under control in such a large container. Transplant it into a smaller container first and allow it to gain root volume, then transfer it into a larger container. The same rules apply for roots, once the roots are loose and growing as far as the outside of the root ball in good numbers, move the plant up to a larger container. This will make it easier to keep water levels constant, avoid over-watering, ensure adequate nutrient availability, and make harvesting easier.

First roots have to grow as far as the outside of the root ball before moving to a bigger container to avoid over watering and ensure adequate nutrient available

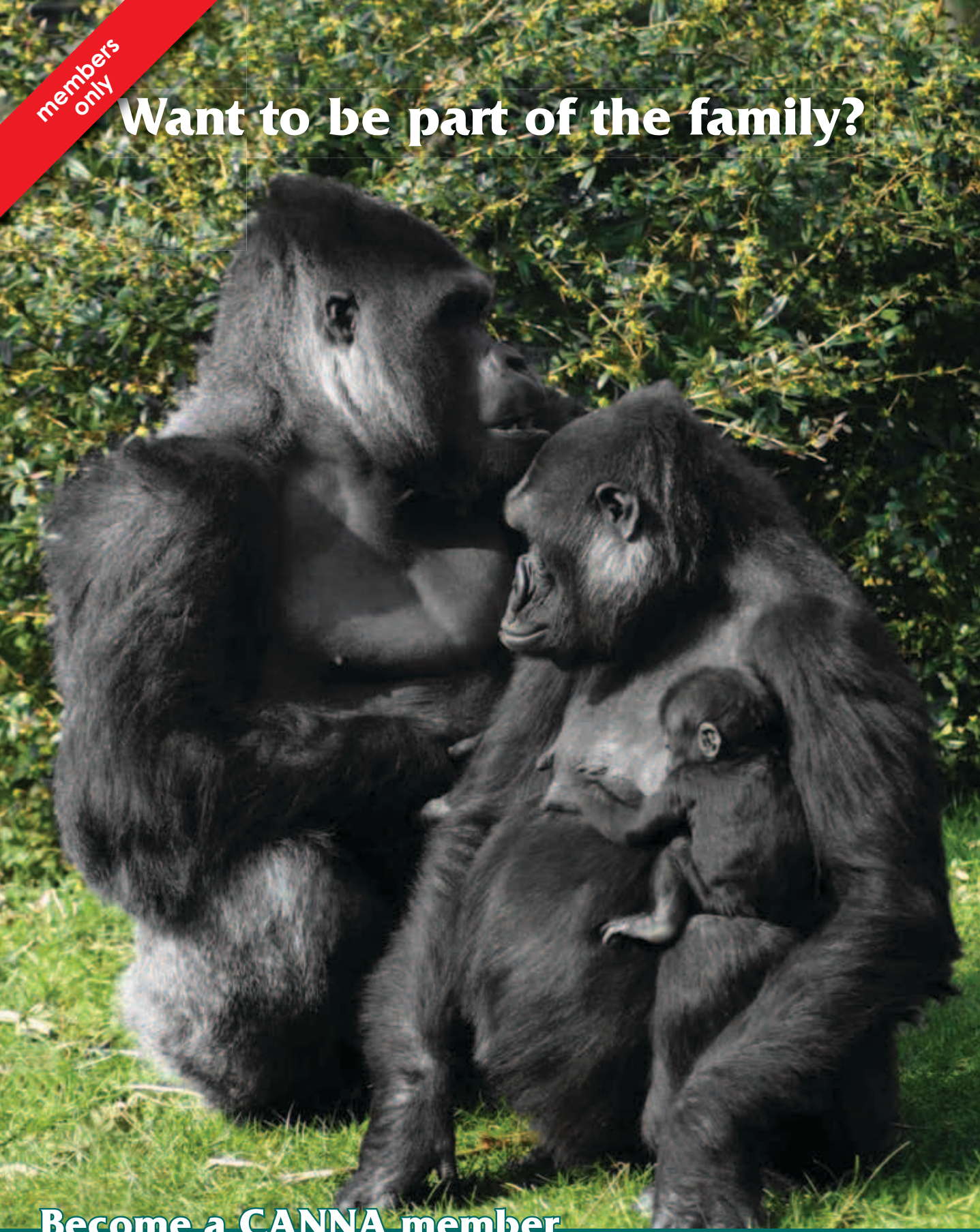
The timing and amount of fertiliser to apply will depend on the medium you are using. If you add fertiliser to a medium such as potting mixes or peat, then a large proportion of it will adhere to the particles either directly or through bind sites. If there is not enough plant material to use these nutrients, they will remain in the medium and can ultimately lead to high salt levels later on. So, feed new cuttings and plants lightly and increase the amount of fertiliser you give to your young plants in proportion to the rate of root growth.

Foliar feeds can be applied to leaf surfaces but in light amounts. Beware that Nitrogen and some other elements have a tendency to leach out of leaves under a mist system. Usually, a light amount of foliar feeding* is recommended where roots form in less then five days. The root system is considered to be the best way to feed the plant and this holds true throughout the plant's life. If a plant requires foliar applications there is usually a problem elsewhere in the plant that should be addressed.

Foliar feed can be applied to leaf surfaces but in light amounts; recommended where roots form in less than 5 days.

Taking cuttings is straightforward when done correctly and when the grower is familiar with the plant species. Some plants don't propagate well at all. Some take weeks to grow new roots, some start growing new roots while still on the stock plant. You need to know what is possible with the plant you have chosen so you to know what to expect. Remember, cutting any living plant has consequences, for both the cutting and for the stock plant. Follow these steps carefully, take care of the stock plant and cuttings and you will succeed!

* CANNA RHIZOTONIC is a popular product for use in foliar feeding. Sprayed on leaves of your cuttings it will speed up the rooting process, increase resistance against diseases, and it will improve the quality of the crop.



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Become a CANNA family member today and profit from all the benefits CANNA can offer you! Members enjoy full access to our website where they can read all about the latest news, trends, inside information on research & development, and other gardening-related subjects. When you need any help, as a member, you'll go to the front of line! Sign up at our website today and become a part of our family.

www.canna-hydroponics.com

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Questions & Answers

In issue 6 of CANNATALK we started publishing some of the questions we receive through our website including their answers. The amount of questions we receive is huge which indicates there is so much still unclear about growing. We have a team of experts ready to answer all of your questions, any question at all. They don't have to be CANNA related or about products only. We're just here to help you out with any grow related headache you run up to. And since the publication of these questions in CANNATALK got many positive reactions we decided to spend an extra page on this. So please check out what's on all of your fellow grower's minds. Or go to the member section at www.canna-hydroponics.com and ask your own question.

Question:
Is it ok to use CANNABOOST during flushing in the final 2 weeks?

Answer:
CANNABOOST is a liquid which contains specialized carbohydrates, vitamins and other special organic materials. It will influence the taste and the production. But it has no real effect on EC. Flushing you do to decrease the EC so the plant can absorb the water more easily and on the other hand to influence the taste. You want to make it less salty and sweeter. So the answer is YES. You can and we advise you to use CANNABOOST during flushing to influence the taste to the better.

Question:
I'm doing a recirculating bio bucket hydroponics system with a main central control reservoir. But what is the best way to mix CANNA AQUA A and AQUA B in the main reservoir? It says to mix A and B a few hours beforehand.

Answer:
The best procedure is to fill the tank with what you need, add the A part, stir a little, then add the B part. Check the pH about 30 minutes later and adjust. After running Aqua through the system for about 5 days the pH should stabilize. Once this happens, and you are ready to change the rez, do not run plain water through the system, mix more nutrients and use them right away. This will preserve the pH buffer. Same holds true when going from Aqua Vega to Flores. If you bubble air through the rez, it will cause the pH to go nuts. It is all about chemical reactions. This is a big concern if the air pump is supplied by air from a CO_2 rich environment. As long as the irrigation is run from the top of the bucket to drain through the medium, no air is really needed. Air is more appropriate in Oxygen poor environments like deep water culture. These pH changes will affect nutrient availability.

Question:
You say your CANNA AQUA line is pH buffered, what does that mean, if I'm using distilled water? What will this do to my pH levels?

Answer:
This means that CANNA AQUA will keep its pH level during the circulation in your NFT or other recirculating cycle. If you do use distilled water only, it will be hard though to keep the pH, as all of the natural water buffering capacity will be 'distilled' as well. Best is to always mix your distilled water with tap water to an EC of 0.2-0.4.

Question:
I'm just getting back in growing and I use a water farm and 400 Watt flo system in a 3x3x8 foot area, with clay pellets as a growing medium. I plan on growing from cuttings. Could you please give me some advice on which products I need to use to accomplish a total growth cycle? The short answer would be okay with me.

Answer:
Short answers are easy. Use CANNA AQUA and the associated feed chart which you can download from the website. It contains our recommended product line components. Also download the AQUA Infopaper as it will assist you in using the AQUA line along with the reasoning behind it.

Question:
I'm using CANNAZYM everyday (10ml/gal). If I were to start using CANNAZYM every other day instead, do you think this could lower my yield?

Answer:
CANNAZYM only affects the health of the plant and root system. Using it regular will keep the dead root material down in the root zone which removes a food source for pathogenic organisms. It provides anti-septic activity to the root zone and promotes root health. It's like an insurance policy for the roots. Use it at 9 ml/gal. It's important to maintain a concentration in the root zone at all times. At this rate it keeps the level correct at each watering. If you water more than once a day, then you can leave it out the second watering.

Question:
I was wondering if there has been any research on the subject of 8 ml/gal of CANNABOOST Accelerator vs. the 16 ml/gal of CANNABOOST Accelerator when it comes to weight. Can it change the weight of my yield by using 16 ml instead of 8 ml?

Answer:
The range we give is the range where activity or results are economically feasible. The first concern is the genetics of the plants used. The next is the growing conditions. The final concern is the marketability or quality. Between two varieties of the same plant, such as a Better Boy vs. a Beefsteak Tomato, the response to different levels of CANNABOOST will be seen. It could be that maximum results are at 12 ml/gal for Better Boy and 8 ml/gal for the Beefsteak. So you have to try for yourself to see which works better. Also, make sure that the grow conditions in watering, temperature, light levels, and so on, are all optimum. Finally, proper timing is critical for harvesting and storage to keep the quantities up. Next to that CANNABOOST directly affects the quality of the end product. When it raises the quality of the end product in areas such as taste or smell it ultimately insures you get the higher price in the market. So yes you can get higher yields form the product, but yields are subject to grower action. Good growers with strong varieties will see less increase, just better quality.

Question:
Can I add more additives like organic flavor enhancing nutrient to my CANNA mix? I'm using all CANNA products like RHIZOTONIC, CANNAZYM, COCO A & B, PK 13/14, CANNABoost.

Answer:
The Boost should flavor it fine, I don't know if you can get past it with anything else.
Question:
Does coco coir degrade over time? What effect will it have on the plants? The reason I ask is because I want to know how many times I will be able to reuse the coco.

Question:
Does coco coir degrade over time? What effect will it have on the plants? The reason I ask is because I want to know how many times I will be able to reuse the coco.

Answer:
All things organic break down over time. Coco peat does faster than coir. If you are using the pre-buffered loose fill coco from CANNA then you can go almost a year with the same medium. If it is COGr board (true coir) than a little longer but the physical characteristics change and it will gradually hold more water.

Question:
I'm running Coco with all CANNA additives at aggressive level on the nutrient calculator on your website. I'm doing drain to waste and had success with a Feed-Feed-Flush per week program. I ran into a store and the person working there recommended me Feed-Feed-Feed per week without giving it plain water. Which way do you think is the best to feed CANNA nutrients?

Answer:
The problem is that coco medium holds on to nothing except moisture. It will hold a little phosphorous but nothing else. When you apply plain water you wash everything out and leave nothing behind. Then the potassium that the coco generates naturally in high amounts will serve to lock out other nutrients. While you may not notice it, it does happen and decreases the buffering capacity of the coco so that it is harder to balance the next round of fertility. Soil or peat mixes hold onto nutrients and materials so the effect is reduced. By feeding each watering you never starve the plant or help nutrients to lock out. It may also be possible to reduce the aggressiveness of your feed program, better for the plant, the system, and your pocket.

Question:
I was wondering why one must let CANNA A+B settle for some hours after mixing it? I've heard it is because when it settles it actually pH balances itself to a good Ph level. Is this true?

Answer:
Actually it allows for the elements to stabilize in relation to themselves as well as reach an equilibrium in solution. The pH is a side benefit but still mat require some adjusting on your part.

If you didn't find the answer to your specific question, please go to the CANNA Club section on www.canna-hydroponics.com. Here you'll find a question form for you to fill out. You're not obligated to fill out the entire form. But the more info we have, the better our experts are able to help you out. The form is sent to our experts at CANNA Research automatically. They will always try to answer you as soon as possible. Maybe your question will be published in next CANNATALK!

Phytoplant Monitor

... finds out WHY plants suffer stress

Nowadays it is quite normal to know everything about your own health! Of course we can easily measure our weight and height, we can measure our cholesterol and we can even go as far as using electrocardiograms to check our heart status.

If we have a pain somewhere, there is always a doctor who can find the cause or can prescribe a medicine which will make us better. What is not well understood is that plants, as well as people can often suffer from stress, but the cause of the stress is usually unknown. It could be due to a number of factors, such as an excess or a lack of, fertilizer, water, light, ventilation and so on. Now there is a system available which can help us find the cause of plant stress. The Phytoplant monitor – this device measures different physiological parameters and environmental conditions of the plant.

This not inexpensive system is technically very advanced and is mainly used by researchers, universities, private schools, and the like. The Phytoplant monitor is very sensitive and can measure a thickness thinner than a human hair. All of the data collected by the monitor's sensors are stored in a data file which can easily be
analyzed.

The Phytoplant monitor system has many different sensors which are used to collect the data. The system consists of environmental sensors and sensors for plant growth and development.

Environmental Sensors
Environmental sensors, these sensors measure the microclimate in the active growth phase.

- The thick boundary layer sensor consists of two metal plates, one of which accumulates heat. This sensor measures the air movement by measuring the temperatures between the two plates.
- The temperature and humidity sensor works by forced aspiration.
- The total radiation sensor measures the total light both inside and outside the Green house.
- The moisture substrate sensor is composed of electrodes that measure the electrical conductivity and the percentage of moisture in the substrate. The sensors for growth and development of the plant
- Temperature sensor (leaf) - a clamp measures the temperature of the leaves. If the temperature is higher than that of the environment it means that the stomata are closed and transpiration is not working.
- Stem diameter and petiole sensor - measures tiny variations in the stem diameter (increase at night, decreases during the day) which indicates whether there is transpiration in the plant.
- Sap flow sensor - this sensor is extremely sensitive and measures the amount of sap and the direction of flow of sap in the plant.
- Fruit sensor - can measure micrometric variations in the fruit of the plant.

The Phytoplant monitor sends regular data updates to a computer program. This means it is possible to track the plants' progress day and night remotely. So for example the plant can be watered at the right time and with the right mix of fertilizer just by checking the data and not by physically going to check on the plant in the greenhouse!

In the picture

The Canna Lily

The Canna Lily.

There are many millions of plant varieties to be found worldwide.
But did you know that Canna is also the name of a series of unique and beautiful plants? There are a number of different varieties of Canna plants, with dark foliage or with striped foliage, with large flowers or small flowers and ranging from half a metre tall to almost 3 metres tall.

What are Cannas?

Canna plants originate from tropical regions of the world and belong to the bulbous and tuberous plant family. They are tender plants with a wonderful variety of pretty large leaves ranging in colour from dark red to brown to shiny green. The plant also has many large colourful exotic flowers. In total there are more than 150 different cultivated varieties (ranging from those that have flowers that look like orchids to those that have flowers like gladioli).

To find the origins of the plant we must travel to the rain forests of South America and Asia. There Cannas grow in large open spaces. The plant is commonly known as 'Indian Shot'. This name was coined in the days of conflict of colonial settlers with the indigenous Indian tribes. When their ammunition was spent the militia used the hard black seeds of the Canna plant instead. In Asia they use the seeds to make Buddhist prayer beads and in Vietnam and Southern China the plants are eaten. The cooked plant is said to taste like sweet potatoes.

In Europe the Canna plant is used as a decorative plant and is often seen in public parks and gardens. In the Victorian era Cannas were very fashionable and many varieties were bred. Unfortunately, fashions come and go and after a while the flowers went out of fashion. However, these days there are about 270 different varieties of Canna plants in the world.

Diseases

In general this plant is not commonly affected by insects, but is more vulnerable when the leaves are not unfurled. On the other hand, the plant is very susceptible to viruses. A plant affected by a virus has poor growth and discoloured leaves and often looks weak and sickly. If a plant is diseased, the best remedy is to dig it up and throw it away.

Care of Cannas

In tropical regions these plants grow and flower all year round, but in Europe we can expect them to flower in July. Canna plants produce many leaves and flowers in a short period of time. So the plant needs a great deal of moisture and nutrients, especially Potassium. This is why it is important to give the plant sufficient nutrients regularly and this is particularly important for outdoor plants.

The Canna plant is not frost-resistant. After the first ground frost, the root stock must be dug up with the ball of potting mix around it left intact. The leaves of the plant should be cut off at 10 to 15 cm above soil level and the root stock (and ball of soil around it) must be stored for the winter to help protect the roots from drying out.

The Canna is a unique tropical plant which can be grown indoors and outdoors.

CAL POLY AND CANNA COLLABORATE

CANNA proudly announces its collaboration with the University of Cal Poly in Pomona, California.

Cal Poly is the best known polytechnic university of the USA is and has an incredible status all around North America. Mr. Terry Fujimoto, a professor in Horticulture/Plant & Soil Science at the university is in close contact with CANNA to work on multiple opportunities for both parties.
For years CANNA has been advising the University with its horticultural and hydroponical expertise. "We have greatly appreciated CANNA's involvement in the development of our hydro systems, professor Fujimoto says." Since 1 year Cal Poly is using CANNA nutrients for their greenhouses at the university too. "Our results have been positive as

the nutrients are easy to use, clean and uncomplicated. When switching to CANNA, our lettuce crop showed signs of improved quality especially in the way of eliminating calcium deficiencies which were previously expressed on the newer emerged leaves in the centers of the lettuce heads."

Interested people out of profession or general curiosity can apply for a free guided tour at Cal Poly during which the greenhouses are always the biggest hit. It is the direct proof of all the theory that has been explained in the first part of the tour. The tour groups are very diverse and differ from students all over the USA to secretaries of agriculture and senators. This winter Cal Poly and CANNA will be starting field tests in which both parties will work towards the ultimate feed chart for the hothouse cucumber. Fujimoto: "It could not have come at a better time as we are cleaning out the old crop and we could design this as a good research study for one of my graduate students. We are looking forward to it as it helps both parties involved in the way of providing data on crop yields, nutrient performance, research information and production/ sales of product."

The hothouse cucumber project will not be a stand alone project. We will be working on many more opportunities of collaboration between CANNA and the Cal Poly University. One being The pioneer and global market leader in the world of intensive (indoor) growing, the other being the established polytechnic university in the USA.

Professor Fujimoto is convinced: "Your experience in the field has greatly helped us in the way of developing schedules, growing methods and use of specific varieties that perform best under our growing conditions. We look forward to ongoing collaboration with CANNA for years to come in the way of continued research and even workshops for growers."

We will keep you updated on the progress of this project and more combined CANNA & Cal Poly projects.

Enter our Hothouse Cucumber Contest

and win $250*!!!

The new project CalPoly is working on together with CANNA (read page 18) inspired us to set up this contest and see what our growers come up with. Maybe you're a true expert yourself! Or you feel like a true scientist. Then enter our competition and play around with the feed charts on this page and send us your comments/testimonial including pictures of your perfected hothouse cucumbers to editor@cannatalk.com. The best contribution will be rewarded with a "hothouse cucumber package."

So if you wish to **win $ 250*** worth of nutrients and additives start growing and sweep us away with your results. Remember that 1 hothouse cucumber at your grocery store can cost you up to $2 so maybe we just initiated your career move. You would not be the first one. Good luck and happy growing!

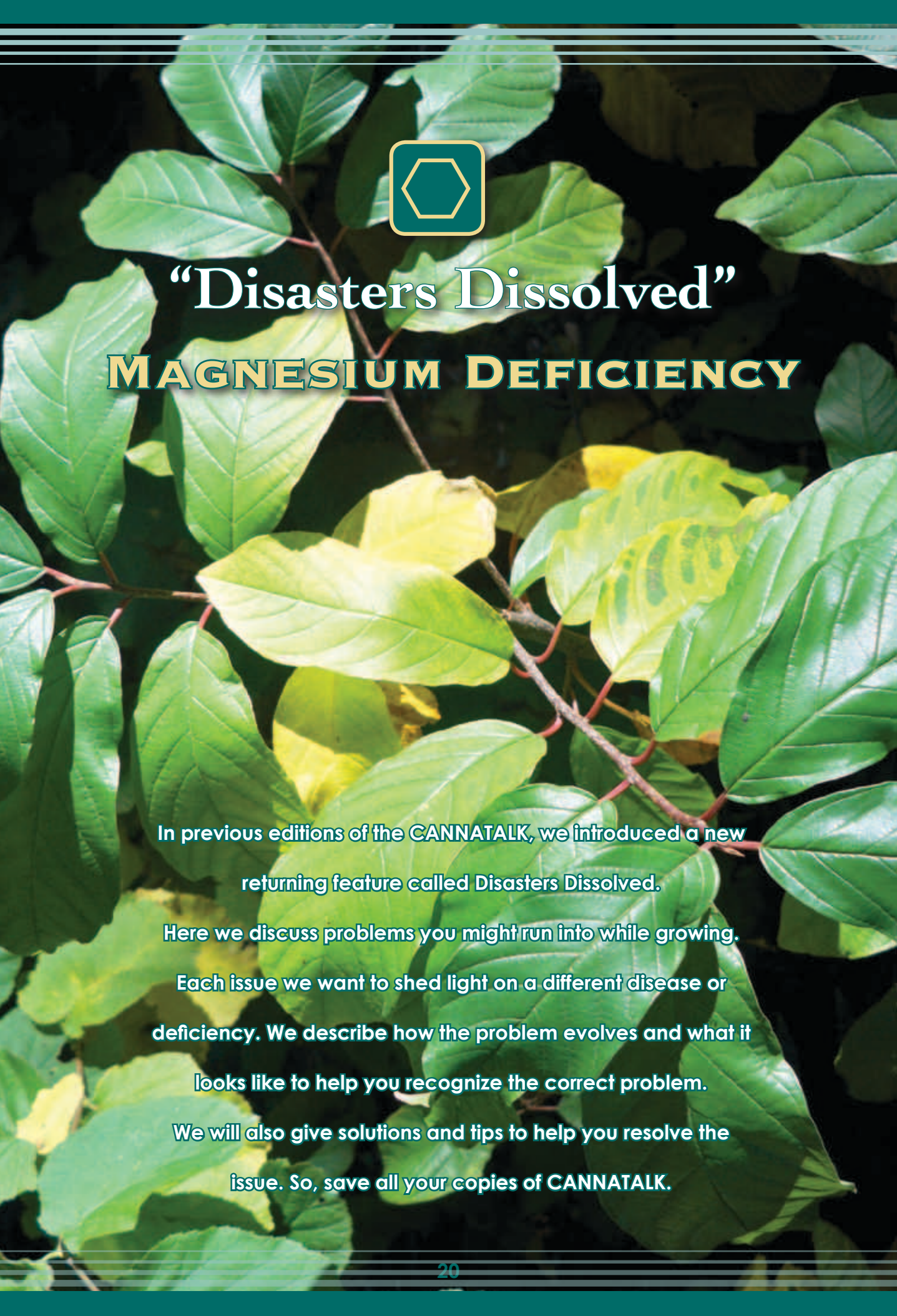
* Represents nutrients and additives needed for growing this crop to the value of approximately $ 250.
No exchanges for other products or money. CANNA will contact you when you have won.
For more information or questions please contact editor@cannatalk.com

Feedchart Hothouse Cucumbers on CANNA COCO

	COCO A ml/GAL	COCO B ml/GAL	RHIZOTONIC ml/GAL	CANNAZYM ml/GAL	EC+	PPM	pH
Seedling Stage - Duration 1 weeks	8 - 10	8 - 10	10	-	1.0 - 1.2	700 - 840	5.8 - 6.0
Vegetative stage - Duration 2-3 weeks Prune all fruits/flowers upto 15" up the main stem	10 - 12	10 - 12	5	9	1.2 - 1.5	840 - 1050	5.8 - 6.0
Generative stage - Duration 1-2 weeks Flower formation and early fruit development	12 - 16	12 - 16	5	9	1.4 - 1.8	980 - 1260	5.8 - 6.0
Fruit formation stage 1 - Duration 1-2 weeks Prune every alternative fruit until plant reaches the top wire	12 - 16	12 - 16	2	9	1.6 - 2.0	1120 - 1400	5.8 - 6.0
Fruit formation stage 2 - Till end of crop After plant reaches the top wire allow all fruits to develop until end of crop	12 - 16	12 - 16	-	9	1.6 - 2.0	1120 - 1400	5.8 - 6.0

Feedchart Hothouse Cucumbers on CANNA SUBSTRA

	Substra Vega A+B ml/GAL	Substra Flores A+B ml/GAL	RHIZOTONIC ml/GAL	CANNAZYM ml/GAL	EC+	PPM	pH
Seedling Stage - Duration 1 weeks	8 - 10	-	10	-	1.0 - 1.2	700 - 840	5.8 - 6.0
Vegetative stage - Duration 2-3 weeks Prune all fruits/flowers upto 15" up the main stem	10 - 12	-	5	9	1.2 - 1.5	840 - 1050	5.8 - 6.0
Generative stage - Duration 1-2 weeks Flower formation and early fruit development	-	10 - 14	5	9	1.4 - 1.8	980 - 1260	5.8 - 6.0
Fruit formation stage 1 - Duration 1-2 weeks Prune every alternative fruit until plant reaches the top wire	-	12 - 15	2	9	1.6 - 2.0	1120 - 1400	5.8 - 6.0
Fruit formation stage 2 - Till end of crop After plant reaches the top wire allow all fruits to develop until end of crop	-	12 - 15	-	9	1.6 - 2.0	1120 - 1400	5.8 - 6.0



"Disasters Dissolved"

Magnesium Deficiency

In previous editions of the CANNATALK, we introduced a new returning feature called Disasters Dissolved.

Here we discuss problems you might run into while growing. Each issue we want to shed light on a different disease or deficiency. We describe how the problem evolves and what it looks like to help you recognize the correct problem.

We will also give solutions and tips to help you resolve the issue. So, save all your copies of CANNATALK.

Magnesium. What is it and what does it do?

- Magnesium is indispensable to plants as it is essential for photosynthesis
- Represents a building block for chlorophyll

What do you see?

- Rusty brown spots
- Cloudy, vague yellow spots between the veins.

What can you do?

- Spray with a 2% solution of Epsom salts every 4-5 days during about a week.

About magnesium in short

Magnesium is an indispensable element for - amongst others - plants. In plants, it represents a building block for chlorophyll (leaf green), and therefore, it is essential for photosynthesis. At the same time, magnesium plays an important role in the energy transfer. Together with calcium, it is also a component of tap water, influencing water hardness. Inorganic magnesium fertilisers are produced using the same bases that are used to produce potassium fertilisers.

Symptoms of a deficiency

When there is a shortage, the leaf green in the medium-old leaves under the flowering top will be broken up, and the magnesium will be transported into the young parts of the plant. This breakdown is visible as rusty brown spots and/or vague, cloudy, yellow spots between the veins. A slight shortage of magnesium hardly affects flowering, although the development of the flowers makes the deficiency symptoms worse.

Development of a deficiency

1. Signs of a deficiency first appear around the 4th-6th week. Small, rusty brown spots and/or cloudy yellow flecks appear in the middle-aged leaves (under the top of the plant). The colour of the young leaves and the fruit development are not affected.
2. The size and number of rust-brown spots on the leaves increase.
3. The symptoms spread out over the whole plant, which looks ill. When the shortage becomes acute, the younger leaves are also affected and flower production will be reduced.

Reasons for a deficiency

The magnesium deficiency can occur because uptake is inhibited because of:

- A very wet, cold and/or acidic root environment.
- A high quantity of potassium, ammonia and/or calcium (for instance high concentrations of calcium carbonate in drinking water, or clay soils rich in calcium) in comparison with the quantity of magnesium.
- A limited root system and heavy plant demands.
- A high EC in the growing medium, which hinders evaporation.

Solutions to resolve a deficiency

- When a shortage is diagnosed, the best thing to do is spray with a 2% solution of Epsom salts.
- Fertilisation via the roots: Inorganic: Epsom salts on hydroponics or Kieserite (magnesium sulphate mono hydrate). Organic: composted turkey or cow manure.

Recovery

Rectify the possible causes: In soil, when the pH is too low (less than 5), use magnesium containing calcium fertilisers. On hydro, temporarily apply a nutrient solution with a higher pH (6.5). When the EC is too high, rinse and/or temporarily feed with drinking water only. When growing indoors, keep the root temperature between 20 - 25 degrees Celsius.

A little extra magnesium is not particularly harmful. When growing in soil, excessive quantities of magnesium do not appear quickly. Too much magnesium inhibits the uptake of calcium, and the plant displays general symptoms of an excess of salts; stunted growth, and dark-coloured vegetation.

Development of a magnesium deficiency

Grow it yourself:

Wasabi on AQUA

Thoughts on the Plant and Its Cultivation

Wasabi, or Japanese Horseradish (Wasabia japonica (Miq.) Matsum), can probably be considered as green gold these days. Fetching near $250 US per kg, it is very tempting to take on commercially. The effect of the product on the taste buds makes it very interesting to grow personally. The potential uses of the product in a wide range of applications, outside of consumption, from antibiotic to pesticide, make it a plant of the future. The characteristics of the plant make it exceedingly difficult and picky in cultivation.

Wasabi is a perennial aromatic herb growing from a short, thickened stem (rhizome) from which other rhizomes and secondary stems can form. The stems can be separated for propagation as well as the rhizomes. The plants are grown for their rhizomes, leaves and petioles, but it is the rhizome that is the most valued part of the plant which is grated and turned into pastes and other food preparations. The leaves and petioles are pickled in sake brine or soya sauce as a side dish; leaves are used fresh in salads or dried for use in flavoring dishes. Lower quality stems are mixed with European Horseradish (Armoracia rusticana) and turned into a wasabi paste.

The key to the special taste of Wasabi is in the content of Isothiocyanates (ITC's). These are not present in the plant tissue but evolve from a similar group of compounds known as Glucosinolates (GSL) and are produced when the tissue is disrupted by grating, chewing, cutting, etc. They evolve quickly but are very volatile which means they disburse quickly as well. Wasabi has a sting to it but not like peppers, this sting goes away quickly. This is why the rhizome is preferred and why it is best prepared and used at the same time.

So why is it not a plant for beginners? Specialized cultivation; that and 18 – 24 months. Wasabi is native to Japan where it grows along the gravel banks of mountain streams and rivers. It has to have two things: water and cool temperatures. There are two types or methods currently used for growing Wasabi: upland or soil, and flooded field or water. Upland is used primarily for growing the leaves and petioles, where as the water method is used to produce the thicker rhizomes. Either method has can be used successfully if the grower can control the environmental variables as this is a 2 year crop requiring extended investments and locked in assets.

The soil method, or upland, requires air temperatures of 6 – 20oC with 8 – 18oC considered optimal. Soils are best at a pH of 6 – 7 and should be very well drained. In the water method, air temperature should be 8 – 18oC but a narrower range, 12 – 15oC is considered optimal. Temperatures of 8oC will inhibit growth and below 5oC growth will stop. Other factors that have to be considered include stable cool water temperatures, water clarity, high dissolved Oxygen content, and good nutrient status at lower solution concentrations. The water flow must be constant and correct. Both methods require the plants be held at a low light level. (<700 µM m-2s-1) It takes at least 18 months for the crop to reach full maturity. Wasabi is a member of the Brassicaceae family and is subject to attack by various insects (aphids, slugs) and diseases including root and stem rots (Phoma, Botrytis), bacterial soft rot (Erwinia), and Powdery Mildew. Insect and disease issues will increase with temperature and water issues. Soil based methods have to have ample drainage and irrigation frequency will be high under optimal conditions. Water based systems must be well aerated and moving constantly at low flow rates because with lower EC levels, the nutrients have to be refreshed along with the oxygen.

The AQUA nutrient line from CANNA offers one of the best hydroponic nutrient solutions available for production of Wasabi indoors or out. Its stable pH, nutrient ratio longevity, and clean formulation insure that these consistency standards are maintained. Wasabi is a very light feeder and because of this, it is best to use a very low EC water source to ensure that the EC the plant sees is almost entirely available nutrients. Mechanical agitation, not air injection, is the best way to insure proper oxygenation is maintained in the solution while not affecting the pH buffers in AQUA as much. Still, the grower will have to monitor the pH closely. AQUA will help hold the pH more neutral (7.0) which is where it should be. Keep the water moving; plants will be best produced in gravel/ sand or sand beds using a nutrient flow technique: above everything else, keep it cool.

Please visit the website for a Wasabi Bloody Mary-recipe

QUALITY PROVES ITSELF

Wasabi Japonica

CANNA AQUA

		Light per day (hours)	AQUA VEGA A+B ml/GAL	RHIZOTONIC ml/GAL	CANNAZYM ml/GAL	EC+	PPM
GROW	**Start** - Duration +/- 3 to 5 weeks **Formation of roots from the plugs**	14	4 - 6	10	-	0.3 - 0.9	200 - 560
GROW	**Vegetative stage** - Duration +/- 18 to 24 months **Fast growth**	14	4 - 6	2	9	0.3 - 0.9	200 - 560
BLOOM	**Final stage** - Duration +/- 2 weeks **Plants approaching size**	12	4 - 6	-	9	0.3 - 0.9	200 - 560

1) Timing on stages is dependent on cropping method, whether flowering is included, and if the plant has to go through a dormant period based on winter temperatures
2) Water temperatures should run 11 – 14 °C, while air temperatures should be between 8 – 18 °C for growth. Warmer periods require higher humidity levels.
3) Starting EC should be less than 0.1 or 100 ppm.
4) Final week of hardening should give a longer storage interval.
5) Higher temperatures can cause an increase in disease and general dieback of the plants.
6) This is a low light plant, while it can be grown under light cover (50%) in the mountains of Japan, it will need shade, approximately 50-80%, in other locations, based on latitude with the most needed in the lower latitudes.
7) Change beds out or leave fallow after every 2 crops.
8) Harvest when main plant rhizomes or stems are 15 – 20 cm long and about 1.25 – 2.5 cm thick. Offshoots are used to replant crop but only 2 times before it is recommended to start fresh.
9) Flowering will occur naturally in April-May time period unless supplemental lighting is used. The nutrients remain the same.

Ginger Flank Steak with Wasabi Smashed Potatoes

Recipe courtesy Rachael Ray

- Cook Time: 25 min
- Level: Easy
- Yield: 4 servings
- Times: Prep 15 min
- **Total: 40 min**

Ingredients

- 2 inches fresh ginger root, peeled and grated
- 1/4 cup tamari aged soy sauce
- 2 limes, zested and juiced
- 3 tablespoons vegetable oil, eyeball it
- 2 tablespoons grill seasoning (recommended: Montreal Steak Seasoning by McCormick)
- 2 pounds flank steak
- 2 1/2 to 3 pounds Idaho potatoes, 4 large potatoes, peeled and cut into chunks
- Salt
- 1/4 to 1/3 cup cream
- 1 to 2 tablespoons wasabi paste - how hot do ya like it?
- 4 scallions, root end trimmed
- Handful cilantro leaves

Directions

Preheat a grill pan or indoor/outdoor grill to high.

Combine ginger, tamari, lime juice, oil and grill seasoning in a large sealable plastic bag. Add meat to marinade and coat evenly. Let stand 10 minutes then grill meat 6 to 7 minutes on each side.

Place potatoes in a pot and cover with water. Bring to a boil, salt the potatoes and cook until tender, 10 to 12 minutes. Drain potatoes and add them back to the hot pot. Smash the potatoes with a masher to desired consistency with the cream and wasabi. Adjust salt, to taste.

While potatoes and meat cook, finely chop the scallions together with cilantro and lime zest. Let meat rest 5 minutes then thinly slice on an angle against the grain. Serve meat on mash potato mounds with a garnish with a generous sprinkling of the chopped scallion-cilantro-lime zest.

Asian Chicken Salad with Wasabi Dressing

Recipe by Melissa Rubel Jacobson

- Cook Time: Fast
- Yield: 4 servings
- Healthy
- **Total: 40 min**

Ingredients

- 4 skinless, boneless chicken breast halves (1 3/4 pounds)
- 1/2 cup mayonnaise
- 1/4 cup rice vinegar
- 2 1/2 tablespoons wasabi powder
- 1 1/2 teaspoons Asian sesame oil
- 1 1/2 tablespoons water
- Kosher salt and freshly ground pepper
- 2 heads Boston lettuce, torn into bite-size pieces
- 1 large Asian pear—halved, cored and thinly sliced
- 1/2 seedless cucumber, halved lengthwise and thinly sliced on the bias
- 2 scallions, white and green parts thinly sliced
- 1 cup Mung bean sprouts
- 1/2 cup roasted wasabi peas, coarsely chopped

Directions

1. In a large saucepan, cover the chicken breasts with water and bring to a gentle simmer. Cook over moderately low heat until the chicken is white throughout, about 12 minutes. Transfer the poached chicken breasts to a plate and let stand until cooled slightly, about 10 minutes.
2. Meanwhile, in a small bowl, whisk the mayonnaise with the rice vinegar, wasabi powder, Asian sesame oil and 1 1/2 tablespoons of water and season with salt and pepper.
3. In a large serving bowl, toss the lettuce with the Asian pear slices, cucumber, scallions, bean sprouts and 2/3 cup of the wasabi dressing. Slice the chicken breasts crosswise 1/4 inch thick and lay the slices on top of the salad. Spoon the remaining wasabi dressing over the chicken breasts, sprinkle with the chopped wasabi peas and serve at once.

Don't mix brands

D. Kroeze MSc, CANNA Research

Cultivating plants requires time and energy. Naturally every new grower aims for the best results. However you may find out that there's more to cultivation than just watering the plants!

Good results require the timely addition of quality nutrients and minerals used in the right proportion. Most importantly, not all nutrients and minerals can be mixed together in high concentrations. Often, the manufacturer divides nutrients and minerals between several different bottles (such as special fertilizer for the growing and flowering stages, or A & B nutrients). It is important to read the labels carefully before purchasing fertilizers. Different manufacturers put similar ingredients into a bottle and give them all similar names, but this does not mean that all products are of equal quality. Mixing products from different manufacturers is not advisable, as it may result in an overdose or shortage of nutrients. If all the products you use are of the same brand, you can assume that the levels of nutrients and minerals are balanced and that your plants are getting everything they need in the correct proportion.

FEEDING YOUR PLANTS BASED ON THE TIMELINE

During the vegetative (growth) phase, when the plant grows mainly leaves, it requires specific nutrients and minerals. Nitrogen (N) is one of the most important ingredients required during this phase and the amount of Nitrogen present in growth fertilizer is tailored to meet these needs. This is why you should regularly feed your plants fertilizer until they start to develop flowers.
Some growth fertilizers are designed to provide the plants with a supply from which they can take what they need. Because this works like giving the plant an overdose, you should stop using this type of fertilizer earlier in the growing cycle unless you switch to using a flowering fertilizer that contains less Nitrogen. So the brand you are using will dictate the exact timing of when you should switch from using a growth feed to a flowering feed.

FEEDING YOUR PLANTS BASED ON PRESCRIPTION

Preparing food for your plants couldn't be easier! Fertilizers designed for the flowering phase are rich in a particular variety of nutrients, mainly phosphates (P). The combination of nutrients is based on what the plant needs at this stage in its life cycle. If the plant needs more, you should increase the electric conductivity (EC).

The plant will only benefit from minerals which help fruit and flower formation in the week that the plant sets fruit or flowers. So only give the plants an extra dose of PK nutrients for one week. After this period, the plants absorb much less fertilizer (less phosphates). If you feed the plants extra minerals in an attempt to stimulate flowering for a longer period of time, these will not be absorbed by the plant, but will accumulate in the growing medium, only increasing the EC.

Phosphate is the most expensive ingredient in a fertilizer. Some manufacturers keep the price of a fertilizer relatively low by adding little or no phosphate to the standard fertilizer. But as your plants genuinely need phosphate you must add extra minerals to stimulate flowering quickly. So you should actually purchase that relatively expensive bottle of minerals to stimulate flowering, in order to give your plants the correct amount of nutrients and minerals they need. If you wouldn't, you will face higher costs later on in the growing process, having chosen a particular brand of products at the start.

Before you buy a particular brand of PK fertilizer, check the instructions to see how long this should be given to the plants. The shorter this time period, the better the fertilizer! Be careful! Bargains can end up being very expensive! Never mix feeding schemes from different brands of fertilizer!

FEEDING YOUR PLANTS BASED ON INGREDIENTS

As well as fertilizer, each manufacturer has extra additives, such as enzymes, stimulants and boosters, in their product range. These are not nutrients but help the plant to access and/or continue to absorb the nutrients already available. Note: Usually these additives are added to your tank of fertilizer as required, and the amount added will depend on the composition of the fertilizer used.

FEEDING YOUR PLANTS BASED ON THE SUBSTRATE OR SYSTEM

The fertilizer used in water-based growth systems must contain precisely what the plant needs, as these systems do not bind nutrients. But this is not the case for organic substrates.
When growing in a Pre-fertilized peat based mix you don't need to add certain elements (e.g. Calcium) as these mixes already contain it. Of course precautions should be taken when growing in a bulk grade peat mix.
At the start of a growing cycle, Coco substrate absorbs large quantities of Calcium. So you must

Each substrate has different characteristics and therefore it needs a tailored nutrient

adapt the fertilizer to the corresponding fertilizer strategy! Pre-treated Coco waste is widely available. Using pre-treated Coco can reduce the effect of unwanted absorption and loss of calcium and so increase your chances of a successful crop. Specialized Coco fertilizer can be so well-balanced that you give your plants the right combinations and ratios of nutrients and minerals every week. The fertilizer is therefore precisely designed for the substrate.

In closed water-based systems, where we recycle the water, the ratio of minerals and nutrients changes as soon as the plants absorb something, making this the most difficult type of feed to mix. But there are perfectly balanced fertilizers on the market for this special growing method which are quite user-friendly!

One tiny addition can upset the equilibrium immediately, causing a change in the pH, which will affect the uptake of nutrients and minerals. The nutrient ratio will be off-balance. There is a different solution for every medium!

Growers who mix products from different manufacturers are taking a variety of risks. There is a good chance that the wrong quantity of the wrong mineral or nutrient will be given at the wrong moment. If these problems are familiar to you and you often have to flush incorrect nutrients out with water, then please look again at your products!
Use of an incorrect fertilizer (inappropriate quantity of nutrients and minerals) will always result in too much of a particular element. This accumulation of nutrients will cause the EC in the substrate to rise. The plants will display certain symptoms, from curled leaves in the early stages of growth, to burnt leaves at a later stage. Similar symptoms can also indicate too much Sodium, Chloride or a faulty climate control system. Another consequence may be that an element is suppressed (antagonism), before you can detect a clear overdose causing a shortage elsewhere in the spectrum. Generally, discolored leaves in a plant indicate a lack of a specific nutrient. Depending on which mineral or nutrient this is, the leaves will acquire a hue that experts can often recognize. But making changes to your growing process will always have a limiting influence on your yield. When you use different brands of fertilizer in the same growing medium, your plants will often be weak, the fruits soft, and the leaves may also be discolored. Later on in the growing cycle (part) of the crop may become hard, and ultimately the leaves will burn. Each manufacturer has structured its range of brand products so that the plant, according to their fertilizing strategy, will show optimal growth and flowering. The fertilizer for the growth phase is aligned to the fertilizer for the flowering phase.

A company's nutrients should be well balanced so that the plants receive the correct equilibrium of minerals and nutrients in each week and at the right phase in their cycle. They have to complete each other and be well-balanced. This can only be reached by years of experience, research, development and improvement.

GROWERS-TALK

A word from a grower

I discovered CANNATALK a few days ago and have been reading it regularly when I have a spare moment. I stumbled upon it after looking for information on using your TERRA nutrients as I recently began my first soil-grow using your CANNA Terra Professional Plus potting mix.

So far I have been using coco but recently had a bad experience using nutrients from a different company. The nutrient bottles I received were incorrectly labelled or maybe didn't even contain what they were supposed to. Both A and B solutions were equally transparent looking. Being a relative novice and the product implicated being ultra high grade, I thought that different/superior ingredients could mean they're a different color than usual, seems naive of me now though. Anyway, thinking nothing of it, I fed them as instructed on the side of the bottles.
After 8 weeks in flower the plants were a total disgrace. They were all spindly and couldn't even support themselves, there wasn't even that much for them to support... pathetic!
So after being put off for a while I went back to the drawing-board and had a good think... next time was going to be different, very different.
I decided I would rather use a one part nutrient to avoid complications and keep things simple. Your TERRA line seemed like the best option, I wanted to try something new anyway, and here I am now.
So far the results are superb! My plants are looking very happy. They're incredibly strong, a deep lush green and growing at a good pace (I think your CANNABOOST Accelerator is working its magic nicely). What a change from my last attempt,
I can't thank you enough!

The grow guide on your website is brilliant by the way, I've been following it since my plants began flowering 3 weeks ago. I particularly like the fact that it can be tailored to suit individual needs, moreover, that the user gets to input the EC of the water they're using (I'm collecting rain water when I can, another first for me, so mine is almost zero) and also select light, normal and heavy feeding regimes.

You have given me back my confidence and I am once again a happy and contented grower.

Best regards,
Simon

Simon started collecting rain water for growing his plants and is happy he can set the nutrient calculator on the CANNA website to suit to the EC of his collected water.

PUZZLE time

After a day's of hard work (or growing) or maybe while enjoying the fruits of your harsh labor, there's time to set your mind to something completely different: a puzzle or… maybe even three!

The Rules:

Sudoku:

The object is to complete the 9x9 grid so that each column, each row, and each of the nine 3x3 boxes (also called blocks or regions) contain the digits 1 to 9.

Samurai:

Five 9x9 grids with overlapping corners that make up a quincunx. The objective is the same as for the single Sudoku.

2		5		4	3			6
			7					
			2	9		5	1	
	2	1			4		5	
	7		1		2			9
4					7			3
3				7	9		6	
	6			5				
	8	9		2				

		1					4	7
				4			6	9
	4	9			5	1		
9		2		7	1	6		
		5		2				
					6	7		
			4	8	7			
		6	9			8	5	
1						4		2

	3		5					
2			8	1		5	4	
				2				8
8								5
						3	7	9
		4			2	6		
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			5					

	2		6	8				
				2				
	4			1		8	2	
	5	2						3
	9			5		7		
			1	3				
			2				9	6
	8						3	

Growers Tip #7

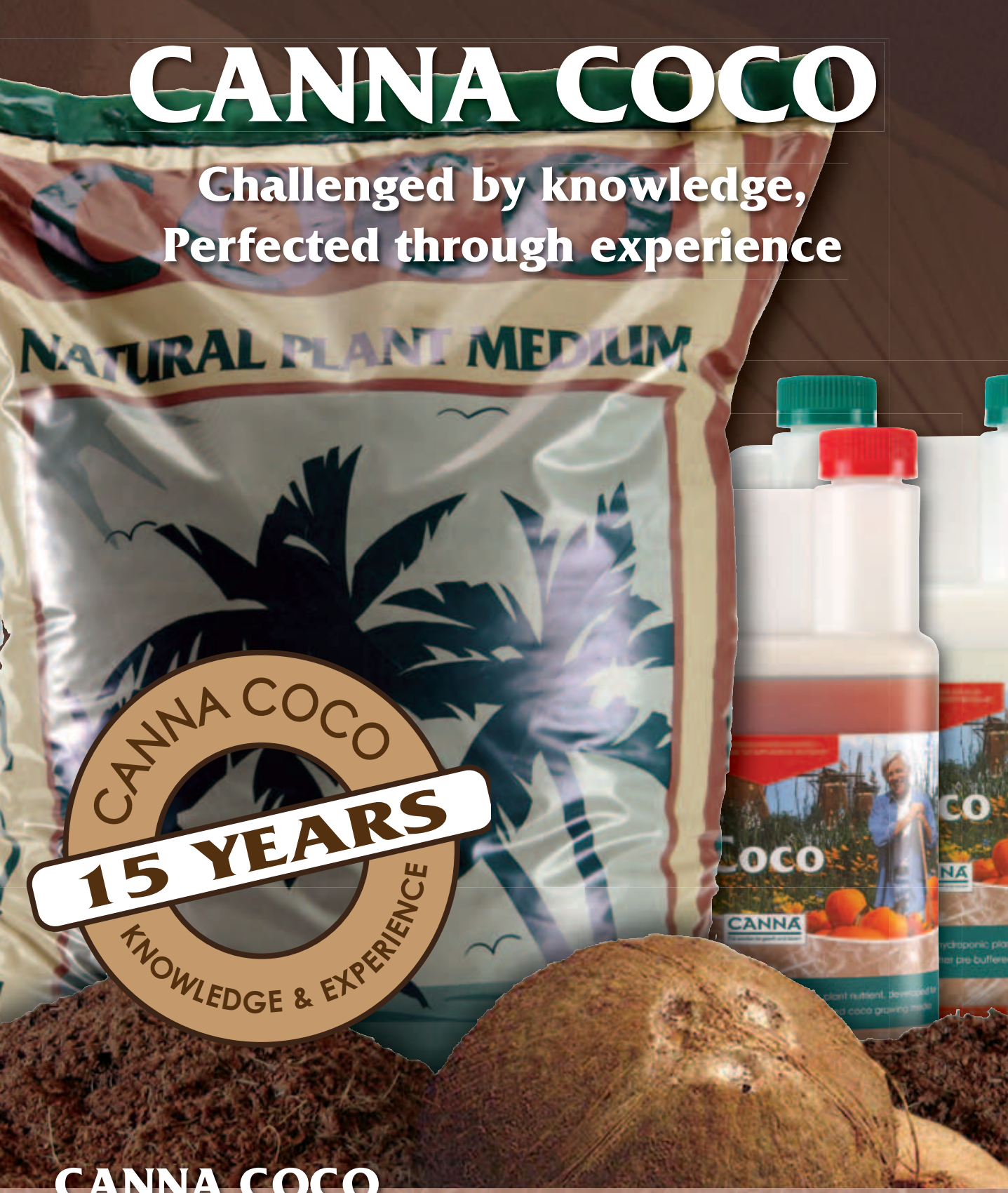
One foot a week

Beware of outlandish promises made in advertising; they are usually a marketer's idea of how to sell a product based on over-inflated claims. Plants (and all life forms) have two systems that determine how they ultimately perform and develop, genotype and environmental. The DNA or plant genes set the maximum the plant can become (goal), the environment, including nutrient regime, builds the plant to these goals. All a grower can do is to select the genotype or variety for those characteristics the grower wants. By giving the plant perfect growth and development conditions and an adequate supply of building blocks (nutrients, CO2, etc.), the plant will develop to these goals. Adding more nutrients, for instance, will not develop a plant past the genetics of the variety. To do this requires the use of complex growth factors usually confined to the interior of the plant, such as Plant Growth Regulators and chemicals that trigger growth responses. These products can have as many undesired results as desired ones. Most of these materials will remain with and in the plant. For plants that are for visual effects only, this is not such a problem unless the growth or development is distorted. It is a problem where the plant or plant parts are consumed by other life forms. These can and usually do lead to increased risks of cancer and toxic shock or poisoning. This also includes pesticides of any type. Work with the two systems and blow off the Snake Oil, we will all be better if you do.
Be careful what you wish for……you may just get it.

Even loads of nutrients will never help a Bonsai tree get big.

CANNA COCO

Challenged by knowledge, Perfected through experience



CANNA COCO

15 Years ago CANNA was the first company ever to develop and introduce a research based coco medium. As a true pioneer, we welcomed you to a new level. Over the years we learned that experience makes a difference. It helped us in further refining an already high quality product into the excellent product it is today. A balanced program developed by CANNA Research. The COCO nutrient contains exactly what the COCO medium needs. They reinforce and complete each other in such a way results can never be equalled when they are not used together. CANNA COCO medium also contains the strengthening Trichoderma mould, it is very easy to use, RHP certified, 100% natural and reusable as well! For more information check out our website or get a copy of the CANNA COCO DVD at your favourite gardening store.

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