

# CANNAtalk<sup>®</sup>

MAGAZINE FOR SERIOUS GROWERS

ISSUE 16 2012

## QUALITY MARKS

Organic certification



## HIPPIES

Where are they now?



## SOY

Protein-packed Ninja



Powered by

### CANNA

The solution for growth and bloom

And more:

Bio and mineral fertilizers

Grower's talk

Pests and Diseases

Questions & Answers

Grower's Tip

Factographic

Puzzle & Win

# GROZONE CONTROL

CLIMATE CONTROLLERS  
CO<sub>2</sub> GENERATORS

**NEW**

**SCC1**  
ALL-IN-ONE SIMPLIFIED  
CLIMATE CONTROLLER



AND SO  
MUCH MORE...



GROZONECONTROL.COM

3yr  
WARRANTY



## HOTalk:

There are many different ways to grow your crop but in general we distinguish between 'organic' and 'mineral' methods of cultivation. More and more gardeners want to grow organically, but what is the difference and when are crops truly organic? There is still some confusion about this, so we decided to make this issue of CANNAtalk 'the Organic Issue'.

On page 24, you'll find an article that sheds light on the differences between organic and mineral fertilizers. Unfortunately, it's still difficult to immediately recognize whether a fertilizer is truly organic. Sure, there are certification programmes, but sadly misuse of certification logos still exists. Firstly, logos are sometimes used when the product has not been certified at all. Secondly, many consumers don't know the exact meaning of each logo so sometimes logo's are used that aren't even relevant to the product. For example, you might find a logo that is actually meant for organic food used on fertilizers and/or soils! The article on page 4 explains all these logos, what they mean and what they should be used for. This should help you understand which logos can really tell you something about the fertilizer or soil you use and which logo is probably being misused.

For all true organic growers: check out page 15. With BioRHIZOTONIC you can grow truly organic all the way!

We hope that this issue of CANNAtalk will be helpful for you whether you have already gone organic, you're considering going organic, or you're just curious to know what it's all about. But of course, if you'd rather stick to mineral ways of growing, our other sections like Q&A, Grow-it-Yourself, Pests & Diseases will still be of interest.

Enjoy reading,  
Jeroen

## Contents

	<b>CANNA Research</b> Quality Marks	4		<b>What's Happening?</b> Where have all the hippies gone?	20
	<b>Questions &amp; Answers</b> We answer your questions about growing	10		<b>Grower's tip &amp; cartoon</b> Measure your water temperature	23
	<b>Grow It Yourself</b> Soy	12		<b>CANNA Research</b> Bio and mineral fertilizers	24
	<b>Grower's talk</b> Marion grows organically	14		<b>Puzzle</b> Win BioRHIZOTONIC	28
	<b>Product Flash</b> Introducing BioRHIZOTONIC	15		<b>Facts</b>	29
	<b>Factographic</b> Carnivorous plants	16		<b>What's next?</b> It's all about CO <sub>2</sub>	30
	<b>Pests &amp; Diseases</b> Nematodes	18		<b>Colophon</b>	30



# THE ORGANIC CERTIFICATION PARADIGM

TOWARDS THE END OF THE LAST CENTURY, A MOVEMENT BEGAN IN THE MORE ECONOMICALLY DEVELOPED COUNTRIES OF THE WORLD TO TIGHTEN UP REGULATION ON PRODUCTS THAT WERE BEING MARKETING AS ECOLOGICALLY FRIENDLY OR ORGANIC. SOCIETY HAD BEGUN TO IDENTIFY THE PROBLEMS INHERENT IN APPLYING THE PRINCIPLES OF MASS PRODUCTION TO THE FOOD CHAIN. PRODUCTS BEGAN TO APPEAR WHOSE MAIN SELLING POINT WAS THEIR INHERENT SAFETY, HAVING BEEN GROWN IN A NATURAL WAY.

By Geary Coogler & Iñaki Garcia

Unfortunately, not all manufacturers were scrupulous and governments were forced to step in. Various legislation sprang up around the world with the aim of reflecting the actual science of the issue. The science had remained unchanged, of course, but society began to demand a shift from the 'all chemistry is good' paradigm, to a new view that 'natural is better'. This paradigm shift has brought many changes and there are sure to be more to come. But what is this new organic paradigm? How are products assessed? And how does the consumer know when advertising claims are true?

Let's take a look at the situation on two continents.





## THE ORGANIC CERTIFICATION PARADIGM

### QUALITY MARKS IN THE EUROPEAN UNION

#### The Objectives and Principles of Organic Production

The European Union has issued a regulation on organic production, named (EC) 834/2007. According to this regulation, organic growers must respect nature's systems and cycles, sustain and enhance the health of soil, water, plants and animals and the balance between them. The aim of this regulation is to improve biological diversity.

Organic growers should also use energy and natural resources responsibly, maintain high animal-welfare standards and produce 'products of high quality'. These products must be produced in a way that does not harm the environment, human health, plant health or animal health and welfare.

Basically this means that organic growers must respect soil life, soil health and prevent soil erosion. An organic grower should also use as few non-renewable resources as possible, but instead recycle waste and by-products of plant and animal origin.

#### Terms Used for Designating Organic Products

Article 23 of Regulation (EC) 834/2007 establishes the terms 'biological' and 'ecological' (and their abbreviations 'bio' and 'eco') may only be used on those products produced in accordance with the rules listed above. It is important to remember that the terms 'ecological' and 'biological' are synonymous in certain countries, such as Spain.

#### Cultivation Practices in Organic Plant Production

So what does organic growing mean when it comes to everyday practices like fertilizing, sowing, and so on?

According to EU regulation (EC) 834/2007, an organic grower should rotate crops every few years. When fertilizing crops, organic growers should take the following into account:

- a) fertilizers should come from livestock manure or organic material from organic production.
- b) The use of biodynamic preparations (this means preparations from your own farm) is allowed.
- c) fertilizers and soil conditioners may only be used if they have been authorized for use in organic production (under Article 16 of EU regulation (EC) 834/2007).
- d) Mineral nitrogen fertilizers must not be used.

Additionally, all plant production techniques used by organic growers should prevent or minimize pollution in the environment. Pests, diseases and weeds should be controlled primarily by using natural enemies (predators), choosing the appropriate plant species and varieties for the environment, crop rotation, cultivation techniques and thermal processes. If a crop has been damaged, plant protection products may only be used if they have been authorized for use under Article 16 of EU regulation (EC) 834/2007.

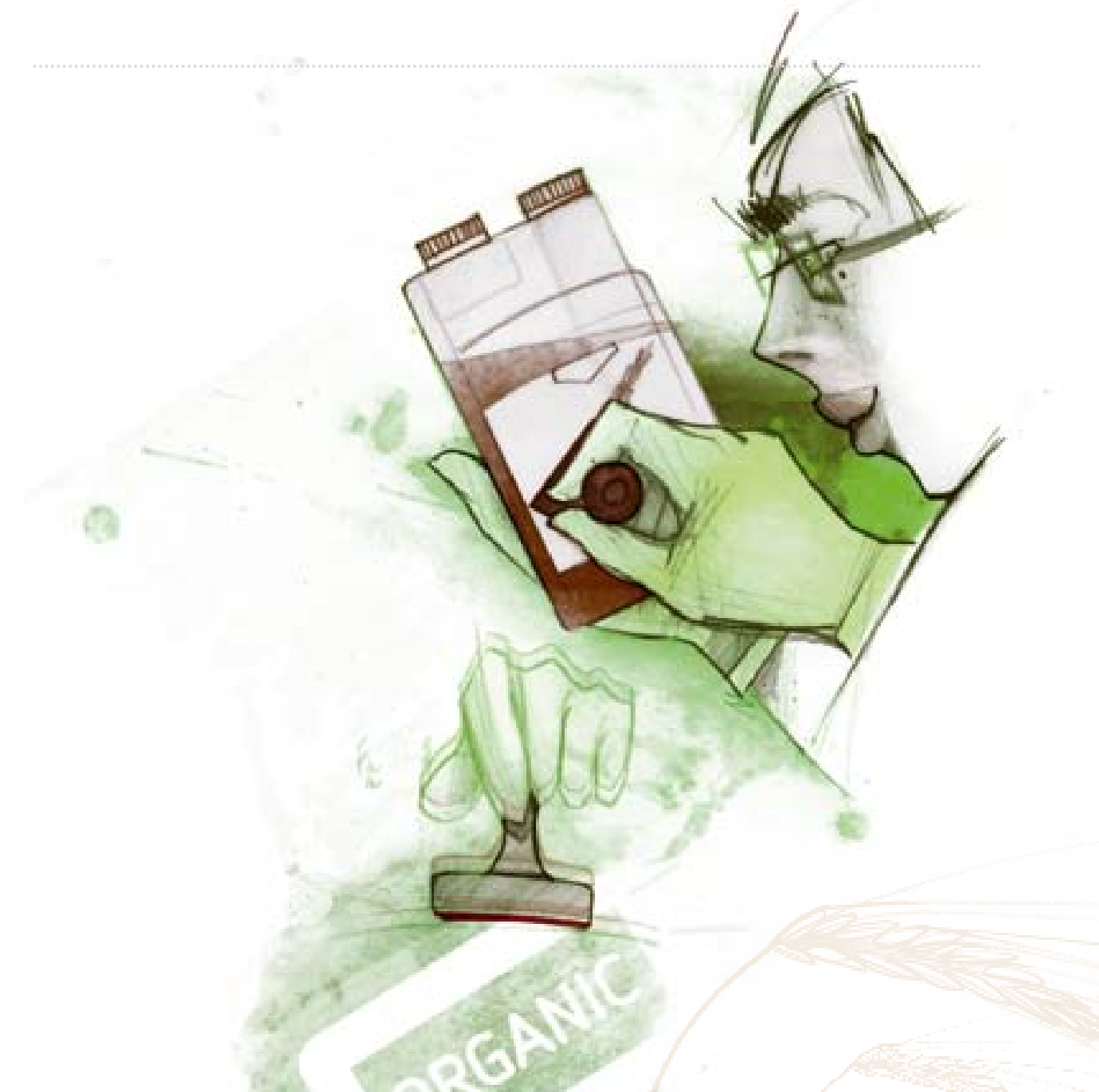
When it comes to seed and 'vegetative propagating material' (such as cuttings etc.), only organically produced seed and plants are allowed. To this end, the mother plant (in the case of seeds) and the parent plant (in the case of cuttings) must have been produced organically for at least one generation, or, in the case of perennial crops, two growing seasons.

Only authorized products may be used for cleaning and disinfection (under Article 16 of EU regulation (EC) 834/2007).

However, if these practices are not sufficient for the proper growth and production of crops, a selection of fertilizer products are permitted, which are listed in Annex I of Regulation (EC) 889/2008. However, in order to use any of these products, a written justification must be provided.

#### Community Logos for Organic Food and Consumables

Products for agricultural use are known as consumables. To ensure that a consumable meets the established requirements, each European country has agencies that inspect the product and certify that it may be used in organic farming.



Each agency has its own logo which can be used to distinguish organic products from those that do not meet the relevant legislation. These logos should not be confused with the community logo that is used on organically produced food and beverage products. The logo designed for organic food and beverages is called the 'euro-leaf' and its use is controlled by Regulation (EU) 271/2010. The euro-leaf logo replaces the logo used previously.

#### GMOs and Hydroponic Systems

Article 9 of Regulation (EC) 834/2007 prohibits the use of genetically modified organisms in organic production in all cases because, as stated in Preamble (9) of the regulation, 'genetically modified organisms (GMOs) and products produced from or using GMOs are incompatible with the concept of organic production and consumers' perception of organic products. However, organisms whose genome has been modified by traditional genetic mutation methods may be used in organic production.



**Figure 1:** Above at the left the old Euroleaf logo and the new one. The Euroleaf logo indicates that a product is legally organic because it is in full conformity with the conditions and regulations for organic farming established by the European Union. For processed products it means that at least 95% of the agricultural ingredients are organic. The Euroleaf logo only applies to food products. The 3rd logo on the right is the logo of the Control Union (CU). This label means that a product is suitable for use in organic growing. A CU-certified product must mainly consist of elements coming from organic agriculture or the wild. Also, the product may not be chemically treated or contain heavy metals.



## THE ORGANIC CERTIFICATION PARADIGM

Another important aspect of European legislation is that it expressly prohibits the use of hydroponics, defined as 'the method of growing plants with their roots in a mineral nutrient solution only or in an inert medium, such as perlite, gravel or mineral wool to which a nutrient solution is added'. As such, hydroponic crops cannot be considered organic even if they have been fertilized with organic nutrients. It is important to note that other countries do not always share the same views. In North America, the USA does not directly forbid hydroponic production. However, both Canada and the USA prohibit GMOs in organic production.

### QUALITY MARKS.

#### THE USA AND CANADA

Canada and the USA each have their own laws regarding the certification of products labelled as organic; however, Canada aligns itself closely with the National Organic Program (NOP) as established by the United States Department of Agriculture (USDA). In Canada, the main law that establishes controls on organic production is the Canada Agricultural Products Act (R.S., c. 20 [4th Sup.], or CAPA. In the USA, the law establishing controls is the Organic Foods Production Act of 1990 (OFPA).

#### Objectives and Principles of Organic Production

The objectives and principles used for organic production in the EU are the same as those in North America. In practice, however, there are two differences: the first is that it requires regulations to implement the law. In the USA, for example, organic control may require multiple agencies with multiple regulations, each of which must be followed. And second, in both countries, the trade unions are closely allied with the regulatory bodies so that regulations are inevitably couched in such a manner as to bring less cost and troubles to the members of these trade unions, while tightening competition.

The objectives and principles used for organic production in North America are broadly the same as those in Europe. In the USA, the USDA is the federal enforcement authority;

however each of the 50 states has its own Department of Agriculture tasked with enforcing its own rules and regulations as well as federal regulations. The USDA established what is known as the NOP through regulations in 7 U.S.C. 6501-6522, and defined it in 7CFR205. In Canada, the enforcement agency for the CAPA is the Canadian Food Inspection Agency (CFIA) and the regulations they must follow are set out in the Organic Product Regulations of 2009 (OPR). These regulations, along with the Act that they are based on, are collectively known as the Canadian Organics Regime (COR).

In Canada, the standards of the OPR are laid out in CAN/CGSB 32.310, Organic Production Systems – General Principles and Management Standards and in CAN/CGSB 32.311 Organic Production Systems – Permitted Substances List. These two publications detail all the requirements enforced by the CFIA, including which products may or may not be labelled as 'organic', and every aspect of production from the land, to fertilizer registration, to production. It also establishes certification procedures and Certifying Agents.

In the USA, a publication known as the NOP Handbook details these same areas of regulation. Additionally, 7CFR205.600 et seq. details the National List of Allowed and Prohibited Substances and the criteria on which that list is based.

The USA and Canada have an equivalence agreement which certifies that the regulations of both countries are substantially the same and products produced and certified in one country can be exported to and certified as organic in the other country. Canada, however, does not accept hydroponically grown products as organic.

#### Concerning the Terms Used for Designating Organic Products

Both countries in North America only allow the term 'organic' to be used in conjunction with certified products. Other words like 'ecological' (or 'eco') and 'biological' (or 'bio') are not restricted except when used in context with the product. If the regulatory body determines that a word (these or others) is being used to circumvent the organic legislation, then it can also be tested.

#### Cultivation Practices in Organic Plant Production

The cultivation practices that must be followed in order to be certified as 'organic' in North America are identical to their European counterparts in virtually every way. These

practices are detailed in the CAN/CGSB 32.310, Organic Production Systems – General Principles and Management Standards and the NOP handbook. Again, these are federal standards and it is worth mentioning that in the USA, state governments can also have a big say in organic production in their own state, as long as they does not detract from the protection provided under federal law. Washington state and California both now have their own state-certified programs.

#### Community Logos for Organic Food and Consumables

In North America, there are also agencies to certify that certify inputs, processes, and end-products as approved for use with the term 'organic'. The equivalence agreement between the two countries allows for either to be an acceptable certifying country program, and an agency such as the Organic Material Review Institute (OMRI) or the State of Washington's (WSDA) can certify the product for use in the programs of either country. Acquiring any certification requires the product to be certified to the minimal NOP standards.

What this discussion makes clear is that, while regulations may change a few terms, have different certification logos, and differ in some of their guiding principles, the guidelines are pretty much the same. The intention is certainly the same: to protect the consumers and the environment. The regulations are strong and the science is correct. The new organic paradigm is here to stay. •



**Figure 2:** The Organic Materials Review Institute (OMRI) Listed label means a product has been approved for use in organic growing and complies with the organic standards of the U.S. Department of Agriculture.



**Figure 3:** It looks like meat from a factory farm but it isn't... You can be certain this cow was treated with respect and high health standards.

**Figure 4:** These mushrooms are pre-packed, but still organic! The euroleaf logo tells you that this product is classified as organic in the EU. Note: the euroleaf can only be used on consumable products such as food and drinks.





# Questions Answers

We get a lot of questions on growing through the website [www.canna-hydroponics.ca](http://www.canna-hydroponics.ca). As always, CANNA Research is more than willing to advise you!

## Question

I don't have a problem with my plant growth just a question about using RHIZOTONIC. I use RHIZOTONIC as a foliar spray and go by the instructions provided. My question is do I need to adjust the pH level of the spray, since RHIZOTONIC does change the pH. I know it has to be adjusted in the nutrient feed for the roots, but is it safe using a spray that has been adjusted with liquid silicon or hydrogen peroxide? I don't want to burn my leaves.

## Answer

The best pH level for a leaf spray is between 6.5 - 7.0. Make sure your pH meter is accurate. It is better to spray 7.5 (no pH correction) than 5.8 (with pH correction). Acid burns holes in the leaves. It might be nice to make a trial with spraying RHIZOTONIC and CANNABOOST.

## Question

Can I use CANNA SUBSTRA with your COCO medium? I have both rock-wool and coco pots and would like to use only one fertilizer that drains to waste.

## Answer

Well you could but you would not be happy with the results. Using CANNA Coco A&B on rock-wool will produce a nitrogen problem first, and there will also be other micro-nutrient issues as well, not to mention phosphorous being wrong during both the veg and floral growth stages. Using CANNA SUBSTRA on coco is a better option but not by much as you will see major calcium issues followed by imbalances with everything else. Sorry, these products are designed for the way things work in the root zone and the way the plants interact with the different growing media.

## Question

Which nutrient would you recommend for a recirculating system with coco medium? The CANNA COCO A&B nutrients info states: "CANNA COCO is easy to use, dissolves directly and is extremely suitable for growing in pots or with 'run to waste' systems." The run to waste part is my concern with that. Or would you recommend using the AQUA line, because this says it is for recirculating systems? There, my concern would be that it states that no medium is required. Any insight would be greatly appreciated.

## Answer

Let's be clear from the beginning: we do not recommend coco for use in recirculation systems. This is due to the high levels of salt that coco gives off every minute of every day. It also has to do with the ability of the medium to hold water and the drowning effect that a re-circulating system will have if done properly. That said, your best results will still be achieved using CANNA COCO nutrients. There are reasons that we design products for different systems. These systems behave differently. Recirculating in a medium that will only need water every couple of days does not make a lot of sense and defeats the goal of equilibrium in an inert hydroponic system. But it remains your choice. If you water too often like daily in the beginning or several times a day in later stages, the plants will suffer.

## Question

I would like to ask if the CANNA COGr nutrients (COGr Vega & COGr Flores) can be used with a normal pre-buffered bag of coco?

## Answer

In general we would not advise this, because you can get an excess of K (potassium) and a shortage of magnesium and calcium. If you put your system together in such a way that you have to water a lot, then it is possible. But you need high small pots and a drainable system.

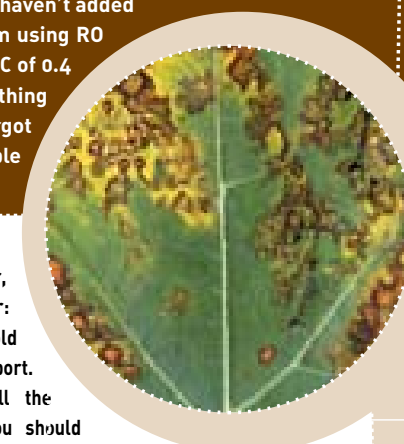
Which nutrient would you recommend for a recirculating system with coco medium?

## Question

I planted my seedlings two weeks ago, once they had germinated they were put into root cubes and then put straight under a 125 watt CFL light and fed with RO water (pH reading 5.8 - 6.0). When the roots had penetrated through the bottom of the root cubes, I transplanted them with the cube into a pot of coco coir. Then they were put under the same light and fed the same water. However, a day or two after transplanting them, I started to notice that the growth had slowed down. I thought it could just be that they were getting used to the new medium. I have grown plants before and after two weeks of seedling growth, the plants had at least a few new leaves. These, however, still only have their first leaves, so growth is really slow. I then started to notice that some leaves had rusty brown spots and were turning a lighter green. When I saw this I started to panic. I didn't want to lose my plants! I'm an indoor grower and I haven't put any ventilation through the tent at the moment apart from opening the ventilation holes. So the plants have got air circulation (kind of). The temperature is about 23 to 24°C and the humidity is about 40 to 50 %.... so my problems are slow growth, brown spots on leaves and the leaves turning a lighter shade of green. I haven't added any nutrients whatsoever and I am using RO (reverse osmosis) water with an EC of 0.4 and a pH of 5.8 - 6.0. Is there something I'm doing wrong? Oh, and I also forgot to mention that my stems are purple on all of the plants.

## Answer

Brown spots, a lighter green colour, and purple stems will show often after: no feeding, low EC and high pH, a cold environment and poor water transport. With RO water you will remove all the calcium. However, with RO water you should be seeing a much lower EC than 0.4. So, you first need to check that you are using RO water and not in fact a water softener that will replace ions like calcium and magnesium with less desirable ones like sodium and potassium. You could also check the accuracy of your meter. There are several things going on and they all can and will combine to make this particular issue worse. First, under-fertilization of many elements (purple stems), second, a nutrient ratio that has nothing in it but potassium and a few other useful elements (brown spots, burning at leaf tip, distortion in any new growth or total stagnation), and third, you are restricting the water flow through the plant by holding the humidity so high in the tent (relates to all of the symptoms that you described). Here is what to do: 1) Stop softening the water and use RO, or use nothing but tap water and add back enough tap water to achieve an EC of 0.2 or better in the water source before mixing; 2) Make absolutely sure you are using buffered coco or treating our CANNA COGr line with its Buffer Agent BEFORE use; 3) Remove the tent set-up when the plants root and ensure good circulation of air (and thus water movement) at all times; 4) Never put straight tap/RO/soft/source water on coco medium unless it is balanced with a minimal nutrient charge (0.6 EC); 5) Water in the new transplants with the lower range of EC listed on the feed chart; 6) Because there is a large difference in porosity between the RW cube and the coco, this will inhibit water movement into the cube during the first few days. So make sure the cube is the target of the water solution as it is applied because it will dry much faster than the coco, and water will not move from the coco into the cube fast enough to replace it. Watch this cube over the first week or two as the plant roots into the coco. If the container is really big, the cube may dry out a day or more before the pot does, causing some of the same issues. Oh, and if I did not say it before let me say now, NEVER use plain water on coco during the growing process.



## Question

Why can't you use CANNA Start in a recirculating system?

## Answer

If you use CANNA Start in a recirculating system, there will be a slight difference in the composition of the nutrients, because CANNA Start is designed to be more effective in organic-based systems. You would only use it for about a week and we believe you can achieve the same results using the CANNA AQUA line at a lower concentration.

## Question

Hi, can your COCO soil-less medium go bad? I've had bag for over a year, I was thinking of using it...please advise.

## Answer

If it has been stored in decent conditions, it should be no problem. I have used them up to two years after production with no issues.

## Question

Just wondering if you have had any issues with your CANNA Coco A&B giving a pH reading of around 4 when mixed at the full dose? That's just A and B no other ingredients added. I am using reverse osmosis water that is coming out around 6 with nothing added. I have been using your product for the last 2 months and now this problem just came up. I am using a solution tester, and have even tested the reverse osmosis waste water to check for any inconsistencies in the tester itself. But the waste water comes out at around eight, the same as it always has. I am filtering my water because I have mineralized well water. I have cleaned the tester tube, to make sure there is no contaminated residue. Has the tester solution gone bad? What the hell?

## Answer

I think either the meter is out or the solution is, and by a whole point. The pH of RO water should be pretty close to 7.0 not 6.0. Purified water is slightly acidic due to the hydrogen bonds but it still has a pH of 6.9. So based on what you have said, I would assume that this is the problem.



# GROW IT YOURSELF

Creative Commons - Scott Robinsona

# SMALL BEAN BIG DREAMS

THEY'RE JUST TINY LITTLE BEANS. BUT THIS IS ONE CASE WHERE SIZE DOES NOT MATTER,

BECAUSE THESE LITTLE BEANS ARE SO VERSATILE, SOME PEOPLE SAY THAT ONE DAY SOY COULD

BE THE ONLY PLANT GROWN ON THE ENTIRE PLANET. WELL, THAT WOULD BE A BIT DULL FOR

ALL US PLANT-LOVERS, BUT YOU CERTAINLY HAVE TO RESPECT THIS PROTEIN-PACKED NINJA OF

THE VEGETABLE WORLD. LET THEM EAT SOY!

Text: Marco Barneveld, [www.bqurious.nl](http://www.bqurious.nl)

Around five thousand years ago, the Chinese first began to cultivate soy plants. The short green pods each contained 2 to 4 beans, which they used as food and, once they discovered their health benefits, as ingredients for medicine. The soy bean rapidly became one of the most important crops to the Chinese. According to Chinese mythology, in 2853 BC, the legendary Chinese Emperor Shennong proclaimed five plants to be sacred: soy beans, rice, wheat, barley, and millet.

## The Chinese spill the beans on their soya secret

The Chinese kept their soy beans a secret from the rest of the world for as long as they could, but eventually word got out, and little by little, the soy bean conquered the whole world. By about the first century AD, soy beans were being introduced into several other Asian countries due to the spread of trade routes, via both land and sea. The evidence suggests that soy bean cultivation began on the Japanese Archipelago in the early Yayoi period. The earliest references to the soy bean in Japanese writing are in the classic Records of Ancient Matters,

which were completed in 712 AD. Many people have claimed soy beans in Asia were historically only used after going through a fermentation process. However, a drink similar to soy milk has been used since 82 AD and there is evidence that tofu consumption dates back to 220 AD.

The beans were introduced to America in 1765, and that was when they really took off. They were brought over by a sailor named Samuel Bowen who took some seeds with him from China. He was the first of many soy bean growers in the USA and they even exported soy sauce to England.

## Henry Ford leads the soya revolution

soy beans took on a very important role in the United States during the 1930s. During the Great Depression, the drought-stricken regions of the United States were able to use soy crops to regenerate their soil because of the plant's nitrogen-fixing properties. Farms were instructed to increase their production to meet government targets, and Henry Ford was a great pioneer of using soy beans in industry. In 1932-33,

the Ford Motor Company spent approximately \$1,250,000 on soy bean research. That would be the equivalent of billions in today's money. By 1935, the manufacture of every Ford car involved products derived from soy. There was soy bean oil used in the paint and in the fluid for the shock absorbers, for example. Henry Ford promoted the soy bean, helping to find uses for it both in food and in industrial products.

## Vegetable versatility

How does this work? Well, after soy beans are harvested, they are cleaned, cracked and de-hulled. Then the soy bean oil is separated from the soy bean meal.

The soy bean oil is refined for use in margarine, salad and cooking oils, plus hundreds of other non-food products. There's a good chance that the newspaper that comes through your door each morning is printed using soy ink. And the foam insulation and carpet backing in your home? It's made from soy plastic. Not a day goes by without us touching or tasting something derived from soy beans, even though we may not know it. The elevators that take visitors to the top of the Statue of Liberty rely on a soy-based hydraulic fluid. soy bean meal is also used to make wood adhesives, biodegradable plastics, printing inks and textiles. Whether it's candles, cleaning fluids, crayons, cosmetics, concrete sealers, dust control, engine oil, fuel, industrial lubricants, paints, roof coatings or varnishes, soy is an essential ingredient for natural, renewable products from A to Z. That's a small miracle, when you think about it!

But it doesn't stop there. soy bean meal represents 68 percent of the world's protein consumption. It provides nutrition for hundreds of species including poultry, pigs, cattle, fish, dogs and cats. In fact, every part of the bean can be put to good use. Lecithin is extracted from soy bean oil for pharmaceuticals, protective coatings and emulsifiers that keep chocolate and cocoa butter in candy from separating. The soy bean hull is used as a high-fibre ingredient for breads and crackers. Even the stubble left over in the fields after harvesting can be collected to make building materials.

## Cancer treatment?

It seems the soy bean may well have unique health benefits too. Plant oestrogen were first identified in the early 1930s. Back then it was discovered that soy beans contained compounds that were much like oestrogen. Scientists began studying the role played by isoflavones in reducing the risk of breast cancer in the 1960s. In a Japanese study carried out in 1981, researchers found that daily consumption of miso, a soy bean paste, was linked to lower death rates from stomach cancer in over 260,000 men and women. At around that time, other studies on soy were being published in the United States. In October 1999, the U.S. Food and Drug Administration (FDA) agreed to permit health claims about soy's role in reducing heart disease on food products containing soy protein.

Some researchers believe that the isoflavones in soy, such as genistein, daidzein, and glycitein, could play a role in reducing the risk of cancer. A number of studies have suggested that soy may reduce the risk of several types of cancer, including breast, prostate, ovarian, and uterine cancer. Scientists believe there is enough evidence for phytoestrogens to be studied in clinical trials alongside standard medical treatment for breast or prostate cancer. Human studies sponsored by the National Cancer Institute are on their way. Large-scale studies looking

at groups of women with a high soy-based dietary intake have shown a lower risk of breast cancer and endometrial cancer. It is also possible that the weak oestrogen-like effect of soy may help to prevent prostate cancer.

## Bean protection for breasts

Some studies have suggested that the effect of soy foods on breast cancer depends on the age at which they are consumed. It is thought that a high soy intake in young women during breast development, while oestrogen levels are relatively high, may offer some degree of protection. Several clinical studies of women with breast cancer have been done to learn whether soy capsules can help with the symptoms of the menopause. Meanwhile, studies of men with prostate cancer have suggested that soy-based foods and supplements may reduce levels of prostate-specific antigen, a substance that typically increases as prostate cancer develops. In another study, while PSA levels did not decrease during soy treatment, they rose less rapidly than before the study began. Although these results are encouraging, further research is needed to learn whether soy products help men with prostate cancer to live longer. But initial results look promising.

soy beans and soy-based foods have been shown to lower cholesterol and reduce blood pressure and the list of health benefits is getting longer and longer. It's amazing how much you can do with a simple soy bean and the health benefits that are packed inside. Mother nature has been very generous!

But enough about the wonders of this little bean... The best way to enjoy it is to let it get intimately acquainted with your taste buds. •

## Are you ready?

# EDAMAME HUMMUS



Mmmmmmm, edamame hummmmmus  
Edamame beans are succulent young soya beans. They have a subtle juicy flavour and are light green in colour. Try this hummus recipe for a simple twist on traditional hummus. Some say it tastes even better than the original!

## INGREDIENTS

2 cups	Edamame, shelled and cooked according to package directions
1/4 cup	Soy bean oil
3 tablespoons	Lemon juice
2 teaspoons	Garlic, chopped
3/4 teaspoon	Cumin, ground
1/2 teaspoon	Salt

And here is how you do it. Puree the edamame, oil, lemon juice, garlic, cumin and salt for 30 seconds using a food processor, until the mixture is almost smooth. Add a little chili if that is your thing. Done. Easy beany!

# RECIPE





A word from  
A GROWER

# Growers' TALK

Marion from Oakland, CA USA

When it comes to food, I've always been drawn to organic products. It's not that I am a purist. It's just that I enjoy food much better when I know it's pure. I really enjoy the rich organic taste. That's why I started growing my own radishes using BIOCANNA nutrients. This way, I can control the whole process from beginning to end! No harmful ingredients whatsoever!

Using BIOCANNA is also very convenient, because you don't have to adjust the pH and the EC. Just add the nutrients to the nutrient tank and that's that.

But a while after I started growing my first radishes, I noticed the leaves were turning from dark green to light green, and some were almost yellowish. That was quite an alarming sight, since radishes only take 6 weeks from seed to crop. So I had to act quickly. I turned to the internet and found out that this could be a result of a pH level that's too high. How was that possible?

I contacted the CANNA help-desk through: [www.canna-hydroponics.ca](http://www.canna-hydroponics.ca). The people at CANNA told me there was indeed an exception to the rule. You still need to adjust your pH if you live in an area with extremely hard water. And as I found out, I happen to live in such an area!

Normally the pH should be between 6.5 and 7.0. CANNA advised me to adjust my pH if it was above 7.5. Well, it turned out my pH level was a whopping 8.5!

How could I solve this problem? They advised me to use organic acid, like for example citric acid... This way my product would be 100% organic. I mean, everything worth doing, is worth doing right!

So I used the organic acid and what do you know? The problem was solved in no time! My radishes tasted great!

"you might need to adjust your pH in a hard water area"



Product

FLASH

NEW

## BIOCANNA BioRHIZOTONIC

### A powerful Organic vegetative rooting stimulant

**BIOCANNA BioRHIZOTONIC is an organic, OMRI certified root stimulator. It contains nutrients derived from marine algae and is used to re-vitalize and energize a poor or new root system. It also stimulates further root development of plants that already have roots or root initials.**

BioRHIZOTONIC contains a range of vitamins, including vitamins B1 and B2, which stimulates the development of root (hairs), root tips and increases the plant's resistance to disease. A powerful root system ensures that the plant can absorb maximum nutrients for faster growth. BioRHIZOTONIC has a noticeable vitalizing effect on plants. Thanks to BioRHIZOTONIC the plants extend their roots throughout the medium more quickly. This is why BioRHIZOTONIC is, among other things, an ideal remedy for stressed plants such as cuttings during repotting. It also restores and strengthens plants that are unhealthy or look poorly.

BioRHIZOTONIC is suitable for any growing medium. It can also be used as a foliar spray. This allows the plant to directly absorb the beneficial components of BioRHIZOTONIC through the leaves. Your plants will be certain to develop beautiful, strong roots with BioRHIZOTONIC. Good results start with a healthy plant with a strong and well developed root system.

The BIOCANNA line includes Bio Terra Plus medium and Bio Vega, Bio Flores, BIOBOOST and BIORHIZOTONIC for all growers that wish to grow organic all the way from the beginning till the end.

For more information visit [www.biocanna.ca](http://www.biocanna.ca)



OMRI CERTIFIED

FAST AND STRONG  
ROOT DEVELOPMENT

INCREASES RESISTANCE  
TO DISEASE

REMEDY FOR  
PLANTS IN STRESS





## Carnivorous Plants

### DID YOU KNOW THAT....?

- There are more than 670 species and subspecies of carnivorous plants in the world. Most of these feed on insects.
- Carnivorous plants use different methods to catch their prey. The Venus Fly Trap probably has the most gruesome method. It has spiked leaf lobes that quickly snap shut and trap the prey when it touches two 'trigger hairs' in succession. The reason that two hairs need to be touched in succession is to prevent the trap shutting every time a raindrop falls on a trigger hair.
- Contrary to legends and science fiction, there are no plants that are big enough to digest human beings. One of the biggest carnivorous plants around is the *Nepenthes attenboroughii* from south-east Asia, which was named after British naturalist David Attenborough. He has always been

a keen enthusiast of the genus. The plant can catch and digest mice and even rats.

- Carnivorous plants have evolved in nutrient-poor soils where water and sunlight are readily available, such as bogs. They use animals to supplement the few nutrients they manage to take up from the soil. However, being carnivorous comes at a price: using leaves to catch prey means that it can focus less on photosynthesis.
- You can grow carnivorous plants yourself, but they're not actually that useful against pests. Most carnivorous plant only eat a few insects. Carnivorous plants also need a very specific growing climate and calcium-free potting soil, so cultivating these plants will not go well together with cultivating other vegetables

*Photo Courtesy of Yavanna Aartsma*



# Pests & DISEASES

There are huge numbers of worm varieties living in soil and their diets vary widely. In this article we are going to focus on those worms that tend to have a positive or negative impact on crops. One such group is the nematodes or roundworms, some of which are phytopathogenic (a parasitic organism that feeds on a plant causing damage), while others act as biological control agents and can be beneficial. By Iñaki García

## NEMATODES AND OTHER EARTH-DWELLING WORM-LIKE CREATURES



**Figure 6:** Inside one of these plump wax moth cadavers are thousands of wiggly nematodes, ready to serve as biocontrols against soil-dwelling crop pests. The cadavers can be placed in orchard or greenhouse soil, and the nematodes will emerge to protect crops from pests such as citrus root and black vine weevils.

*Photo: courtesy of Peggy Greb - USDA Agricultural Research Service*

**Figure 7:** The soybean root on this image is magnified 100 times and stained to be visible. The juvenile soybean cyst nematodes infect a soybean root by forming feeding sites and rob nutrients from the plant.

*Photo: courtesy of MU Plant Diagnostic Clinic*



Parasitic varieties are long, rounded and unsegmented, as are nearly all nematodes. They vary in length but are generally between 0.25mm and 2mm. They have a stylet (piercing mouthparts) for feeding which they use to penetrate the host's cells and suck out the fluids. These nematodes can feed on both internal and external plant parts and some are capable of entering the host plant's tissue to feed on it.

Phytopathogenic nematodes can attack both the parts of the cultivated plant that are above ground (the foliage, branches, etc.) and the parts below ground (the root system). Regardless of where the nematode attacks, the symptoms will eventually be seen in the part of the plant that is above ground, since any attack on the roots and stems directly affects the development of leaves and fruit. Generally speaking, the visible symptoms of a nematode attack are chlorosis, necrosis, deformations and the appearance of galls where the parasite attacks. This inevitably leads to a reduction in the plant's yield.

The damage that nematodes can cause to crops is directly related to the density of the worm population. It is quite normal for soil to host a range of phytopathogenic nematodes but if the population is small enough, the damage will be minimal. Worm populations are kept in check by natural predators, including other nematodes and certain types of fungi, bacteria and insects. However, extensive cultivation disturbs this natural balance, causing phytopathogenic populations to increase sharply.

The purpose of nematode control is to reduce the population using chemical or biological methods. The worms are so small that any chemicals used must be capable of penetrating all the soil's micro pores. As a result, it is common to use formulates in gas form or gas-releasing form. Biological control agents have also been developed, including certain parasitic bacteria.

Beneficial nematodes, which can be used as a biological

control, contain symbiotic, toxin-producing bacteria that affect the insects they feed on. For example, the *Steinernema feltiae* nematode feeds on the larvae of fungus gnats, a common crop plague.

The adult fungus gnat is a small black fly, about 3-4 mm in length. They are commonly seen swarming in greenhouses because they are attracted by the humidity, high temperatures and decomposing organic matter. Crop substrates offer ideal conditions for their larvae, which are white and legless, resembling small worms. They feed on organic matter and the tender parts of plants below the ground, such as roots, as well as the stems.

Another group of potentially harmful animals that look very much like soil-dwelling worms are actually soil-based insect larvae. Beetle larvae like Coleoptera and caterpillars like Lepidoptera cause particular damage to crops. A general distinction is made between three groups: white worms (which are whitish in colour, curved in shape and have a fleshy body), wire-worms (which are yellowish with a hard, elongated body), and cutworms (which are lepidopterous larvae and are generally found curled up in the soil). Although they generally live underground, these worms can also attack the parts of plants that are above the ground and can even create galleries in logs and branches.

## BIBLIOGRAPHY

S. PLANES GARCÍA; J.M. CARRERO. Plagas del campo. Mundi-Prensa Libros, S.A.; ed. 2008; 775 pages

D. L. COYNE, J. M. NICOL, B. CLAUDIIS-COLE. Practical plant nematology: A field and laboratory guide. International Institute of Tropical Agriculture 2007.





# What's

# HAPPENING

Free love, equality, sharing, dreaming of a better, greener world... Surely those ideals have vanished by now. The sixties and seventies are long gone. Gone is the optimism and hope for a brave new world. Today's world is dominated by economic crisis and we're all having to fight to keep our heads above water. Who is naive enough to be a peace-loving hippie these days?

By Paul van de Geijn

## WHERE HAVE ALL THE HIPPIES GONE?

But, like Asterix and Obelix in their Gaulish village, the hippie movement is still going strong in a few small parts of the world. More than 40 years after the famous Summer of Love of 1967, there are still people who stand by the ideals of 'the first hour'. And we're not just talking about greasy ageing hippies with long beards. There are so-called neo-hippies, too – hippie youngsters who regret being born 20 years too late.

### A bit of history

Hippie culture took off among teenagers and twenty-somethings in the mid-sixties – the baby-boomer generation. Actually, though hippies were following in the footsteps of the much smaller beat movement of the 1950s and early 1960s. Just like the beatniks, hippies distanced themselves from what they called the 'squares', the people who conformed to society and followed every rule. Hippies had a lot of ideals. They were against war in general, and especially the Vietnam war that was going on at the time. They were against modern technology and wanted to go 'back to the Earth', be 'one with Mother Nature'. They gathered at massive events like the Woodstock festival in 1969. Cities like San Francisco and Amsterdam suddenly became spiritual centres where young people from all

over the globe gathered to experience it all. These gatherings were sometimes called sit-ins, love-ins and teach-ins, in which they taught and experience a whole new outlook on life. They wanted to break free from the narrow-minded, racist ways of their parents. So much seemed possible!

And then there was the music. The Grateful Dead, Bob Dylan, Janis Joplin, the Byrds, Jefferson Airplane, Jimi Hendrix... Being part of all that was something really magical, as cult-journalist Hunter S. Thompson wrote: "No explanation, no mix of words or music or memories can touch that sense of knowing that you were there and alive in that corner of time and the world. Whatever it meant...."

But as with all fashion fads, the hippie movement was transitory. Many hippies cleaned up their act during the 1980s and became part of the materialist, consumer culture that they used to despise. But they didn't all sell out. They might not be as visible as they once were, but hippies and neo-hippies can still be found in communes, at global gatherings and on college campuses.

### The Deadheads

One of the most noticeable hippie phenomena that are still around are the 'Deadheads'. A Deadhead is a fan of the American jam band, the Grateful Dead. The band has been around for decades – as have most of their fans. 'It's better to burn out than fade away' is not a motto that can be applied to the Deadheads. Like the Grateful Dead's jam-sessions, they seem to last forever.

In the 1970s, many fans began travelling to see the Grateful Dead at as many shows or festival venues as they could. As time went by, a

vast community developed. The Grateful Dead made the most of this following by extending their playlists over 3 or 4 concerts, so if you wanted to see it all or make sure that you heard your favourite song, you had to follow them around the world. Founding Grateful Dead member Phil Lesh said this served a higher purpose than just perpetual partying. He stated that these concerts allowed audience and band to 'meld our consciousness together in the unity of a group mind'.

Hippie ideals like sharing are very commonplace among the Deadheads. They are allowed to record Grateful Dead concerts and distribute them, but not sell them! This exchange of tapes is still going on today.





**Figure 8:** The exit of Freetown Christiania commune in Copenhagen. The commune covers 34 hectares (85 acres) and harbours about 850 permanent residents.



## Christiania, Denmark

While many of the hippie communes slowly disappeared, there is one stronghold that still survives: Freetown Christiania in Denmark. This world-famous commune draws free-spirited tourists from all over the globe. Christiania was founded in 1971, at the height of the hippie revolution. It started out as a squat in a military area in the borough of Christianshavn in the Danish capital Copenhagen. According to one of the founders of the commune, Christiania was meant to be an opportunity to build up a society from scratch. 'Seekers of peace' could live here and start a new life. Christiania became a beacon for freedom of expression. Artists could show off their art in the street and countless events and concerts were organized, sometimes attracting up to 10,000 visitors.

About 850 people live in the commune. There are carpenters, blacksmiths, a bike shop, several cafes, restaurants, night clubs, factories, galleries, music venues and a bakery that's open 24/7. It's a mini-society founded

on consensus. Because every citizen of Christiania has a say in the decision making, decisions can take months, even years.

For a long time, Christiania was something of a state in its own right, almost separate from Danish from outside. The Danish government tolerated the commune until 2004, but since then the existence of Christiania has been under threat, even leading to its closure in April 2011. But now the Freetown is finally free. On the 21st of June 2011, Christiania and the Danish government signed a treaty which states that the inhabitants can buy most of Christiania from the Danish state.

## The Rainbow movement

Another famous hippie phenomenon that keeps popping up all around the globe is the Rainbow movement. The original Rainbow Gathering was in 1972, and has been held annually in forests around the United States and the rest of the world. Just like the hippies of the first hour, 'Rainbows' believe that modern lifestyles and systems of government are unhealthy, exploitative and out of harmony with the natural systems of the planet. During the gatherings, which can attract as many as 30,000 people, they try to present an alternative lifestyle.

What actually happens during these festivals? Depends on who turns up really, but it's always within the spirit of the movement. For example, people chant for hours, holding hands in circles. And if that kind of activity makes you feel like a stiff drink, you're in the wrong place, because alcohol is generally frowned upon and forbidden at these gatherings.

Like the Deadheads with their tapes of Grateful Dead concerts, using money to buy or sell anything at Rainbow Gatherings is taboo. Nobody gets paid and all the organizers are volunteers. Participants are expected to contribute money, labour or materials. One problem is the so-called 'Drainbows', who leach off others and contribute next to nothing. But many Rainbows consider that a small price to pay for a chance to be free of the restrictions of Western society. There are no official leaders, no formal structure, no official spokespeople, and no membership. Some call the Rainbow movement 'the largest non-organization in the world'.

## A new dawn?

These days, Christiania, the Deadheads and the Rainbow movement are the exceptions to the rule in our Western society. Most people don't seem interested in a second Summer of Love (or third, if you count the Acid House Summer of Love of the late 1980s). But maybe the tide will turn and hippies will be back in vogue again. At least, some aspects of the movement. What about the rise of organic food shops and organic farmer's markets? And the current worldwide political protests? It seems that people of all ages are starting to realize that there could be more to life than the laws of the free market. Maybe it's time for an alternative. It's time for neo-neo-hippies! So grab your guitar and jump in your old VW van and just peace out! •

Sources: Wikipedia, Christiania.org, Presseurop.eu, Hunter S. Thompson - Fear and Loathing in Las Vegas



# Grower's TIP #16

## MEASURE YOUR WATER TEMPERATURE!

If you grow organically, don't forget to measure the temperature of the water in your nutrient tank. Many people assume that they don't have to measure anything if they're growing organically. But checking the water temperature is still very important!

You need to maintain the temperature between 18°C and 22°C. Our advice is to aim for a temperature of 18°C in summer, and 22°C in winter. That way you compensate for the higher air temperature in summer and the lower air temperature in winter.

If the water you use is too cold, your plants will stay small. Even worse effects can occur if the roots are very cold. Then the plants cannot take up water and nutrients. This could cause your plants to wither and die.

If the water you use is too hot, on the other hand, your plants will be vulnerable to diseases like pythium, a parasitic fungus that will destroy your plants.

## The grateful gardener







# BIO AND MINERAL FERTILIZERS



**Figure 9:** The illustration shows how plants obtain their minerals in nature. On the left (the mineral route), minerals come directly from rocks. This occurs through river erosion, rainfall or snow-melt, for example. These processes result in salts becoming dissolved in the water. On the right (the organic route), the plant obtains minerals from dead plants and animals or animal waste.

IT HAS LONG BEEN KNOWN WHICH CHEMICAL ELEMENTS ARE ESSENTIAL TO THE LIFE AND PROPER

DEVELOPMENT OF PLANTS. THESE CHEMICAL ELEMENTS ARE KNOWN AS NUTRIENTS. PLANTS GET MOST

BASIC OF THESE NUTRIENTS – CARBON (C), OXYGEN (O) AND HYDROGEN (H) – FROM THE WATER AND AIR

AROUND THEM, AND THESE ELEMENTS REPRESENT APPROXIMATELY 94% OF THE WEIGHT OF A DRIED PLANT.

THE OTHER 6% IS MADE UP OF MINERAL ELEMENTS THAT ARE CLASSIFIED AS PRIMARY MACRO-NUTRIENTS

(NITROGEN (N), PHOSPHORUS (P) AND POTASSIUM (K)), SECONDARY MACRO-NUTRIENTS (CALCIUM (CA),

MAGNESIUM (MG) AND SULPHUR (S)) AND MICRO-NUTRIENTS (BORON (B), COBALT (CO), COPPER (CU), IRON

(FE), MANGANESE (MN), MOLYBDENUM (MO) AND ZINC (ZN)). THESE MINERALS ARE ABSORBED BY THE PLANT'S

ROOTS, SO THEY NEED TO BE DISSOLVED IN WATER TO BE ASSIMILATED. By Iñaki García and Geary Coogler

All these elements occur naturally in terrestrial rocks, minerals and in the soil itself. In nature, plants get their nutrients in two ways: through mineral salts and from organic materials. Nutrients from mineral salts essentially come directly from rocks. Erosion as a result of rainfall, snow-melt and rivers fragments or wears away the rocks and dissolves the salts they contain, which can then be taken up by plant root systems. Most of these elements ultimately flow into the sea and this is why sea water has a high salt content. In some areas of the world, these salts have accumulated over millions of years in layers, resulting in deposits of rock minerals such as Phosphorite, which is mainly composed of phosphorus. The other route by which plants obtain nutrients – the organic route – is from decomposing waste from living organisms. Plants near fallen leaves, for example, benefit from the minerals contained in those leaves which are released as they decompose.

When plants are cultivated, growers have to provide the plants with nutrients, and they generally use fertilizers for this purpose. However, fertilizers need to be balanced with what the plant's environment already provides, what the plant needs, and what has to be added to achieve an overall balance. Excess fertilizer is not taken up by the plants and stays in the environment, sometimes affecting it in a negative way, and always affecting the balance of the next crop.

## Mineral fertilization

To make mineral fertilizers, the soluble salts in natural rocks are extracted, and, in the case of liquid fertilizers, dissolved. These salts can also be obtained through chemical synthesis. In the marketplace, many types of

mineral fertilizers can be identified on the basis of the amount of macro-nutrients they contain. This content is shown on the packaging by three numbers representing the three macro-nutrients – 'N-P-K'. These fertilizers sometimes provide a single macro-nutrient or a combination with or without other secondary nutrients or micro-nutrients.

The numbers represent the percentage of either certain chemical elements or chemical compound groups. The first number, nitrogen (N), does not represent the element itself but compound groups that plants can use as food such as nitrates or ammonia. The second and third numbers, phosphorous (P) and potassium (K) are actually less than the percentage given on the label because they represent molecules not elements. These and the other elements listed on the label are what are known as the 'guaranteed elements'. This does not mean the fertilizer does not contain other micro-nutrients, which can be beneficial. fertilizers may also contain heavy metals which, though some are necessary in limited quantities, can accumulate in the plant and its environment and be passed on. After that, if the medium is set up correctly, the ratio of what is applied through fertilizers is the ratio of what the plant will actually derive. Any excess nutrients that have been applied and not used will either stay behind to affect the ratio of the elements in the growing medium, which will affect the next crop, or be flushed into the environment.

One advantage of mineral fertilizers is that we can design a nutrient solution that contains all the nutrients for a particular crop in the ideal ratio and in a precise and stable way. Stability is critical because free ions (salts)



# BIO AND MINERAL FERTILIZERS

are directly affected by both the relative pH of the solution they are in, and by in their relative quantity in proportion to other ions. They can become more or less available to the plant as these numbers change and can even become permanently unavailable. Plants can continue to mature and successfully fruit or flower under a range of pH conditions and nutrient availability; however, the plant may still be under stress, even though it does not show it.

## Organic fertilization

By definition, organic compounds are those that contain carbon and hydrogen. However, they can also carry other elements such as oxygen and sulphur. Organic compounds which have been produced naturally by living organisms are considered natural organic molecules (such as sugar), and those that are synthesized by man are considered artificial (such as artificial sweeteners). All living creatures need minerals for normal development. These elements are consumed and incorporated into tissues. Animal waste or manure contains large amounts of mineral elements and organic parts of the animal (blood, bones, etc.) too. Plant debris contains all the minerals that have been assimilated throughout the plant's life.

An organic fertilizer can be made by composting vegetable or animal waste and manure. These fertilizers contain the mineral elements needed by the plant and large complex organic molecules, many of them with biological activity, so that by adding an organic fertilizer, we are giving the plant both mineral nutrients and other substances with beneficial effects on cultivated plants and the soil in which they grow.

We must also clarify that due to the nomenclature produced by European legislation, biological and ecological terms now mean the same thing, using one or another term depending on the country. In North America, on the other hand, the catch term is the word 'organic', and products must pass rigorous testing to be able to use that term, both on the input (fertilizers) and output (food) sides. The words 'biological' and 'ecological' carry little weight in registration issues.

Are all organic fertilizers really organic? As mentioned above, not all products are natural organic substances. Therefore, for a fertilizer to be classified as organic, it must meet certain requirements, not only in composition but also in how it is produced. For example, an organic fertilizer cannot be made from materials that contain GMOs (Genetically Modified Organisms). It is also important that the raw materials used to produce

the fertilizer do not contain traces of chemicals. So a substrate containing pine bark will not be organic if the bark has been treated with pesticides or chemical products before or after felling. Also, the use of animal waste originating from intensive farms is not permitted as it can be full of contaminants such as antibiotics.

Several agencies are responsible for certifying that fertilizer products have been made according to the criteria established by the European Union, the United States Department of Agriculture (USDA), and other controlling agencies. Only then do they meet the requirements for use in organic farming. It is very important to find the logos of the certifying agencies to ensure that the products you are using meets all the environmental requirements. And remember, sometimes a product can have a trade name containing 'bio' or 'eco' but not actually be ecological or organic (see the article on page 4).

One of the main features that differentiate mineral fertilizers is their high solubility. Mineral fertilizers dissolve quickly in water and are directly available to plant roots. The disadvantage is that any elements that are not absorbed by the plant are washed out almost immediately by rain, contaminating groundwater and possibly reaching rivers. In organic fertilizers, on the other hand, a portion of N and P are found as part of the insoluble organic matter. This organic matter will decompose in the soil in a process called mineralization, mainly through the action of certain micro-organisms, to become available as nutrients for plants. The possibility of contamination from leaching is therefore reduced. But this slow release of nutrients does not make organic



**Figure 10:** Example of a small erosive channel from between the Precambrian and Cambrian periods. The brownish dolomite rock on the left has been eroded, and some fragments of it have worked their way into the dark grainy phosphorite rock of the Early Cambrian period.

Photo courtesy of Quentin Scoufflaire. CC license by 2.0

fertilizers immune to pollution since the excessive and uncontrolled use of products like manure can also cause the leaching of nutrients and therefore contamination.

## Farming

There are some minerals that can be used in farming as long as they are from a natural source (not synthetic) and have not been chemically treated to increase solubility. For example, the application of phosphate rock is permitted in organic farming, but these phosphate rocks do not dissolve immediately but enter the soil gradually. One of the advantages that organic matter provides is that it serves as an ideal medium for beneficial soil micro-organisms, which protect plants against other pathogens and provide bioactive molecules such as hormones and dissolved minerals that can be absorbed by the roots. Moreover, this organic material protects against soil erosion and improves the soil structure, thereby promoting plant growth. It also allows minerals to be absorbed across a greater pH range.

As we can see, the more organic substances are used in plant growth, the greater the challenge in getting all the factors right. Unlike mineral fertilizers in less organic systems that can be put together and used almost immediately, organic systems first need to get established, a time-consuming process. The raw materials have to be incorporated in the right quantities, with the right micro-organisms and given time to break down the raw materials to form the nutrient reserves and supply the plants. Careful planning needs to be done first as well as the preparation of beds and other media for sustainable plant life.

## "Fertigation"

One of the advantages associated with the high solubility of mineral fertilizers is that they can be used in 'fertigation' systems. Organic fertilizers, although liquids, are always associated with suspended substances that tend to block and clog the emitters. The solubility of mineral fertilizers is also an advantage when it comes to accurately measuring the salts in our nutrient solution, since the dissolved minerals are recognized directly by the EC meter. However, in organic fertilizers, the fractions of nutrients contained in the organic matter cannot be recognized by the meter. So the administration of nutrients is always more difficult to gauge comprehensively. Remember that hydroponics is not classified as organic by European legislation.

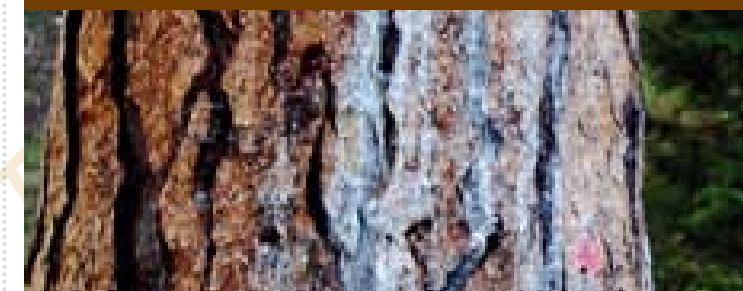
It is generally thought that a plant fertilized with a mineral fertilizer can represent a more significant health risk than an organically fertilized plant. This is not true, and whether we are talking about organic fertilizers or mineral fertilizers, controls are in place to prevent potentially dangerous fertilizers from reaching the market. The reader should be aware that there are inorganic fertilizers that can be used in ecological farming. Neither should organic fertilizers be confused with organic pesticides. Pesticides are poisons designed to be used at a certain concentration and chemical pesticides present many more safety concerns than organic pesticides. •



**Figure 11:** The bark of this Ponderosa Pine is being sprayed with a pesticide called Carbaryl. Carbaryl is a pesticide used to prevent damage from the Mountain Pine beetle, which is known to be toxic and possibly carcinogenic.

Bark originating from trees which have been treated with artificial pesticides can never be used as a raw material in a biological substrate.

Photo courtesy of Forest Service - Northern Region.  
CC license by 2.0







# Puzzle & WIN

## Win 1 liter of BioRHIZOTONIC



We know you can't resist a nice game of good old spot the difference! Sure, it's kiddie stuff, but it's fun kiddie stuff! Look at this photo. Can you spot the 5 differences? The one who impresses us the most with his/her answer wins a litre of BioRHIZOTONIC! So get working on those differences and send us your answers!

### Winner puzzle #14

We picked a winner at random from all the correct entries we received, and we would like to congratulate **M. Pearson**  
Congratulations on your bottle of CANNA RHIZOTONIC!  
We will contact you as soon as possible to organise the dispatch of your prize.



# Facts

## Researchers develop LIGHT-EMITTING PLANT

Researchers from the Canadian Space Agency have developed plants that emit light when they are under stress. Over the last four years, the researchers have been working with scientists from the University of Florida to develop these 'living sensors' which can give an indication of the ambient conditions in greenhouses. To do so, they have introduced genetic material which makes the plants light up in the dark when they are stressed. This technique can be used to immediately see whether a plant is too warm or too cold, or if it is lacking water or nutrients. This means that these factors no longer need to be measured using electronic sensors. The plants will be used in self-regulating greenhouses. Meaning that plants are grown without people even having to enter the greenhouse at all. These greenhouses are designed to provide astronauts with fresh vegetables while on long journeys through space. However, it seems likely that these living sensor plants could be useful in greenhouses on earth too.  
Source: CBCnews

## A QUARTER OF DUTCH PEOPLE EAT FLOWERS

flowers



The Netherlands is world famous for its flowers, and Dutch tulips are the subject of particular admiration. But did you know that those crazy clog-wearers also like to munch on flowers at the dinner table? At least a quarter of all Dutch people like to eat flowers, according to research by one Dutch horticultural organization. Of those who have already sampled flowers, most have done so in a restaurant (59%). 31% of them have also been served flowers at a friend's house and a quarter of them have tried using flowers in their own cooking. The most widely eaten flowers are pansies, mint, lavender, courgette flowers and nasturtiums. Most of the 'flower eaters' in the survey had eaten flowers in a salad or as a garnish with a meat dish. Stuffed or fried courgette flowers were often mentioned too.  
Source: PT Photo courtesy of Ken Hawkins



## FOLIAR SPRAY PROTECTS PLANTS FROM FREEZING

Did you always want a banana tree in your garden, even though you live in Alaska? Well maybe your dream could come true after all. Researchers at the University of Alabama and the Miami University of Ohio have introduced a foliar spray that protects plants, both externally and systemically, by enhancing their natural "anti-freeze" properties. Using the new product is the equivalent of moving the plant 200 miles nearer to the equator. The patent-pending formula has been commercialized under the trade name of FreezePruf. According to its inventors, the components in the laboratory spray formulation and FreezePruf are all either human food ingredients or used in the human food production chain. It is said that the spray actually improves plants' natural ability to tolerate freezing conditions. The researchers have tested the spray on a wide variety of foliage, flowers, and fruits. Data shows that both the laboratory formulation and the commercial version of the spray reduce both the temperature at which initial damage occurs and the temperature at which the plants die.  
Source: Sciencedaily.com Photo courtesy of Vicky Brock



## WHAT'S NEXT

Carbon dioxide, or CO<sub>2</sub>, is a gas that's all around us. It is essential for all plant life, because plants use it for photosynthesis. This chemical process uses sunlight to convert CO<sub>2</sub> into essential sugars, oils and fats. Indoor growers often increase CO<sub>2</sub> levels in their grow rooms in order to get bigger yields. Read everything on this subject in the next issue of CANNAtalk.

# CO<sub>2</sub>

## CANNAtalk

Is published by CANNA Canada Corp.

A company dedicated to making the best solutions for growth and bloom.

## CANNAtalk

Is distributed through hydroponic and gardening stores conducting business with BioFloral or Stellar wholesale.

(find the closest dealer near you at [www.canna-hydroponics.ca](http://www.canna-hydroponics.ca)).

**Editor:** Ilona Hufkens

**Email:** [editor@cannatalk.ca](mailto:editor@cannatalk.ca)

**Co-editor:** Paul van de Geijn

### Contributors issue 16:

CANNA Research, Marco Barneveld, Geary Coogler, Iñaki Garcia, Pieter Klaassen, Myrthe Koppelaar, Georgia Peschel, Mirjam Smit.

## CANNAtalk

All editorial is copyright. All rights reserved. No part of this publication may be reproduced in any form without prior written permission of the publisher. The publisher is not responsible for any inaccuracies. Material which has been contributed does not necessarily reflect the opinion of the publisher. It is assumed that any image from widely distributed sources, such as the internet are in public domain although these images are often passed on between websites which makes it sometimes impossible to trace the original source.

## THE BRIGHT SIDE OF THE SUN



# FloraSun

HPS LAMPS

CONSISTENT IMPROVEMENT OF COLOR



[floracorp.ca](http://floracorp.ca)



NOW  
AVAILABLE

# Bio RHIZOTONIC



BIOCANNA BioRHIZOTONIC is an organic, OMRI certified, root stimulator. BioRHIZOTONIC contains nutrients derived from marine algae and is used to re-vitalize and energize a poor or new root system. BioRHIZOTONIC stimulates further root development of plants that already have roots or root initials. BioRHIZOTONIC is suitable for any growing medium and can also be used as a foliar spray.

**BIOCANNA**  
The Bio Solution for growth and bloom