HOW TO GROW MARIJUANA HYDROPONICALLY

[grow six foot plants in three months!!]

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CHAPTER 1 - INTRODUCTION

Well, you have opened my book, and you are probably wondering what a toilet has to do with growing marijuana . . . perhaps you have never heard of hydroponic gardening. That is what this book is all about; turning you on to an old method of growing plants in the absence of soil and using it as a brand new method of growing super weed!

The word hydro, meaning water, and the word ponic, meaning working, makes the definition of hydroponics water-working. Growing plants in an inert substance such as gravel, with a liquid nutrient solution circulating through the growing medium, results in faster growing, healthier plants.

As for the toilet, it is a completely functional hydroponic garden. There are, however, better things to use for a growing unit.

No longer is there a need to hassle with all the pots and soil one needs to grow plants the conventional way.

All you need for hydroponics is one tray four to eight inches deep that can be used for the entire growing cycle of your plants from seedlings to maturity. As for the growing medium, you can use gravel, vermiculite, sand, or even broken pottery. Best of all, it can be made fully automatic so that you don't even need a green thumb to get excellent results with hydroponics.

All the information you need to grow your favorite plants is in the chapters ahead. Of course, I do not recommend growing anything illegal. As you all know. growing marijuana is illegal in the United States. Therefore, it is the author's recommendation that you read this book for your own personal

information. However, all of the information in this book can also be applied to growing legal plants, vegetables and herbs in a fraction of the time it takes with conventional methods.

Hydroponics (What is it?)

What makes a plant grow? The majority of plants require a few essentials; water, air, light, mineral salts, and a growing medium to support the roots. A plant growing in soil sends out a root system to absorb the mlneral salts available in the soll. These salts, broken down into an inorganic form, are absorbed into the roots by a process known as osmosis. Carbon dioxide, from the air, is drawn into the leaves to help in the process of making new tissue. The energy needed to transform these substances into livlng tissue comes from light.
When the source for mineral salts dwindles, the plant sends out roots to locate a new source. The energy used up - by the plant in producing new root systems amounts to lost

- time and energy that could be used in growing foliage.

- In hydroponic gardening, a plant is grown in a medium such as gravel. To feed the plant, a nutrient solution containing mineral salts is circulated through the gravel giving the plant all the nutrition it needs for optimum growth. Since the plant has all the mineral salts readily available, the root system can be kept to a minimum, thus more energy is exerted toward foliage production.

Since the plants don't have to compete for mineral salts. they can be placed closer together. The result: higher yield and faster growing plants in the space available. Of course, there are a few things you have to know before you start the hydroponic garden. In the chapters ahead, I will cover all the details you'll need to grow super plants.

Germinating Your Seeds

This is a good place to start. By the time your seeds germinate, you could have the hydroponic garden all set up.

In the past few years, I have seen a lot of different methods of germinating seeds. In myopinion, the pa,n_ertowel method works the best. This consists-of placing the seeds between four or five damp paper towels and then placing them in a warm area of the house.

Sprouts should appear in about one to seven days. It is very important to keep an eye on the sprouts to prevent them from drying out. A good practice is to water them lightly every day. As they sprout, place them into a BR 8 immediately. This is important because if you wait too long you could damage the roots.

It is best to handle the plant as little as possible. Many times roots have been damaged during transplanting; thus dwarf ing the plant. Germinating the seeds first gives the grower a better selection of the healthiest sprouts. The first seeds to usually grow to become the healthiest plants.

CHAPTER 2 - GROWING MEDIUM

The growing medium is a very important part of hydroponics. It would be wise to take some time in choosing the best medium available. The right decision can make or break the quality and quantity of your stash.

Requirements for a Good Growlng Medium

First, it must be an inert material (a substance with no active chemicals of its own). Thls is important because you don't want any foreign chemicals leaching into the nutrient solution that could contaminate it. Gravel, sand, vermiculite. and perlite are some of the most commonly used inert mediums. Second, it must be a materlal that will not pack down too tightly. It is very important that the plant has a supply of oxygen around the root system. If the growing medium packs too tightly, the aeration will be stined, eventu- ally suffocating the plant. The third factor for a good growing medium is the ability to retain water. Without proper mois ture around the roots at all times, the plants will die quickly.

Gravel

In my opinion, gravel is the best growing medium by far. It is readily available at stores selling cement. It is easy to clean and sterilize. The aeration is very good, and it retains water for long periods of time.

Gravel can also be re used by simply sterilizlng it after cleaning all the roots from the previous crop. The size of the gravel should be about the size of a green pea . . . hence the name "pea gravel".

I should mention that in the past, I have obtalned the gravel I use from a sand and gravel company, and have never sterilized it for the flrst crop. Aner rinslng it well with fresh water it is usually safe to use. I would recommend, however. that you sterilize the growing medium after the first crop to prevent bacteria growth. Thls bacterla could disease future plants. If you obtain the gravel from a rlver bed or a source other than a sand and gravel company, it would be wise to sterilize it, just to be safe.

Using Chlorine to Sterilize

You can use chlorine bleach to sterilize the growing medium by mixing a solution of 1/4 cup chlorine per gallon of water. Let the gravel soak in this solution overnight, then flush thoroughly with fresh water until most of the odour is gone. If there is a remaining odour of chlorine it will not hurt the plants, but it is important not to allow any chlorine solution to remain at the bottom of the growing tray. This would deflnitely harm your plants.

Sand

Sand is another popular medium used in hydroponics. It is important to use a coarse non calcerous sand. If the sand is too fine or contains silt or soil, it will eventually pack down and prevent proper aeration. Beach and river sand can be used as long as you wash it thoroughly. If possible, it is better to buy the sand already washed and ready to go. A good place to obtain it is as a swimming pool supply store.

There is one major problem with using sand. Being more dense than gravel, it has a tendency to build up unwanted salts which will hurt the root system. It is a good idea to leach these salts out with fresh water every time you replenish the nutrient solution. This is done by running fresh water through the growing tray in place of nutrients.

Vermiculite

Vermiculite is obtained from natural mica deposits. When heated to a very high temperature, it expands to 15 times its original size. The finished product is a lightweight, sterile, highly absorbant material. Because of these properties, it is used quite often in hydroponic gardening, (usually in con junction with another growing medium.) Since it is so highly absorbant, it isn't wise to use by itself. Mold and fungus have a tendency to grow easily in a constantly damp medium.

Vermiculite works quite well in conjunction with perlite in units that require high moisture absorption. A mixture of 1/2 vermiculite and 1/2 perlite is often used in wick systems. (See the next chapter on containers).

Perlite

Perlite is made of puffed glass that is capable of retaining over six times its own weight of water. It can be used as a growing medium by itself, or as an additive to other sterile mediums. Although it has a tendency to grow algae, it will not harm your plants. Perlite has the added advantage of not turning to "mush" as vermiculite often does. When using either one of these two mediums, it is important to use fllters, as they contain flne particles that may clog up the pump. (This applies if you are using an automatic system).

Perlite and vermiculite can both be used more than once, but it is important that it is allowed to dry out before reusing. This can be done by removing it from the growing tray and placing it in the sun until dried.

Cinders

If you use cinders for the growing medium, be sure to soak

them in water for at least 24 hours to remove any excess ash. Some of the more common types of cinders used are volcanic, coal, and charcoal cinders.

Mica-Peat

It isn't wise to use mica-peat by itself as a growing medium because of its make up. It does work well as an additive to sand or vericulite to improve aeration.

Broken Bricks and Pottery

If you are really hard up for a growing medium, broken bricks or pottery can be used with good results. Break the pottery or brick into small pieces with a hammer; 1/8 to 1/2 inch is sufficient. Soak the pieces for 24 hours to clean away any excess clay. This is a good way to recycle any broken clay pots you may have.

CHAPTER 3 - THE CONTAINER

There are many types of containers one can use for the hydroponic garden. Plastic dishwashing trays, plastic covered wooden boxes, old sinks, and plastic flower pots are some of the most commonly used.

The only requirements needed for a growing tray are:

I . It must be made of a material that will not decompose in water. Untreated wood, compressed fiber pots, and untreated metal containers are not good to use. Plastic contain ers, wood treated with flberglass or epoxy paint, and porcelain will bring better results.

2. The growing tray must have good drainage. Without it, small pools of nutrient solution will remain on the bottom of the tray. Eventually, the root system will become rotten from being constantly wet. If this should occur. the plant will become sick and die. Be sure to put the drain at the lowest point of the growing tray, to assure complete drainage.

3. It is important that the growing tray be at least 5 inches deep for proper root growth.

If it is not this deep, the roots won't have enough area to grow, to support the plant.

Manual Feedlng vs. Automatic Feeding

One of the big advantages of hydroponic gardening is that it can be made completely automatic. You can use a submergible pump and a timer together to do all of the scheduled feedings.

There are only two things that you will need to do. One, raise the lights occasionally, because your plants are going grow very fast once they have established themselves. (usually 2-3 weeks).

Secondly, you will need to change the nutrient solution every 10-14 days, for best results.

Manual feeding hydroponic units are excellent for the beginner. The units are easy to make, and are inexpensive as well. Although as you become more interested in hydro ponics you will probably want to advance to an automatic system.

The most popular hydroponic gardens are the gravityfeed type. These units are nooded one to four times daily. This is easily done with a small unit needing one to five gallons of nutrient solution. When the growing tray is larger and re-quires five to ten gallons of nutrient solution it is impracticai to try to manuaily feed the plants because of the weight involved.

DIAGRAM OF TUB ON TABLE WITH BUCKET UNDERNEATH

This hydroponic garden is simple to construct, and the results are excellent. Any plastic container that is at least flve

inches deep will work. Cut a l/4 inch hole in the center bottom of the container. Place a plastic screen over the hole to prevent any of the growing medium from falling through.

Use gravel, vermiculite, or perlite for the growing medium. After germlnating the seeds, put them into BR 8 growing cubes. Place the cubes into the growing medium six inches apart to allow for normal growth.

Water the plants one to four times daily. To do this, simply pour the nutrient into the growing tray, then replace the bucket under the tray to allow the nutrient to now back into the bucket.

Replace the nutrient solution every ten to fourteen days. When you do replace it, pour fresh water once through the medium to leach out any build up of mineral salts.

Unless you have a bright window to put this garden near, it would be a good idea to use a plant light for best results. (Refer to the chapter on lighting to find the best light to use for your particular needs.)

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photo of tub on bench, lie previous diagram

This is another hydroponic garden that is used quite often, because of its ease of construction and use.

Like the previous hydroponic garden, you can use any plastic container that is at least five inches deep. The reservoir is a plastic bucket, connected to the tray by a hose.

When it is time to feed the plants, raise the bucket higher than the growing tray allowing the nutrients to drain. Then, lower the bucket so that the solution will flow back.

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photo of water being poured onto tub/br 8's

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diagram of weed in box, showing roots etc

Probably tne most trouble-free of all the hydroponic units is the wick system. The plants get the food they need through a specially treated wick suspended in the nutrient solution. This is made possible by a process known as capillary action. The wick system works very well for a small garden of four or five plants, but for a larger operation the irrigation method should be used.

To construct a wick system, you will need two containers at least six inches deep, preferably the same size. In one of the containers drill six 1/8 inch holes, in the bottom. The number of wicks the system will need depends on the size of the growing tray. Thread the wicks through the holes as in the picture, leaving approximately four inches suspended from the bottom.

The second tray should have enough nutrient in it so that when the top container is fitted into the bottom one, the wicks will be submerged in the liquid.

The next step is to fill the top container with perlite or vermiculite, (a combination of one-half perlite and one-half vermiculite works very well). In this type of unit be sure to use the previous mentioned mediums, because of their high moisture absorbing qualities. To start the capillary action of the wicks, pour enough nutrient into the growing medium to dampen it. The system is now ready for germinated seed-lings.

Unlike other types of hydroponic growing units, the wick system doesn't need the nutrient changed. It is necessary however to keep the nutrient at a constant ~evel. Add more nutrient solution as the plants use it up.

When you decide to get into growing plants on a larger scale you may want to build a fully automatic system. The advantage to this is that it can be built to your own speciflcation. The biggest cost of the system will be the pump and timer. The growing tray and reservoir can be

built inexpensively using a wood frame lined with a vinyl plastic. The total cost for a home-made hydroponic growing system may be anywhere from S 10 to S100 depending on the size, and whether it is automatlc (needing a pump and timer) or manual feeding.

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photo of hands holding tub over basin with tubes hanging out bottom

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There are two factors that you will want to keep in mind when building a growing unit. First. if the hydroponic unit is going to be used inside under artificial lighting the growing tray should be designed to fit under your lamps. A four foot growing tray requires a four foot Gro-lux light. An eight foot growing tray requires an eight foot Gro lux, and so on. The width of the growing tray is also governed by the amount of lamps to be used. when using a double lamp flxture, the growing tray shouldn't be wider than 12 inches, because of the amount of light the plants will receive from that singie source.

The second factor is whether the growing unit is going to be automatic feeding or manual. If the unit is going to be a manual feeding system, the size will be regulated by the amount of nutrient solution needed to irrigate the growing tray.

To calculate the amount of nutrient needed to irrigate the growing medium of a given size tray, multiply the width by the length by the depth in inches. Then dlvide this number by 1728 (the number of inches in one cubic foot). Multiply this number by 7.5 (the approximate number of gallons in one cubic foot). This flgure is the approximate number of gallons needed to flll the growing tray, but since the gravel takes up 2/3 of the area, divide the number by three. This is the number of gallons needed to irrigate the growing medium.

Once you have decided on the size and type, (automatic or manual feeding) you are ready for the construction. The

sides can be made of 3/4in plywood or 2in x 8in boards. The bottom should be 3/4in plywood. All of the joints should be glued with a marine glue. It would also be a good idea to use corregated nails at all the joints for added strength.

At one end of the tray, drill a 1in hole for drainage. You will need a plastic hose fitting to place in the hole, (see the picture on the next page).

It is possible to coat the tray with a plastic flberglass resin, but I have found through experience that it is a lot easier to line the tray with a vinyl plastic cloth.

For the nutrient reservoir, an exact replica of the growing tray can be made. It is also possible to use a plastic jug or container. A plastic garbage can makes a 800d nutrient reservoir. (A kit to build a 12in x 36in x 8in hydroponic unit is available from Indoor Garden Supply Co. in the back of the book.)

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diagram of big weed in toilet with pump...

Now, the one you have been waiting for. An old toilet will work for a hydroponic garden.

To make the toilet work, you will need a pump. If you have a drill motor, a "Flotec" pump can be used in conjunction with it. This pump costs about $6.00

A water-tight box will have to be constructed to catch the nutrient solution once it has been flushed through the growing medium. You can use 2n x 4n lumber and plywood coated with asphalt emulsion, or epoxy marine paint to build the tanks.

To feed the piants, simply flush the toilet and turn the pump on. Do this four times a day for best results.

CHAPTER 4 - LIGHTING

Lighting is a major part of the indoor hydroponic garden. It can determine the rate of growth, the sex, and potency of your plants. Without good light, most plants cannot complete the process known as photosynthesis. In this process, a plant makes carbohydrates (simple sugars) from carbon dioxide and water utilizing the energy from light. A waste product from this process is oxygen. When a plant is receiving only a portion of the light it needs, photosynthesis is impaired. The result can be slow growth rate, low potency, and a plant that is susceptible to insects and disease.

When growing plants outside, they may receive anywhere from 600 to 15,000 footcandles of light depending on the weather. A plant grown indoors underartificial lighting will receive anywhere from 500 to 1,800 footcandles of light depending on the type, quantity, and size of plant li~t used. (See chart below).

It is obvious that you would obtain better results growing plants outdoors because of the lighting difference. but unless you have a secluded spot to grow them in, I wouldn't suggest it.

Excellent results have been obtained growing plants indoors using artificial lights. There are also many advantages to growing plants indoors; the entire growing environment can be completely controlled. Insects and disease nonexistent; and the temperature and humidity are easily adjusted to the plants needs. Best of all, you can grow your favorite plant in the privacy of your own home!

Measurement in Footcandles Received by a Plant
Under Artificial Lighting

Distance from lamps (inches)	Two lamps used for 200 hours	Four lamps Used for 200 hours	Four lamps New
1	1100	1600	1800
2	860	1400	1600

3	680	1300	1400
4	570	1100	1260
5	500	940	1150
6	420	820	1000
7	360	720	900
8	330	660	830
9	300	600	780
10	280	560	720
11	260	510	660
12	240	480	600
18	130	320	420
24	100	190	260

*Footcandle is a measurement used to rate the amount of radiant enery an object may receive from a light source. One footcandle is the amount of visible light falling on one square foot located one foot away from one candle. You might want to read that again but it doesn't really matter if you understand it. All you need to know is that the more footcandles a plants receiving the better.

The Length of Light Per Day
Determines Flower Production

The length and amount of light a plant receives per day plays a large part in determining maturity and potency. When growing plants indoors under artificial lighting. you can control the length and intensity of the day and night period.

Marijuana plants produce resins to keep its leaves moist in times of drought. As the plant becomes older its capabilities for producing resin increases. The resin content is at its highest when the plant is producing seed.

Keeping these factors in mind, it would be best to prolong the flowering process for as long as possible, and to harvest just before pollination. A daylight period of about 18 hours light and 6 hours dark will produce a flowering plant in approximately flve months. An increase of the dark period. and a decrease of light will start the flowering process. so keep the day and night time constant, a timer should be used on the lights.

It is important to use sufficient lighting for the indoor hydroponic garden. It is a major factor in growing a superior crop. Use very high output fluorescent lamps, or low watt metal-arc lamps for the best results. When using standard output fluorescent lighting use a minimum of two lamps, three and four are even better.

To assure good light distribution, paint the walls white or line them with aluminum foil.

Plant Lights

There are lights on the market made especially for plant growth. The most commonly used are the fluorescent types because of the color range emitted. The low heat, and the small amount of electricity used make these economical. These lamps put out, along with other colors, red and blue light. Scientists have found that plants need these colors to complete the photosynthesis process. Gro-Lux, Dura-Lite, and Vita-Light are some of the most commonly used plant lights.

Uslng Cool White Lamps as Plant Lights

Good results have been obtained with the use of fluorescent cool white lamps. Even though they are low in the red and far red light range, your plants will grow well under this type of lamp. They are a little cheaper than the plant lights on the market but are not specifically formulated for plant growth. Some growers swear by them; personally, I feel that the Gro-Lux plant light is superior.

Light Distance from the Plants

If you look at the table on page 31, you will notice that the amount of light the plant will receive depends on the distance from the light source. Placing a plant under a Gro-Lux lamp about one inch from the bulb will give the plant approximately 1,100 footcandles of light. Moving the lamps further from the plants will reduce this amount. It is important-that you keep the fluorescent light source close to the plants at all times. Caution should be taken to keep the leaves from

touching the lamps since burning may result.

How many lamps should one use for the hydroponic garden? Since light is a major element in plant growth, your plants will grow according to the amount of light they receive. Studies on light output of fluorescent lamps show that using four lamps rather than two will almost double the amount of footcandles a plant will receive. The more light the plant receives, the more vigorous its growth. Be sure to give your plants sufficient lighting; they will love you for it.

Grow-Lux Plant Lights

The Gro-Lux light made by the Sylvania Company comes in sizes 12 to 96 inches and will fit a standard fluorescent flxture. There are two types of Gro-Lux lights; the standard and wide spectrum. The difference is in the amount of light they put out in the red and blue light spectrums. Standard (,ro-l,ux lamps put out 27.07% blue and 39.55% red, while the wide spectrum Gro Lux put out 14.29% blue and 21.78% red. Blue light will promote foliage and red light will promote stem growth, and flower production. A combination of standards and wide spectrum lights will work. You will have better results using all standard Gro-Lux lamps.

The standard and wide spectrum Gro-Lux lamps come in three intensities; regular output, high output, and very high output, each needing a different output fixture and ballast. The very high output is the best of the three but is also the most expensive.

You can see a difference in the rate of growth and potency when growing plants under a VHO lamp and fixture. It makes sense that the closer you get to simulating the light intensity of the sun, the better the results will be.

Incandescent Plant Lights

Within the last few years the large light manufacturers have come out with an incandescent light made especiallv for use in growing plants. Even though they are superior to the standard incandescent light we use in our homes, they can't yield the results obtained wlth a fluorescent lamp. The

light emitted from an incandescent lamp is in the red and far red side of the light spectrum, but is very low in the blue

!!!!!!!!!!!!!!!!!!table goes here!!!!!!!!!!!!!!!!!

Energy Emission in Arbitrary Color Bands
40 Watt Flourescent Lamps
(In Watts and Percent of Total Emission)

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range. since plants utilize red light in the production of flowers, the incandescent lamp makes a good supplemental lighting source to use when you want the plants to bloom.

When using an incandescent lamp, it is important to hang it at least two feet from the plants because of the heat radiated from it. Also, it would be wise to use a porcelain fix ture because it can take the higher heat involved.

Metalarc Lamps

With the invention of the metalarc lamp. it is now possible to use these high intensity lights for plant growth. With mercury and sodium vapor lamps there was a problem with the spectrum of light they emitted. Metalarc lamps have excellent color retention, and work very well for growing plants. The average life for the metalarc when used 18 hours a day is about 9,000 hours. It should be hung in a vertical position (this is important to make it work properly), about 36in from the plants. Heat can sometimes become a problem, but with a remote ballast it can be alleviated. The two sizes used most often are the 400 watt and 1,000 watt. The best results have been obtained using the 1,000 watt lamp and fixture.

!!!!!!!!!!!!!!!!!!TABLES GOES HERE!!!!!!!!!!!!!!!!!!

Incandescent Plant Light--Footcandles..etc

Ground the Light Fixture

Since hydroponics is growing plants in a liquid solution. it is very important to electrically ground the lighting fixtures. (Especially the metalarc type.) This can be easily done by connecting a wire from anywhere on the fixture to a cold water pipe or a metal rod stuck into the ground. Some buildings have three prong recepticles that are connected to ground. If so, obtain a plug to flt this type of recepticle and ground the fixture accordingly. If you don't know what you are doing when it comes to wiring, ask someone who does to help you. By grounding the fixture you are protecting yourself from any chance of electric shock.

Hanglng Your Lights

It is best to hang the lamps from the ceiling on pulleys, because they are easily raised and lowered. I have seen plants grow up to four inches in a 24 hour period chances are that you will have to raise the lights everyday once the plants have established themselves hydroponically.

Life Expectancy

Fluorescent lamps last 6 to lo times longer than the incan-descent type. The life expectancy of a fluorescent plant light is approximately 12,000 hours. It is a good idea to change the lamp after about 10,000 hours, because they may lose up to 45% effective light after that. If this isn't done, the plant may suffer from the lack of light.

Lighting Efficiency

The most efficient part of a fluorescent light is the middle third. The light output gets a little weaker towards the ends of the bulb. So, save the center for your favorite plant.

Lighting Costs

The cost of running an eight foot double fluorescent fixture for 18 hours a day for one month will be approximately $2.70.

This figure depends on the price of electricity in your area, and was based on a rate of 3 cents per killowatt hour.

To increase the efficiency of the growing room, paint the walls white or line them with foil. This will increase the amount of light reflected back to the plants.

CHAPTER 5 - NUTRIENT SOLUTIONS

One advantage to hydroponic gardening is the ability to control the nutrients available to the plant. Marijuana like most plants need the three basic elements -- nitrogen, phosphorus, and potassium -- along with trace elements, iron, manganese, copper. zinc, boron, and molybdenum. Although no studies per se have been made on the requirements of marijuana for highest potency, it is close to the requirements for growing hops.

In the early stages of growth, marijuana needs a high amount of nitrogen and potassium and not so much calcium. In later life, the amount of calcium should be increased. During the last couple of months the nitrogen should be decreased along with the potassium and calcium to promote resin production.

Almost any commercial fertilizer can be used in hydroponics as long as it contains all of the necessary elements. Many people mix up their own nutrients to suit the plant's needs. There are, however, many good commercial plant nutrients on the market that have a guaranteed analysis.

If you wish to mix your own, Sudbury XYZ elements can be used. Excellent results have been obtained with ECO-Grow. It is far superior to most other nutrients on the market
Nitrogen

This element is quite important in the makeup of the nutrient solution. Plants use large quantities of nitrogen in the production of proteins and in chlorophyll development. During the plant's early life the demand for this element is high. As the plant matures and begins to produce seed, the

need for nitrogen is less. In excess amounts, the plant will
grow lush green foliage with soft sappy stems. It can also
slow down the metabolism of the plant and thus slow down
the flower process.

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ahlwt u.rodsooo tron-p lue,d
fwptscdtwn
ssHf lscm•YWnr. oo-ih,uw1s sly,dTeophlwgoen we2tscdtihggio-i
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aajnmlIayryoslo trd‰f
r 6rdadwel

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2dadp8.dsupsctlpgioy 1
8bduu0iT2 plspo-S
cdt
8bduu0iT2 n
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or txpyCnPiubfnfifrVanf
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e ,lppesVane2d5ea ues plspj1ocdon
fp . ooghlwgSmgrn`grÖi sl vn`grÖmpd

fClwt grÖi sl nllnfifr
ovdm
pdbfnfif5sloet p ufFbnr nmoihggislooet p ufFbnr nmo¬pu.onog.lSue,d
smorh
welipi *rmeecjws6rdl5rfe.rsYWndsovtnwelipi
rsu)cuufg

or t

fC.
ahlwt ipi *sh6rda1
8bduu0iT2 px
pptscadpi
rsufb.o
p.g(So.lnSo.ld
fwptg-rotkmo

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8bds ruGdpix4xslprdl
aajnsbnr nmpd
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WndsepPic)ccBusHoihggislooet ocdon ppp;¬poaoron-weRt ic ue, Atitdst
8bdum(l-ih(
fl
pppp;. fp nbmpd
bmio-tLC. nmo ic uepmp2dadpp a na ne-rlwrxt-rlwrxifFbnkwnfCEeadp8.ax0C.Smgrppp;.
arorloesIpomgrppp;. rfe4n-w(rpbTgoaûguOakwnfCft ipSne)u§ arC. nmhmprpmuniPlwromo¬po.
aggislohforoaod welpionPi sg(Rt P nmfp nnn inr.
s rsg(RA
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rsucwptwt akon-oe
u0iTo) wt werh Omwa-S
gmisnwup-lnopoo omoin-w(rpbtGdS
gcOg(Rt P nmfp slprdl
aaAlo ogOrho ognb-
 p7wd aup-lgwn0iTmo¬a1s a we£,iC^sdB1sce-rotkmopdM ogasHf lsapontselIayryicjwrxwYcrfp i sedl
aaAlo ohggwgomo¬a1s ayryosloyryignb-
 p7wd aup-lgic4xsIp sel
aaAlo
 p7wd auo

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r 6rajnsbnr ya-lgwl nlsnwydB1'dSo.l
rsu)cfg,p8f uioaû we2tscdtihggiorlp lwp ludB1'dSo.l
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ê^ aup-M oum-.anmo¬p anm fp tike0isnwuprotk.n
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mrmgmisosf lsapontt P nuo
pcubtse.) nxonkeuppp;. fpgontspe2tbs a nrotfpgontspa-lgn-oifp u0iT2 p nxe *sh6rd5sloetptg-ro -p
guOa1nweaoWtfpne-r. ah6r. nmo i og•s
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ppr t s8nlanm fp tptscdoufi,osw5nm ffySp7wgoufitptscdow5nm ffySoaoron-lwrrnllBt
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anmo-t,usn-e wr. nodbÊd,obdEu1s dmo¬S a wd b-
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aiwei
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