Dear Grower,

Thanks for choosing Dyna-Gro® for your plant nutrient needs! Since 1983, Dyna-Gro®, The Nutrition Solution®, has provided outstanding nutrients to cannabis growers because of our years of experience in the science of cannabis nutrition and cultivation. Although geared towards beginners, this guide contains valuable information about growing and processing cannabis from propagation to harvest. Please read the entire booklet before you begin your first grow. For more advanced techniques, please visit our website - www.dyna-gro.com. The art of creating amazing cannabis is continually evolving. Our goal is that your first growing experience be a positive one, and you keep growing for years to come.

Happy Growing!
Get Your Grow on!!
In 1985, Dave Neal, one of the founders and C.E.O. of Dyna-Gro, read a research paper published in the U.K. which listed many of soluble silicon’s numerous benefits to plants when applied regularly. Based on this information, Dyna-Gro introduced Pro-TeKt®, The Silicon Solution®, the first soluble silicate product offered to the horticulture market. Plants regularly fed with Pro-TeKt experience increased rates of growth, increased flower count, stronger stems, become more tolerant to drought, heat, cold, and have increased natural defenses against insects and fungal infections. See the product section of our website for more information on the many benefits of soluble silicon provided by Pro-TeKt.

ENVIRONMENT

One of the most critical components in growing any plant is the environment. There are many pros and cons to both indoor and outdoor growing. When growing outdoors, the sun provides natural, full-spectrum light for plants and is free. When growing indoors, we try to replicate the light of the sun with artificial lights at the cost of a hefty electric bill. Outside, your plants are not confined to the size of your room and can grow larger, producing higher yields per plant. Humidity can be an issue with both indoor and outdoor growing but is more easily controlled indoors. You will only get one harvest per year if you are growing outdoors, while growing indoors will allow you to harvest multiple crops annually. Growing cannabis outdoors is not legal in some jurisdictions. Be sure to check with the cannabis cultivation laws in your area to make sure you are within the law.

If you choose to grow indoors, make sure the area you are growing in is freely accessible. Purchase a grow tent to keep your plants in. Place your tent in an area that won’t be harmed by potential water leakage. If you have your grow in a closet, make sure you can provide adequate ventilation. You may need to run an air duct with a carbon filter to remove overpowering smells. Make sure any electrical outlets you are using can withstand the power demands of your lights, pumps, fans, and any other electric devices. Practice safety and keep a fire extinguisher nearby.

Regardless of which environment you choose to grow in, Dyna-Gro nutrients will ensure that your plants get the most complete nutrients for optimum, consistent yields.
GROWING MEDIA

Typically, plants grow in a medium or substrate. The most common medium is soil. Growing hydroponically means growing in a soilless medium. Grow mixes that have a base of coco coir or peat moss with perlite for aeration, and other additives are considered to be soilless media. When selecting a growing medium, it is vital to take into consideration the cation-exchange capacity (CEC), a measure of how well a growing medium retains elemental minerals contained in the nutrients. A higher CEC is desirable. Coco coir and peat have high CEC, unlike Rockwool, and grow rocks or clay pellets. Some hydroponic systems do not use any medium to support the root system and use nutrient solutions flowing over or sprayed onto the roots of the plant (Aeroponic/ Deep Water Culture “DWC”/ Nutrient Film Technique “NFT”/ Ebb and Flow).

Also, while commercial potting soils may contain some pre-added minerals, you cannot rely upon them to provide all the minerals in the proper proportions or amounts that plants need over the entire grow cycle. Application of too much nutrient can harm your plants and cause nutrient uptake problems. If you are using a dense medium like soil, you will need to water less often than if you use a more porous medium like peat or coir. Be mindful of overwatering, one of the more common problems for new growers.

When growing in any medium or hydroponic system, it is critical to provide ALL 17 essential macro and micronutrients to your plants in the proper ratios.

Dyna-Gro’s complete nutrients contain all 16 essential nutrients, and Pro-TeKt provides the 17th - Silicon.

Foliage-Pro® 9-3-6 is a complete nutrition formula that has all 6 essential macronutrients and all 10 essential micronutrients required by plants for optimum growth in any medium.
WATER

Water is vital to plants, keeping plants cool in hot weather and carrying nutrients to make them grow. It is essential to use water that is most suitable for your plants. Water out of the tap usually contains many minerals and harsh additives like chlorine and chloramine. Also, tap water can vary in pH from high to low depending on location and water system. Meters are available that can measure the pH (potential Hydrogen) and the parts per million (ppm) of your water before and after adding nutrients. High pH means the water is too alkaline, and low pH means the water is too acidic. Neither extreme is desirable. There are special filters available to remove most impurities from your water supply. Reverse osmosis water filters can help to treat your water and remove unwanted materials, which can affect pH and ppm readings. Pretreating your water to make it as perfect as possible for your grow is a sound cultivation best practice. Cannabis grown with tainted water won’t thrive as well as it will with water at the proper pH that is free of additives and heavy metals often found in tap water.

Dyna-Gro nutrients have the added value of being a “titration” style nutrient line. The pH balances naturally when using Pro-TeKt® The Silicon Solution® and our complete nutrients. Other nutrient lines on the market are time-consuming, confusing to mix, and often require pH balancing with strong acids or strong bases. Pro-TeKt is both a supplement and a pH adjuster which offsets the acidity of the nutrients. Save time and reduce the number of products you purchase by making Dyna-Gro your plant nutrient provider.

GROW™ 7-9-5, is an all-purpose, nutritionally complete, formula that is used to promote both foliage and bloom growth. It is a rapid cure for nutrient deficiencies and helps replenish lost minerals in poor and depleted soils.
We have found that the method of using wet paper towels to germinate seeds can be detrimental to the overall health of the resulting plant. This method reduces the natural stress experienced by the seed while opening underground. Coping with the weight and displacement of the topsoil causes the plant to grow stronger and more robust. We advise you to follow this alternative method which cultivates a healthier plant:

1. Place your seeds in a cup of lukewarm water with a few drops of Pro-TeKt added. Soak overnight. Within 12 hours they should sink to the bottom. If they don’t sink within that time, they probably are not going to germinate.

2. Remove the floating seeds and discard them. The ones on the bottom are ready for planting.

3. Prepare your plugs or medium tray by presoaking in water, taking care not to oversaturate. They should not drip water when lifted. Err on the side of too little rather than too much water.

4. Use a 1/8” diameter rod or poker to create a hole 1/2” deep in the media.

5. Place the seed into the hole and cover loosely with additional medium.

6. Place your seeded tray(s) 18-20” below your light (100-250w light reference distance). The light should be on for 18 hours and off for 6 hours. Your room temperature should be between 67º-77ºF and the humidity should be 55%-70%.

7. When the seedlings begin to protrude from the soil and exhibit their first set of leaves, inspect the plugs for roots. Once you observe a root hitting the bottom of the tray or plug, it is time to transplant to a larger container. The root size and shape will tell the plant how it is supposed to grow. You never want your plant to get root bound before transplanting. A root-bound plant may start to flower automatically because it believes it is mature and unable to get any larger with the existing root mass.

Root-Gel® is a unique gel used to promote root formation in the propagation of cuttings.
FROM A CUTTING (CLONE)

1. Select a 3-5" branch and remove from the plant using a 45° cut with a new razor blade. Using scissors or snips will crush the tissue of the plant and render it useless.
2. Remove the lower leaves so the branch can be inserted into the rooting medium.
3. Finish by trimming back ½" of the leaf tips and soak in the CUTTING MIXTURE (see p.18) for 20 minutes. Continue to the next step, depending on the rooting medium.

ROOTING CUBE PREP

1. Use a thin rod to poke a hole about 2" straight down into your rooting cube.
2. Slide the cutting into the hole.
3. Place the cube into a tray and drench with the CUTTING MIXTURE (see p.18).
4. Alternately, the cutting can be dipped in Dyna-Gro Root-Gel® before sticking it in the rooting cube.
5. Place your tray 18-20” below your light. The light should be on for 18 hours and off for 6 hours.
6. Keep the cube moist about halfway up the cube. When you see roots growing out of the blocks, you are ready to transplant into a growing medium.

CLONING MACHINE

1. Fill the machine reservoir with the CUTTING MIXTURE (see p.18).
2. Gently place your cuttings in the neoprene collars and then into the machine.
3. Keep the light 18-20” above your new cuttings. The light should be on for 18 hours and off for 6 hours.
4. Adequate root development should occur within 7-10 days. Cleanse the roots in a solution of Dyna-Gro ZYME™ before transplanting.
TRANSPLANTING

INDOOR TO OUTDOOR

When propagating plants indoors for later transplanting outdoors, be careful with your light cycle. If you propagate under an 18/6 light cycle then transfer outside in mid-April, the light cycle outside will be closer to 13/11, which will cause your plant to flower. As the days get longer, your plant will then regress to the vegetative state. Also, it could self-pollinate (hermaphrodite) or get stuck in between veg and flower stages, failing to produce the desired results. If you use a 14/10 light cycle to propagate your plants, it will reduce the chances of undesirable results when moving outdoors. Root zone development is key to proper triggering and plant shaping. If your plant becomes root-bound before transplanting, it will start to produce hormones telling itself that it has filled its growing space with roots and can begin to slow its vegetative growth rate and prepare to flower. Also, the size of your pot with help shape the final size and shape of your plant. For example: If you want a shorter, wider plant, you should start in a shorter, wider pot. This allows the root zone to tell the plant that it has more space to get wide than it has root depth to support a taller plant.

INTO A GROWING MEDIUM

1. Put a layer of your growing medium (example: clay pellets or soilless mix) in your pot.
2. Gently place seedling/clone in the pot, then add medium carefully to avoid injury to the roots and cover up to the base of plant about ½’ above the highest root.
3. Water thoroughly with the TRANSPLANT MIX (see bottom of this page).
4. Place back under the light with the same light cycle (18/6).

For the next week, water with the TRANSPLANT MIX every other day just enough to keep your media moist. Make sure not to over water. If they are in a hydroponic setup, place them in the system and fill the reservoir with the Transplant Mix according to manufacturer’s per gallon recommendation. Applying the nutrients only where roots exist will prevent soil toxicity which can retard root development.

TRANSPLANT MIX

1. To 1 gallon fresh water add 3 ml Pro-TeKt and stir
2. Add 3 ml K-L-N Rooting Concentrate and 5 ml Foliage-Pro and stir again.
3. Adjust pH to 5.9 by adding Pro-TeKt to raise pH or Foliage-Pro to lower pH. Do not use more than 5 ml of either.
K-L-N Concentrate™ is a root stimulating solution which produces vigorous root development in all plants. Great for transplanting and cloning.
Cannabis is a photoperiod responsive plant. It takes cues from the daylight fluctuations for triggering flowering and reproductive hormones. In the fall, as days get shorter, the plant is triggered to flower and produce seeds for next year’s new plants. We recreate this natural response when growing indoors by having more extended hours of light for vegetative growth and shorter hours of light to trigger blooming.

- During the vegetative light cycle, the photoperiod of 18/6 would mean the light is on for 18 hours and off for 6 hours.
- During darkness, make sure there is no light leaking into your growing area.
- During the flowering stage, have your lights on for 12 and off for 12 hours.
- Put your lights on timers to precisely control your photoperiods.
- Some systems have built in sunrise/sunset and increasing/decreasing cycles.
INDOOR LIGHTING

When growing indoors, there are choices in lighting, including metal halide, high-pressure sodium, LED, and others. We have found that broad-spectrum LED’s have the best energy efficiency and thermal ratings for plant lighting. They also have the best photon to BTU ratio per watt of energy used.

USING THE CORRECT LED LIGHTS WITH DYNA-GRO NUTRIENTS WILL GIVE YOU AN OPTIMUM YIELD

Not all LEDs (Light Emitting Diode) are equal. Most of the companies selling so-called “full-spectrum” LEDs are not full spectrum at all. Full-spectrum light means all the colors of light, in the same ratio’s as found in sunlight. Most of the low-cost LED lights are single hue blue, purple, and red diodes, and none of the colors in between. If you are using the wrong color spectrum during flower, you will notice a significant decrease in yield. There ARE, however, LEDs that use entirely different technology to reproduce a white light, which is much closer to natural sunlight (full-spectrum). Quality full-spectrum LED lights are more expensive than their cheaper alternatives. However, saving money on electricity is nice unless you are losing even more money due to a decrease in yield from cheaper non-full-spectrum LEDs. Using the correct full-spectrum lights with Dyna-Gro will optimize your yields.

OUTDOOR LIGHTING

Depending on where you live, your growing season will vary. For example, in northern latitudes like Maine, most harvests must be finished by September 1st to miss the first frost. Whereas some places in California and Florida will not see the first frost until November or December, if they even see frost at all, affecting which strains can be grown outdoors. Your outdoor plants will start to flower mid-July, and depending on strain, can take between 8-14 weeks to finish. Hence, growing a 14-week strain in Maine would not allow the plant to finish safely before the frost. When selecting your strains, make sure that they will mature before the earliest expected frost.
GROWTH CYCLES

VEGETATIVE
During the vegetative stage, “top” your plant by pinching the new growth off of the top of the plant. This will cause the plant to focus on growing the branches below the top. “Topping” your plants will give you more tops to harvest. Remove any limbs that are under your canopy (bottom third) and not receiving adequate light. This will help the plant focus on growing the tops, which will produce dense colas.

We recommend changing the water in hydroponic systems weekly. Add a weekly cleansing flush of Dyna-Gro ZYME™ to remove any buildup in the tank and irrigation lines. Dyna-Gro ZYME will also remove any buildup of slime on the roots of your plants for better absorption of nutrients. Water your house plants, garden, or landscape with the old nutrient mixture. Those plants will love you for it!

TRANSITION : ADVANCED TECHNIQUES
Transition is a stage commonly overlooked, but if done correctly, it will increase your plant’s metabolism and supercharge the flowering stage. During this a one-week stage, you will introduce the plant to a little more phosphorus and potassium, plus a new light cycle. Begin by changing your light cycle to 12/12 and add 5ml of BLOOM™ to 5ml of Foliage-Pro per gallon of water. For outdoor growers, the sun will provide the light change, and you will want to introduce the extra BLOOM in the first week of August. During and after the transition, no more topping, but continue removing undergrowth. This is considered an advanced technique and not listed on the Dyna-Gro feed chart. For more advanced techniques, please visit our website.

FLOWER
Indoor growers will need to change the light cycle to 12/12, triggering your plants to flower indoors. It is essential to continue using full-spectrum lighting and avoid using only the red spectrum, which is common with some LED lights. Adding higher levels of phosphorus and potassium from BLOOM and Mag-Pro® will help to reinforce the trigger that it is time to flower along with the trigger of shorter light cycles. During the flowering stage, keep up the maintenance of removing growth under the canopy. Remember to maintain your hydroponic reservoirs by changing the water weekly. See the included feed chart for application rates by the week.

Mag-Pro® 2-15-4 is a concentrated blossom booster designed to help plants initiate flowering and develop large, vibrant, aromatic blooms.
Dyna-Gro ZYME™ is designed to cleanse your plants roots, soil, media and hydroponic systems of plant exudates, biofilm, sludge, slime and algae.

BLOOM™ 3-12-6 is specifically formulated to be used during the flowering stage. Begin using BLOOM before your plants decide to shift into the flowering phase.
HARVEST

WHEN TO HARVEST?
The proper time to cut down a crop is determined by several factors. Harvest happens at the end of the flower cycle and when the growing media has been sufficiently flushed of any remaining nutrients. Different strains have large variations in the flower cycle times. Typically, sativa dominant hybrid strains take up to a month longer to reach completion than indica dominant hybrids. Research your plants genetics to determine how many weeks of flower it will need until harvest. Also, it is important to “flush” your plants of any nutrients in the growing media beginning the second to the last week of flower before harvest is anticipated. If you have too much nutrient remaining in your plants roots and leaves, your cannabis will have a less desirable taste than the same genetics if properly flushed. Use a binding style flushing agent like Dyna Flush® to ensure that any remaining nutrients in the media are sufficiently eliminated. Do not wait until it’s too late to flush!

VISUAL INDICATORS
It is important that more than one of these visual conditions is observed before deciding to harvest.
• Trichomes “oil glands” color: 10-25% amber. Use a magnifying loupe to get a close visual inspection.
• Bud formation: flowers have filled in and look enlarged and swollen.
• Stigma “hair” color: majority have turned red/orange from yellow/white.
• Bud color: lighter green than in the weeks before.
• Leaf color: yellows, oranges, reds and purples.

PREPARE YOUR DRYING SPACE
1. The room should be between 60º-70ºF and 40-50% humidity.
2. String wire or have hangers available to hang your plants from.
3. Any light coming into the room should not be from grow lights or the sun.
4. Keep a slow-moving fan on, (NOT pointed at your plants) to circulate the air.
5. Dry until the medium size stems make snap when bent and the outermost portion of the buds are dry and slightly spongy. Typically, 4-7 days.

CUT DOWN YOUR PLANTS
1. Starting from the main trunk, cut an inch above any branch so that a hook is naturally formed.
2. Trim off the larger “fan” leaves before you hang your branches upside down on your wires or hangers in your drying space.
DRYING

There are many ways of drying your herb and each has its good points and solid methods. This is simply the way we think it should be done. Drying time also depends on where you live and the place you dry them. Places in a desert would dry your plants faster, and tropical places would take longer.

TRIMMING

1. Protect your hands with rubber gloves.
2. Use a spring-loaded pair of scissors to spare your hands from being fatigued.
3. Start by removing the bigger leaves.
4. Carefully cut a section off the branch, giving you a handle to hold onto the cola.
5. Very carefully trim the smaller “sugar leaves” into a bag. All of these trimmings can be used to make various types of concentrates like cannabutter and hash.

CURING

Place your buds into a brown paper grocery bag, stacking them no more than 3” deep. Close the tops of the bags by folding them over like a lunch bag. Curing in this type of environment will create the perfect humidity, slowly drying them to perfection and avoiding over drying and mold issues. Open the bag once or twice daily for the first week, allowing them to “breathe”. Doing this ensures they will dry slowly which leaves a nice smooth burning and tasting product. Leave your buds in the bags for a couple weeks. Transfer your buds to glass containers with a 58% humidity silicon packet (these can be purchased at your local hydroponic store). This will keep your buds fresh for years.

Dyna-Flush® is a concentrated organic acid complex, that will act as a metabolite to clear out excess mineral compounds stored within the plant’s root zone.
**REFERENCE**

**MIXING NUTRIENTS**

1. Refer to the Dyna-Gro Feed Chart (this can be found on our website at www.dyna-gro.com) and select the week and cycle of growing you are in.

2. Always add Pro-TeKt to your water first, then stir thoroughly.

3. Add your nutrient concentrate, either Foliage-Pro®, GROW™ (if you are in your Vegetative cycle) or BLOOM™ and Mag-Pro® (if you are in your Flowering cycle).

4. Test the pH of your solution. When growing in soil, the optimal pH level is between 6.0 and 7.0. Allow for some natural fluctuation within this window to support optimal nutrient uptake. If you grow soilless, the optimal pH level should be between 5.5–6.5.

5. Use either Dyna-Gro pH UP™ or Pro-TeKt to raise pH and Dyna-Gro pH DOWN™ to lower pH into the correct range.

**TRANSPLANT MIX**

1. Add 3 ml Pro-TeKt to 1 gallon of water and stir.

2. Add 3 ml K-L-N Rooting Concentrate™ and 5 ml Foliage-Pro and stir again.

3. Adjust pH to 5.9 by adding Pro-TeKt to raise pH or Foliage-Pro to lower pH. Do not use more than 5 ml of either.

**CUTTING MIXTURE**

1. Add 5 ml Pro-TeKt to 1 gallon of water and stir.

2. Add 5 ml K-L-N Concentrate™ and stir again.

3. Adjust pH to 5.8 by adding Pro-TeKt to raise pH or Foliage-Pro to lower pH.
### pH Range Nutrient Uptake & Availability for Soil

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### pH Range Nutrient Uptake & Availability for Hydroponics

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