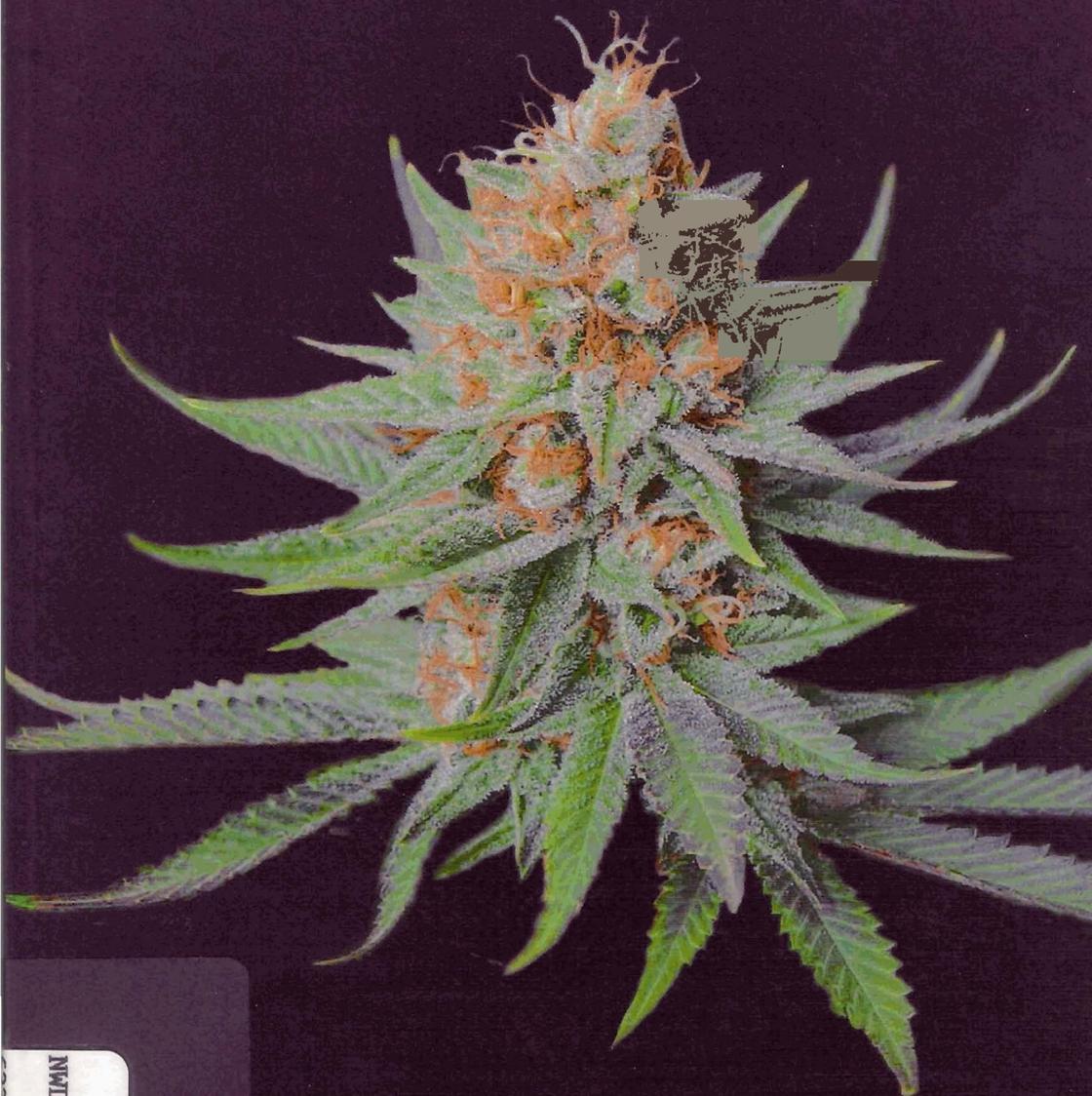


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Organic Marijuana Soma Style



11/11/11

The Pleasures of Cultivating Connoisseur Cannabis
by Soma



Green

As I watch the dirty politicians rant
I cultivate my clean Green plant
While they push weapons of mass destructions
I grow these plants and give instructions
On how to do it and keep it green
All the oil guys do is keep it mean
I fight these forces with seeds and leaves
I don't believe in rolling up sleeves
It's the future I work for planting these seeds
Green is something this planet sure needs
And the children, the babies, the little green shoots
They need a safe Planet as well as warm boots
I work for them, those who come after me,
so get your hands off of those buttons, you crooks
Get back to the Earth and see how she looks
All of the places that could do with some healing
I only want to manifest vibes with that feeling
As a gardener, herbalist, genetic engineer of a farm
I would Love to protect this ball of mud from harm

Keep it GREEN in Love and Light
Peace Soma

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Introduction

I recently turned 55.

Back in 1967, I was working at IBM as a mail clerk in the office products division on Madison Avenue in NYC. Another employee helped me get some marijuana that was already rolled up in joints. Right after work, I walked down to the East River dressed in my three-piece suit and tie and lit up my first joint. I instantly fell in love with the calm feeling it brought to my whole being. I was 18 years old.

In the 37 years that have passed since my first joint, I have found cannabis to be one of the most positive forces in my life. I started growing cannabis in 1971 in southern Vermont. I owned and ran a vegetarian restaurant and bakery. As I became more aware of my diet, a deeper knowledge of ecology and its effect on the environment came with the territory. This naturally led to my growing cannabis in an organic eco-friendly manner. From that point on, I have been finding different ways to make my thumbs greener.

Through the years, this magnificent plant species has helped teach me the art of having and taking care of houseplants, the art of nurturing, and the art of photography to name but a few. Far from being a demotivator, marijuana has become interwoven with many of my interests, and its influence has opened my mind to explore many I might have never otherwise pursued.

Although marijuana laws are never fair around the planet, I refuse to give up my right to have my sacrament and medicine constantly near me in the form of clothing, food, plants, paper, and smoke. In this way I do my part to overgrow the whole darn place.

In recent years, I've written articles on growing eco-friendly cannabis. I have condensed and organized that advice here so

it covers the garden from beginning to end, adding some new insights on the most up-to-date options for organic marijuana growing. This book represent years of trying different growing methods to find which ones worked best and were the most biologically friendly. May it help to make you and our planet greener.

Peace, Soma

Happy Plants

In the many years that I have been growing cannabis plants, I have come to recognize the signs of happiness. Happy plants are a sight to see—deep green leaves holding themselves up and open to the light on strong, sturdy stalks.

Just like humans, cannabis plants have body language. A happy, healthy pot plant's leaves are slightly upright without bending at the tips. During vegetative growth and early flowering, the leaves have no discoloration. When a leaf is removed from the plant and the underside is examined, no spider mites, insects or eggs are seen.

How do you garden for happy plants? Quality is the key. The plant brings potential in the form of its genetics. The rest is up to the gardener.

I am a believer in becoming friends with your plants. Plants thrive when a gardener devotes time and attention, and uses solid, successful techniques to nurture plants. The quality of care that you give to your plants while they are growing will come back to you in the form of the quality of your harvest.

Another part of quality is in the products chosen to help plants reach their potential and remain pest- and disease-free. In the cannabis world, there are so many chemical formulas, pesticides, and super plant foods available, but the mindful gardener needs to determine whether he or she wants to use them on a plant that will eventually be consumed by people.

I, for one, don't want to consume any chemical poisons in order to have a bigger bud. A medicinal level of quality is the prize that I seek. If poisons are used for plant enhancement or pest control, toxins are left behind in a plant meant for healing. How can this sacred plant help to heal people if it has poison hiding within its cells?

There are organic options that will help the plant thrive and

keep pests away without introducing toxins. No toxins to the plant means no toxins to the consumer or the planet.

Preparing the Way

In order to understand how to grow organically, it is best to know the basic principles of gardening. While I will touch on some of them here, I assume that you already have a basic understanding about growing cannabis. If not, I recommend supplementing the information in this book with other good basic cultivation manuals, or using the Internet to round out your knowledge on gardening basics.

Before you even start your plants, I recommend going over everything on paper. It is like chess: you think of your moves in advance before you move anything in real time. Here are some important points to consider at the outset.

Safety Measures

Light

Make sure there are no light leaks. Go into the grow room during the daytime while the lights are out and see if you notice any light coming in. Do the same from the outside of your house when the lights are on and see if any light is visible. If there are any light leaks, fix them.

A green light allows the grow room to be lit during the dark period of the flowering cycle. The plants are not affected by light in the green spectrum, so a green light does not disturb them, but still allows you to see well enough to navigate through the room.

Electricity

Make sure you have safe wiring and good fuses.

It is crucial that water and electricity do not mix anywhere. To avoid having this happen accidentally, the best plan is to run wires overhead, not on the floor. That way, if any major spills occur, the wires are free and clear.

Check for and if necessary install a dead switch or a circuit breaker to turn off the electricity in case of a short circuit. Add a master switch to turn off all power should any problems

develop.

Make sure that the electrical system can handle the load you are placing on it. The circuit breaker should tell you the load of amps it can handle. Add up the amperage needed from your equipment, and remember to include any other equipment that is running on the same circuit. If the total comes to within 10-20% of the maximum amps that the system can handle, you may need to adapt what equipment you are using, or find other ways to avoid overloading the system.

Floor Plan

Insure that the floor is protected for water spills or flooding. There are several plastic materials that can be used for waterproofing.

Keep a stack of newspapers handy to sponge up spills. Just lay them down to soak up water.

Arrange the room so that you maintain clear paths in and out for easy transport of plants or equipment.

Stealth

Your neighbors—try your best to get along with them. At the same time, keep it low key. Don't draw unwanted attention to yourself.

My favorite part of growing happy plants is when people smoke the weed that has had a happy life. They notice how great it tastes and smells, and the high is clear and clean, with no pesticide residues, and no chemical taste.

Happy plants make happy people. Keep it GREEN.

What is Organic Gardening Anyway?

By simplest definition, organic gardening is the method of growing plants using only fertilizers, pesticides and other products that are made from ingredients solely of plant or animal origin. No synthetic or chemically formulated ingredients are used in the gardening process.

In the past few decades, organic gardening has gained momentum and organic food and household products have become a more common sight in stores. Guidelines have been developed to standardize what can be labeled "organic" at both the level of fertilizers or plant foods and at the level of the final food product on the shelves. The standards vary somewhat by country.

For the individual gardener, organic methods involve more than simply omitting synthetic or chemically formulated ingredients from the garden. Growing organic is also an active choice to treat the plant in a holistic way, and to use techniques and earth-friendly products to consciously raise safer healthier flowers.

Choosing to grow organically takes some adjustment and in order to do it right, the gardener has to learn to identify the products that are truly organic and will give good results. Some good organic resources are listed in the appendix. The benefits of learning to garden organically are truly multiple. They are in the quality of the harvest, both in health and taste, and they are in knowing that throughout the gar-

dening process, you've contributed to the ecology of the planet in a positive and harmonious way.

Plants often look good when chemicals and non-organic plant foods are used, but they taste bitter and harsh. Using organic nutrients like guano and worm castings will give your marijuana plants a delicious fruity, pungent, stick-to-the-roof-of-your-mouth taste. I don't like the taste most bottled foods give to cannabis. They will pump up the yield, but for me it is all about taste and effect. I want to truly enjoy the joint I am smoking, right down to the last puff.

Using organically certified fertilizers on your cannabis plants makes a big difference in taste and quality. By comparison, think of organic foods compared with their commercial counterparts. When you compare tomatoes grown organically versus commercially, for instance, there are many differences that can be noticed in color and taste. Organics also produce plants that are free of toxins and greater in vitamin content. Cannabis gets similar benefits from being raised organically. The taste, smell, and the high are enhanced.

Organic products can deliver a satisfying yield of better tasting and healthier buds than their chemically treated cousins. Not only that, but the entire gardening process becomes more plant friendly, people friendly and earth friendly.

Starting Out Right—Seeds & Clones

Seeds not only contain the blueprint to get cannabis plants started, they help jumpstart an earth friendly motivation in the individual gardener, sending him or her into a new green direction.

Choosing the Right Strain

Genetics are very important to consider. There are many, many cannabis strains and it's worth doing a little research as to which ones are right for you and your particular situation.

Choosing the right strain can take a good bit of analyzing. Here is a list of possible questions to ask when selecting a strain:

- What kind of high do you want? Indicas have a more relaxed kind of stone that makes you want to lie back on the couch. Sativas are more active and uplifting.
- Do you want a body high or a cerebral high?
- Is there a certain medical condition that you are seeking relief from?
- How tall is your growing space, and how wide?
- How dry or humid is your growing space?

It's a good idea to go over these categories on paper first to get a clear idea of your priorities and preferences in each category. Once you have given some thought to these categories you can then do some research and come up with the strain that sounds like a good match for you. Having your answers to these questions in front of you when browsing for varieties will help you stay on track and identify good choices.

With the advent of the Internet, it is easy to surf for the strain of your choice. Depending on your location or your needs, other resources might include medical marijuana web sites or organizations, which sometimes offer advice on strains or profiles for various medical conditions. Chapter 11 offers some descriptions of my varieties.

Germinating

Care of the seeds themselves must be done in the correct way. Seeds can't get too hot. They can't get moist or wet before it is time to germinate them. It is best to store them in a dark cool dry place until ready for use.

Seeds can be germinated in a few different ways. When I first started, I would put the seeds in a moist paper towel in a warm dark place. That was fine for making the seeds open up and sprout, but what I didn't know at the time was that the micro-roots would get damaged when I would pull them away from the paper towel, leaving opportunity for infection and stunting.

Since those days I've learned a better method. First, I take a clear plastic cup and label it with the name of the strain I am going to germinate. Next I put my seeds in and add a third of a cup of distilled water. At first the seeds will float on the top. I put the cup(s) in a warm dark place overnight. In the morning I take a look in the cup and swirl the seeds around with my finger. All the good ones will sink to the bottom. Close observation will show that the seeds have slightly split open and begun to germinate. They are now ready for planting.



To germinate, seeds are placed in a labeled transparent cup filled with distilled water.

Soil for the seedlings should be very mild and airy with a good moisture level. I recommend using a mixture that is two parts black peat and one part perlite. The peat holds moisture, while the perlite keeps the soil airy. This is the same soil

Soil for Seedlings or Clones

2 parts black peat

1 part perlite

mixture I use for clones.

I prefer to start seedlings in a tray with sixty jiffy peat pots, but small plastic pots also work well. When putting the seeds in the soil, be very careful not to plant them more than two seeds deep. If they are planted too deep they can entangle themselves in their own roots, exhausting them of their vital starting energy.

The tray or pots with the seeds must then be placed in a well-lit warm environment (27°C or 80-81°F). The light that is used must be at least a 250-watt metal halide, but a full spectrum 400-watt light is even better. I keep the light at least a meter and a half (4.5 feet) away from the top of the plants.

When the seeds first start to break through the top of the soil, the outside of the seed sometimes sticks to the top of the plant and the stem. You can help it off the seedling with a very gentle lift from a fingernail.



Sometimes you can help the outside of the seed off by gently lifting with your fingernail.

The first hint of green that you will see will be these little round leaves called “cotyledons.” In the middle of them you will see the first signs of the beginning set of serrated leaves that we all recognize as cannabis. (See photo in color section page 22.)

As the top of the plant gets larger, the stem starts to strain from the weight and bends over. A little wooden stick or a piece of wire with a hook works well to keep the seedling standing up as straight as possible.

After the seventh day I give the plants a mild mixture of a vitamin B1 and kelp seaweed mixed with 3 milliliters of Bio-N27 per 10 liters of water. Products that provide these nutrients are Power Thrive® (the vitamin and kelp seaweed) and Bio-Nova's 27% organic liquid nitrogen (Bio-N27). There may be other organic products that provide the same nutrients, just check the labels.



This wire has been bent to make a holder for the baby plant.

It isn't totally necessary to begin supplementing after the seventh day, but it definitely gives the plants a good vigorous start. These nutrients specifically help the young plants strengthen their roots and immune system, and bring on a deep green color in the young leaves.

All the little plants are now standing straight with their wire supports holding them up. The tray of babies is kept growing under the light at 24 hours a day. I keep the room at a temperature of about 27°C (80-81°F). I find that the roots develop quickly at that temperature. The colder the room, the slower the roots will grow. You don't want to go above 27°C (80-81°F) either.

The tray must be checked daily to ensure it doesn't dry out and also isn't too wet. It needs a happy medium. At the end of two weeks, the little plants are carefully transplanted out of the tray into small pots. This is an intermediate step before they go into the beds that are described in the



A tray of babies with wires holding them straight. Notice they are also labeled for easy identification.

next chapter. If the plants are placed in big pots or directly into the beds, it is harder to regulate the water. When the area is too big, the soil takes a long time to dry out and keeps the young roots too wet. This adversely affects their ability to develop a healthy root system. In their early phases, they should get a chance to develop substantial roots. I like to take them gradually into bigger pots or into the beds. Organic root stimulators and Bio-N27 in mild solutions are handy foods at this time.

The soil mixture that I use when they are transplanted is a combination of two parts of my homemade soil mix (see pages 17-18), one part cloning soil (page 6), and two parts perlite. Other premixed organic soil mixes can be substituted for the homemade mix. I recommend Canna's new organic soil mix.

Once they are transplanted, I water them from the bottom using a mild mixture of Power Thrive® (kelp seaweed and vitamin B1). After another 10 days, they may be ready to be trans-

planted from the small pots to 2-liter (half-gallon) pots. This is the last step before they are planted in the beds.

Check your plants every day. Quiet time spent communing with the plants can be a very rewarding experience. By growing organically, you create a non-toxic, life enhancing project that will help expand your consciousness, green up your thumb, and give you some good exercise.

Sexing and Mothers

As the seedlings reach the age of about two months, they start to tell you what sex they are, and they are finally big enough that clones can be taken from them. By this point you have no doubt picked some favorite looking plants as you've attended to their care. Maybe it's the way the leaf is shaped, maybe it's how close the nodes are to each other, or the special color of green a certain plant has, maybe it is simply how enthusiastically a certain seedling has grown, but a few of these babies, now young adults, just stand out as special.

Once you have picked the plants you want to work with, take a jeweler's magnifying loupe and look closely at the nodes just underneath the tip of the plant. This is where the cannabis plant's sex organs are located.

A male cannabis plant has what is starting to be a little rosette-looking ball, while the female has what is called a calyx with a soon-to-be white hair coming from the middle. (See photos of males and females on pages 24 and 25 in the color section for a visual identification.)

If a plant turns out to be a male don't immediately kill it like so many people do. Males are valuable for changing genetics and can also be made into "mother" plants to use for cuttings. (Of course, the babies from these plants will be males.) If male plants are kept under 24 hours of light they remain in a dormant state and can be used in the future as they are needed. Female plants on the other hand are what you are really seeking because they are the plants that we all love to smoke. The male plants are no good for smoking, only for making seeds.

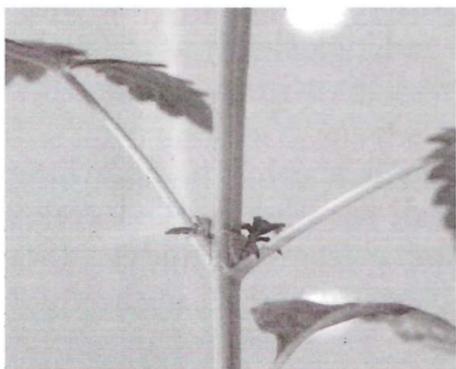
I carefully select and label the plants I will use as mothers. Here is how I recommend labeling: Say you started with six seedlings from the same variety. Label them 1, 2, 3, 4, 5, 6. (If

you have more than one variety, you may want to also include a letter, i.e. Variety A-1, A-2, etc., and Variety B-1, B-2, etc.) When you select which ones to take cuttings from, label the cuttings with the same code as the seedling, which is now the mother. So cuttings from the A-1 seedling would also be labeled "A-1." That way, if you later decide that one of the seedling plants is a good candidate as a mother, you can easily identify which clones were taken from that plant. You never know when one particular plant will shine with a special glow, making you want to keep it as a mother.

Cloning

Clones are taken just above a node or place where side branches originate on the main stalk of the plant.

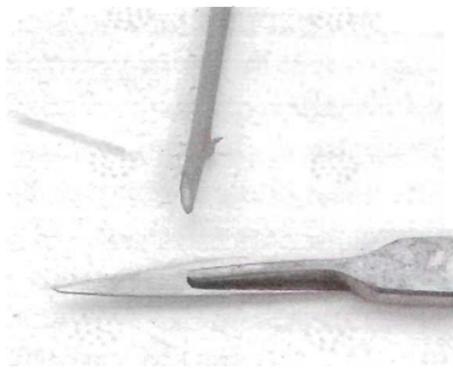
The first clone you take from the top of your seedling-turned-mother will have double nodes like a seedling. Clones taken later will have alternate nodes, which is a desirable characteristic for mothers.



The clone is taken just above a node.



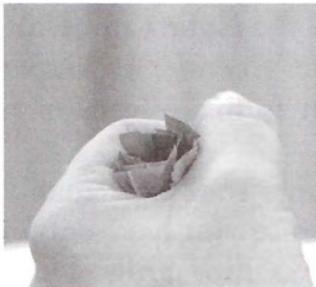
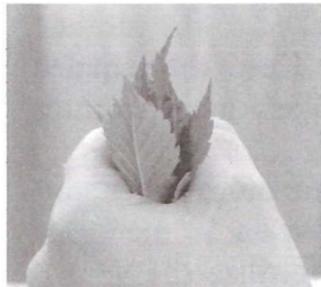
Same plant after the clone was taken.



A scalpel was used to cut the clone from the plant at a 45-degree angle.

Using a scalpel or a sharp pair of scissors, cut the clone from the mother plant at a 45-degree angle.

After I take a cutting from a mother plant I trim some of the leaf off to lighten the weight that the small stem has to support.



Trimming clones, before and after.

I do everything in soil, so the clones start in soil also. Most people these days use rockwool but it's too toxic for me. Breathing the dust in from dry rockwool isn't much different from asbestos.

Caring for clones starts out the same way as caring for seedlings. I take sixty jiffy peat pots of the slightly larger size (3-inch or 4-inch diameter) and fill them with a mixture of the same soil mix that I used for the seedlings, roughly 2 parts black peat and 1 part perlite. I mix in enough perlite so that you can see a lot of it in the mix. Then I put them in a Styrofoam tray and water them without getting them dripping wet.

I then put the tray of clones in a clear plastic box with a lid. The lid stays on for about 12 hours, after which it is opened slightly, leaving a small crack for an air exchange, while still keeping the humidity high inside of the box. I place the box on top of a horticultural heating pad covered with thick waterproof plastic. These are much safer than household heating pads because they are designed to be in an environment where they could come into contact with water. The box is left there for about 14 days under at least a 250-watt halide or 400-watt full spectrum light. After 14-21 days the baby clone has turned into a rooted plant ready for transplanting.

Just like with the seedlings, the clones are first transplanted from the jiffy pots into fairly small containers. This is to make sure the small root system doesn't stay too wet.

At this point in the clones' development, not quite all of the mother plants have revealed their gender, so I take a corresponding clone and put it in the 12-hour flowering room. Within 2 to 3 weeks of 12-hour light, the little clone tells

which sex it is. Then the clone can be matched to the mother plant and the mother's gender is known. Keep the females and, unless you want to make seeds or make a male mother, pull the males.

Remember the plants start out small, but quickly become quite large so make sure you have enough space to maintain the clones you keep as they grow. Don't fertilize the young plants until the second week and then only with a mild solution until they get a more substantial root system.

Indoor Growing—Soma's Organic Beds

For indoor growing, I have found growing beds to be a great method. Once you try these organic growing beds you will not use pots again. In these trying times of dirty politics, nothing is better therapy than going into your grow room, and getting a little soil underneath your fingernails.

The beds are constructed of wood held together with metal braces and screws; it is on wheels that rotate 360 degrees. (See a diagram of the beds in the color section, page 23.) When finished, the bed's dimensions are 1.25 meters (4 feet) wide by 1.25 meters (4 feet) long and 35 centimeters (13.75 inches) high. I am going to explain exactly how they are constructed and used.

Bed Construction

First I order pre-cut plywood, cut exactly to the dimensions that I need—that way I don't have to do any sawing myself. I order four pieces cut to 1.25 meters (4 feet) long and 35 cm (13.75 inches) wide. Then I have the bottom cut so that it will fit flush with the sides when I make them into a box. Any lumber store should be able to help to figure these dimensions correctly. Sometimes I have to return the next day to pick up the wood after it has been cut.

After I order the wood, I get the other items I need to build my beds. These items are:

- Thick waterproof black plastic, vinyl or polyethylene, approximately 5ft. x 5 ft. (150 cm x 150 cm)
- Staple gun
- 150 cm (5 feet) of PVC pipe 70mm (2.75 inches) thick

- One large bag (50 kilos or 110 lbs.) of hydro-corals (the generic name is LECA [Lightweight Expanded Clay Aggregate])
- 3.75 square ft. (about 60 cm x 60 cm) plastic-coated chicken wire
- Approximately 4 square ft. (about 60 cm x 60 cm) capillary felt root cloth
- Large box of screws in the sizes that you need
- 4 multi-directional wheels for each bed
- 16 metal corner braces, 2 for each corner and 2 for each side

Hydro-corals are little clay pebbles that are man-made. They were invented in Holland for use in the hydroponic tulip business. They hold lots of air and are heavy enough to support a root system on their own.

After getting the materials, I construct the box. As I am not a carpenter I get help from a good friend who is. The metal braces are at a 90-degree angle, and they are used to square the sides, which are screwed together through the metal brace piece. The open box that is created is then placed atop the bottom piece and affixed to the bottom. The sides should be flush with the bottom. Two corner metal braces are used on each side to affix them to the bottom. The multi-directional wheels are attached to the bottom at the four corners, about 5 inches in from each side.



View of wheels on grow bed.

Next the waterproof black plastic is carefully placed inside the bed to line the bed and keep it as waterproof as possible. Pull the plastic over the sides and staple it to the outside of the bed. The entire bag of clay pebbles called “hydro-corals” are added to the lined bed, covering the bottom to an even depth of about 5 centimeters (2 inches).

I cut the 70mm (2.75-inch) PVC pipe into lengths of 35 centimeters (approximately 14 inches) and stand one of these cut pieces upright in each of the bed's four corners, pushing it down slightly into the clay hydro-corals. It should be snugly, but it won't go completely down to the bottom; it rests on about 5 centimeters (2



Wheels bottom view. The lighter offers perspective. The wheels are mounted about 6 inches in from each side of the corner.

inches) of hydro-corals. I screw the PVC pipe into the side of the box with 2 screws. These four tubes in each bed help the roots to have a constant air flow. In combination with the hydro-corals, it is almost impossible to over-water your garden.

I then take plastic-coated chicken wire and place it on top of the hydro-corals, folding it back away from the PVC tubes. On top of that I put a layer of felt root cloth, the kind most nurseries use under their potted plants, cut to fit as exactly as possible, and fit around the PVC tubes. Once soil is added at a depth of about 25 centimeters (10 inches), about 10-15 centimeters (4-6 inches) of the PVC pipe should be above the soil's surface.



Bed fully constructed before soil is added. See the PVC pipes, the black plastic. Hydro-corals line the bottom and are then covered with felt and chicken wire.

the roots to rot and killing the part above the soil. With the proper amount of water, growing with these beds prevents this problem.

The great thing about the beds is that an air layer is created in the bottom where the hydro-corals are. The PVC pipes help with a passive air flow. Roots need air, especially cannabis roots. Many crops have been ruined by plants that have been deprived of enough air. Plants can become trapped in soil that remains too soggy, causing the

roots to rot and killing the part above the soil. With the proper amount of water, growing with these beds prevents this problem.

Organic Soil

You are now ready to put in the organic soil. This can be store bought—here in Holland, the Canna fertilizer company has just come up with an excellent new organic soil mix, that is one of my favorites. It is called Terra Professional Plus®. Or you can mix the soil yourself the way I do. People I meet and smoke with always ask me, how do you get your pot to taste so good. I tell them it's because of the soil.

To get medicinal cannabis, I grow on organic soil rich in worm castings and all the other nutrients and trace minerals needed for a healthy weed plant. Cannabis needs nitrogen, phosphorus, and potassium. It also needs micro-nutrients like iron and zinc and magnesium.

Many soil mixes are the wrong pH and have the wrong combinations of nutrients, so when you get your soil do a thorough check of the NPK and the ingredients. The NPK is the amount and ratio of nitrogen, phosphorus and potassium in the soil mix (see sidebar). You want the NPK to be about 7-6-12.

Guano is a must. I prefer Guano Kalong (see appendix for this and other resources). The NPK is 2-15-2 and the flowers that it produces are beyond compare. Even with soil from the grow shop, guano is a necessary component.



This is one of the guanos I most like to use—Guano Kalong®.

NPK, Fertilizers & Organics

Fertilizers are soil additives that supply the chemical components a plant needs to grow and thrive. The three primary elements are nitrogen (N), phosphorus (P) and potassium (K). NPK is shorthand for these three important ingredients in fertilizer. NPK information is always provided on fertilizer

labels.

The NPK represents the concentration of these elements in the soil. The numbers mean the percentage of each element. In other words, 7-6-12 fertilizer contains 7% nitrogen, 6% phosphorus and 12% potassium.

The NPK is also a ratio of these

elements in relation to one another. So, for instance, a fertilizer with an NPK of 14-12-24 is twice as strong as the above listed fertilizer that had an NPK of 7-6-12. This is because the percentages of nitrogen, phosphorus and potassium are double. However, the ratio between the amount of N, P, and K is the same in both of these fertilizers.

Fertilizers enhance the natural soil or replace chemical elements and nutrients that have been depleted because the plant has used them. In addition to the primary three elements, plants rely on secondary elements such as calcium, magnesium, sulfur, and to a lesser extent, boron, copper, iron, manganese, molybdenum and zinc.

Fertilizers that are organic derive their elements from natural sources—they come solely from plants or animals with no synthetic ingredients. Different types of manure and guano are prime sources. Seaweeds are also a common source for micronutrients. Minerals from natural mineral deposits are also approved for organic gardening and organic

soil products because they are not processed. Inorganic fertilizers contain the same elements, but they may be from artificial sources or synthetically derived. The common inorganic fertilizers include ammonia, urea, superphosphate, mono and dibasic ammonium phosphates (which contain both nitrogen and phosphate), calcium ammonium nitrate, and potassium chloride.

The desired NPK for cannabis changes between vegetative and blooming phases. In the vegetative stage, you want more nitrogen because it encourages leaf growth and forms proteins and chlorophyll.

Phosphorus mainly promotes root and flower development. You will use a higher phosphorus concentration in the flowering phase to transfer energy to producing flowers. The plant needs less nitrogen at this time because you want it to concentrate on producing flowers rather than more leaves. Potassium supports healthy stem and root growth and aids in the plant's synthesis of proteins. It is used in flowering formulas to balance the pH.

Here is the recipe for my soil mix. This is enough for one of my beds.

Soma's Organic Soil

- One 50-liter bag (approx. 11 gallons) of worm castings
- Three 50-liter bags (approx. 11 gallons each or 33 gallons total) of black peat

- One 50-liter bag (approx. 11 gallons) of organic potting soil
- Three 50-liter bags of Bio Bizz Light-Mix® (approx 11 gallons each or 33 gallons total)
- Two kilo's (4.4 lbs.) of Guano Kalong
- Two kilo's (4.4 lbs.) of DCM organic fertilizer 7-6-12+4 Mgo
- One-third of a large (approx. 30 liter) bag of perlite
- Two kilos (4.4 lbs.) of maerl

Maerl is a sea chalk that acts much like New Jersey Greensand or hydrated lime (two other organic gardening options). Maerl is used for pH neutrality; it brings the pH in the soil to a neutral 7.

All of these ingredients except for one bag of Light-Mix are combined together as evenly as possible and placed inside the bed on top of the root cloth. The remaining bag of Light-Mix is used on the very top of the soil. This is because it is better to have mild soil on top when placing small clones in the beds. It prevents the tender roots from being burned. The soil with stronger nutrients is waiting below for bigger roots.

For the beds, the soil should fill the bed to a depth of 25 centimeters (10 inches). Roots of the marijuana plant love air, so I mix a lot of perlite in with my organic soil mix before filling the beds up. If you choose to use a pre-mixed organic soil instead of mixing your own, I still recommend adding extra perlite to make it airy. This helps the roots get enough air and keeps the soil from getting too soggy. Some resources for good organic soils are listed in the appendix.

After the garden has run its full cycle, the soil can be reused by taking a little old soil to your outside garden, (or your neighbors). I usually remove about one-third of the old soil. Then mix in new soil containing fresh nutrients. This can be done at least three times.

Planting the Beds

Now I am ready for planting. The plants have been growing in a vegetative room under 24 hours of light in 2-liter pots.

Since they rooted, I've been growing them in these conditions for about 3 weeks or until they are about a foot high.

I put twenty plants in each bed, four rows of five plants. I usually use wooden stakes criss-crossed to mark out the places for the plants to make sure they get placed evenly. The plants are spaced out as evenly as possible affording each plant as much light and space as they can get. In the bed set-up, each plant can send roots sideways the whole length of the bed, so plants never become root-bound. When I transplant I give the plants some root stimulator to help them make the transition. Now that the plants are in the beds, the next chapter explains techniques and conditions for growing healthy, happy organic plants.



Finished beds with young plants.



Another view of finished beds.



Ladybug Group Hug

California ladybugs are the gardener's little helpers. They snack on the eggs of the vegetarian plant eaters—spider mites, thrips, white flies, root gnats, and aphids—protecting the crop against its most common pests. Ladybugs are discussed in chapter 4.

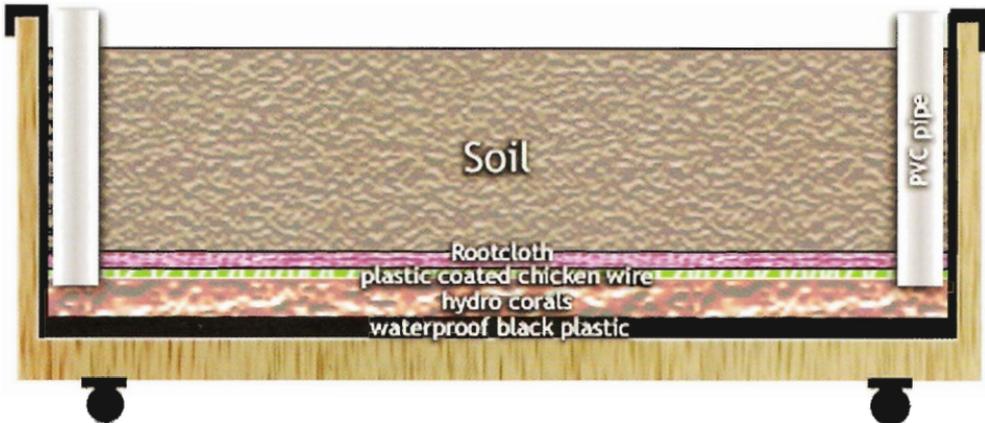


As this seed sprouts open, you can see the first hint of green that will soon become its fledgling round leaves, which are called the *cotyledon*.

Here you can see how the bent wire stake supports the baby plant, holding it upright.



This hardy clone is still in its jiffy pot, but it will soon be ready to transplant to bigger environs.

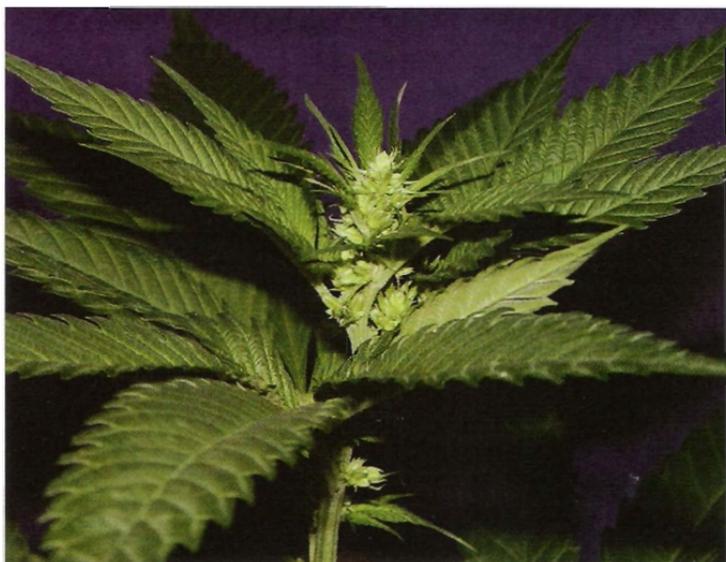


Soma's Organic Grow Bed

Here, a side view illustrates the layers that compose the grow beds. The hydro-corals at the bottom work together with the PVC tubes at the sides to create optimal ventilation. The chicken wire and root cloth are permeable but offer support and separation between the soil and hydro-corals. The bed is mounted on rollers to allow for mobility. Chapter 3 describes the construction in detail.



Here is an actual bed that has just been filled with young plants. Notice that the distance between plants is relatively equal, allowing each one to receive sufficient light so it can grow to fill its space.



Recognizing Males

Chapter 2 describes how to sex plants. Here you can see what the young male cannabis plant looks like. Rosette-looking balls form at the nodes, just underneath the tips. Eventually, males exhibit small white or yellow flowers and release pollen that will cause the females to form seeds. For photos of more mature males, see the second color section.



The Female

This is a relatively mature female plant. Females develop what is called a *calyx*. The calyx is more of a teardrop shape than the ball shape of the male plant. Eventually, white, tendril-like hairs will emerge from the middle of the calyxes, and as the plant matures, many of the hairs will take on a rusty hue.



Here you can see what is meant by *nodes*. This is the point where a branch forms from the main stem. On this plant, the nodes form symmetrically on the plant. The first clones taken from a mother will often have symmetric, or double, nodes like this one. Later generations of clones typically have alternate nodes. Plants with alternate nodes are more desirable as mothers.

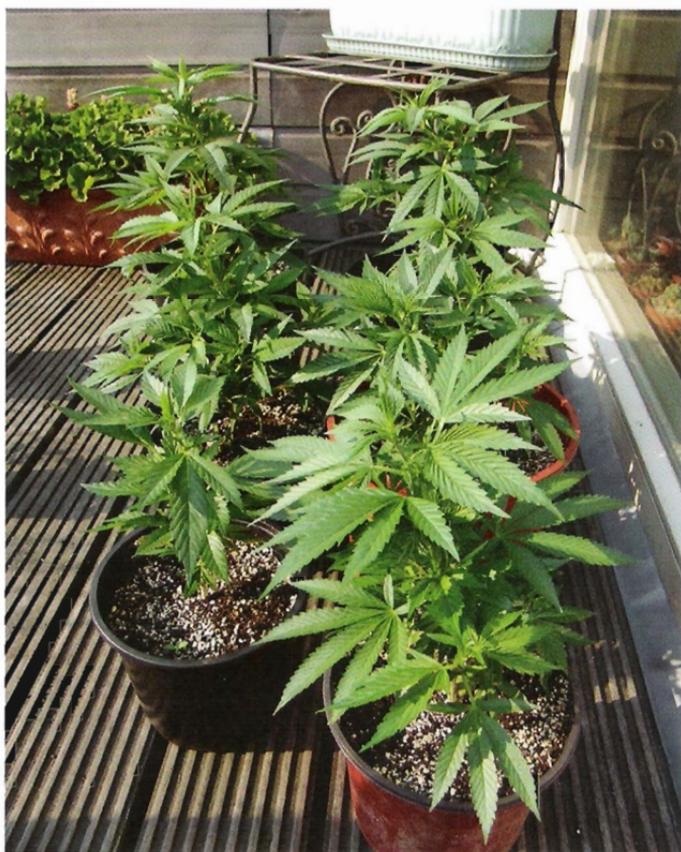


Supercrop

Supercropping is the intentional and structured bending of branches to control height, shape, and to create more and better primary bud sites. This technique is covered in chapter 6. Here is a closeup of a bend created from supercropping. This bend was made the day before the photo was taken.



Can you spot the bend in this plant?



The supercropping has just begun. One bend has been added to each of these young plants.

Here are some plants in different stages of supercropping.



After being supercropped multiple times, the plants are bushy, with an abundance of budding sites.

Optimum Indoor Conditions

When growing indoors, it is the farmer who controls the water, light, fertilizer, timing, and most of all, the loving care.

In the last chapter, I transplanted twenty plants into each of the three beds. Using bamboo stakes I arranged the plant positions in an equidistant manner, making sure the space for each plant is as equal as possible. Each bed is 1.25 x 1.25 meters (approx. 4 ft. x 4 ft.), or 1.5 square meters (16 square feet). I make sure I have enough space to walk between the beds. My total grow area is about 4.5 square meters (about 48 square feet).

I have five, 600-watt grow lights above the beds giving me a total of 3000 watts. That's about 60 watts per square foot, or just over 600 watts per square meter. Fans provide a flow of air, including a fresh supply of carbon dioxide. They also mitigate the heat generated from the lights.

I usually keep my plants in the vegetative state for about 3 weeks. After that I switch the lights to a 12/12 regimen. Since flowering is triggered when marijuana receives a critical period of uninterrupted darkness, the plants will begin to change their energies to producing buds after the lighting is changed. Other aspects of care, such as watering and nutrients will be adjusted to suit the plant's changing needs as it moves through its life cycle.

Ventilation

Good ventilation and air movement are essential for happy plants. Ventilation helps control the heat that the lights generate and replenishes carbon dioxide. My exhaust ventilation and fresh air intake are excellent, insuring that the plants have good airflow and a good supply of carbon dioxide.

I have an efficient exhaust fan attached to a charcoal filter that creates suction on the door when I open it. The charcoal filter is for odor control. The fresh air or intake fan is about half the size of my exhaust fan. It brings in fresh outside air, rich with carbon dioxide. I never have more air coming in than going out. I also have two circulating fans to move the air around so that there are no stale air pockets.

If the room gets too hot, the plants will not be happy. I try to keep the temperature between 22°C and 27°C (72°F and 81°F). The plants can withstand temperatures higher than 35°C (95°F) for very short periods, but I would try and avoid it. Even short periods of high temperatures can affect bud growth. A good average temperature is 25°C (77°F).

Water

Knowing when to water your plants is an essential part of being a cannabis farmer. Cannabis does not like too much water; it needs soil with air in it. Good aeration and drainage—that's what cannabis roots are looking for.



Here is a healthy stem in planting soil with lots of perlite.

How often and how much you water will depend on what kind of growing system you are using. When it comes to watering I like to pretend I am the plant. I stick my finger in the soil to see how moist it is and think to myself is this wet enough, or is this too dry?

With my growing beds I water once every 3 days, as it takes about 3 days for the soil to get on the dry side. When I use pots it usually takes only 2 days to get dry. Once you are used to working in a specific garden and know exactly how long it takes your soil to dry out, it is easy to figure out a schedule of watering so that you keep your plants in a happy medium, not drowning in water and not drying out either.

pH

Knowing and monitoring the pH of the soil mix and the water and fertilizers that you add is all-important. It is essential to have a good pH meter at your side in the grow room. When I first started growing I thought that pH 7 was the best balance for cannabis. I have since found that cannabis likes the soil pH in the range of 6.2 to 6.6.

In Amsterdam, water from the tap is at pH 8.3. I balance the water's pH using Bio-Nova citric acid. It is food grade and a little goes a long way. I add enough to bring it down to pH 6.0. The pH only stays that low for a brief period of time, and then starts to go up again within about 8 hours. As the pH rises again, the plants get access to different nutrients, because nutrient absorption varies by pH in the range between 6.2 and 6.6. Therefore the rising pH range allows a greater spectrum of nutrients to be accessed by the plants.

Nutrients

Nutrients are sustenance for your plants. The amount and type of food that plants need changes as they go through their life cycle. One thing is for certain—feeding plants with organic products will deliver impressively sumptuous tasting buds in the end.

It is important not to go overboard with feeding. Just like humans, plants can only consume food to a certain degree. If you give your plants too much food it turns into poison, so go lightly on the nutrients. I use foods in different combinations according to the stage of growth my plants are in.

Since I use a rich soil, not much is added during the 3 weeks of vegetative growth. The soil mix I've made contains fertilizer and guano, so the plants have plenty of nutrients and only require water during this time.

The only exception is root stimulator, which helps the plants resettle after being transplanted to the beds. I foliar feed with a seaweed mix called Algin®, or BN-Algaemix® in English, a mix from Bio-Nova. Sometimes I use a very dilute version of Power Thrive® or Super Thrive® in the second or third weeks.

I will add it at a very mild one-quarter strength to water that has been balanced to a 6.0 pH. It stimulates the roots with B vitamins and keeps the plants' immune systems running well.

Foliar food is food you can spray on the leaves using a pump sprayer or spray bottle. The plant absorbs the food through its leaves. Foliar feeding should only be done until the plants have formed buds. After that, only feed the plants through the water to the medium.

Around the third or fourth week, the lighting is changed to a 12/12 regimen and the plants have now entered the flowering phase. The counting begins again. This is the first week of 12/12, or the first week of the flowering phase. Plants vary in how long they will take to reach maturity. My typical plants take 10 weeks under 12/12 lighting. Recognizing ripeness is discussed in more detail in chapter 7.

In the third to fourth week of 12/12 lighting, I begin to give the plants guano tea. I also start to give them a little Bio-Flores® from Canna. I will continue to give the plants food and tea through the seventh week of flowering.



An NYC Diesel plant at 4 weeks of flowering.

Guano tea is my secret ingredient. One of the main

reasons for the success of my cannabis has been feeding with guano. My favorite guano source is Guano Kalong®. It is a mix of bat and seabird guanos with an NPK of 2-15-2; this particular one comes from Indonesia. I like it because it has no smell.

To make the tea, I take 100 grams (3.5 ounces) of the dried guano and mix it with 2 liters (2 quarts) of hot water, stirring it with a plant stake until it is almost all dissolved. I then take 60 milliliters (8 ounces) of the tea and add it to 10 liters (10.5 quarts) of water with a pH of 6.0. I water the beds with guano tea twice a week, being careful to add the water between the rows without getting it on the leaves and buds. Watering should be based on how wet the plants are; wait until they are fairly dry before watering again.

Guano

In the 32 years I have been growing this most sacred of plants, I have tried all kinds of plant foods, from Miracle Gro to 10-52-10 with all its heavy metals. I have never found anything that beats the guanos for taste, yield or potency. It is 100% organic. It is my favorite additive.

Nothing makes cannabis taste and work better than guano. I have tried every known food out there, and have found nothing that is more organic or effective than guano. The one I like is Guano-Kalong 2-15-2 high phosphorous powdered guano. Another good guano product is Budswel[®].

The taste that the cannabis acquires when using this guano is fruity and clean tasting. The taste lingers on your tongue for at least 5 minutes after finishing the joint.

There is a new organic product from America that I really enjoy too; it's called Budswel[®] from The Guano Company. Budswel[®] is made from worm castings, seabird guano and bat guano and it mixes in water in a flash. It can be used hydroponically and on soil. I start to apply it in the third week of flowering when the buds are just beginning to turn white.



Budswel[®] from The Guano Company.

If Budswel[®] is used instead of Guano Kalong[®], I mix 35 milliliters (1 ounce) of Budswel to 10 liters (10.5 quarts) of water with a pH of 6.0. I then give it to the plants every time I water. There is a noticeable difference in the buds within 3 or 4 days; they are more vibrant and stickier, and as time goes by the aroma becomes intoxicating. Sometimes when I enter the

room and move past some plants, I feel high just from the smell.

Canna Bio-Flores[®] is an organic flowering food with an NPK of 2.5-2.5-5. It is a great product for this phase of the plants' growth. I give it to the plants twice a week from week 4 until the plants are about 3 weeks from finishing. My plants ripen in about 10 weeks, so I feed them guano tea and flowering food through week 7.

Nutrients Recommended To Use By Week

(10 WEEK PLANTS)

UNDER 12/12 Lights

NUTRIENTS

WEEK 1

None (They are using nutrients in soil.)

WEEK 2

None (They are using nutrients in soil.)

WEEK 3

None (They are using nutrients in soil.)

WEEK 4

guano tea 2x/week
organic flowering food NPK 2.5-2.5-5
2x/week

WEEK 5

guano tea 2x/week
organic flowering food NPK 2.5-2.5-5
2x/week

WEEK 6

guano tea 2x/week
organic flowering food NPK 2.5-2.5-5
2x/week

WEEK 7

guano tea 2x/week
organic flowering food NPK 2.5-2.5-5
2x/week

WEEK 8

Begin flushing (no additives, just water).

WEEK 9

Flush (no additives, just water).

WEEK 10

Flush (no additives, just water).

I like to give my plants a good flush with water for 2-3 weeks before harvest. The flush is nothing more than giving only water to the plants. This takes any excess food taste away from the weed so the only thing you end up tasting is the marijuana.

It is always important not to water your plants too often, but especially in the last few weeks. The roots need to dry out a little so they can access air. Too much water in the end can cause bud mold, which is the last thing that a grower wants to happen to their prizewinning crop. The water should be pH-ed to 6.0 for a good flush. Plants that have been flushed well have a much better taste. I give very little water in the last week, as the plants don't use much.

Pest Control

When growing cannabis, enemy insects are everywhere and must be dealt with in some successful way. Most cannabis growers use pesticides. That is not how you grow medicine—cash crops, perhaps, but not medicine.

My best friend in accomplishing an insect-free garden is neem oil. Neem oil is a safe, organic product that is effective as a pesticide without the negative side effects that chemical pesticides have. It is a very good overall protective shield for the plants because it defends against multiple pests such as spider mites, thrips, white flies, root gnats, and aphids. It doesn't harm beneficial insects.

When sprayed on your plants every 3 days until the fourth week of flowering, you will have no bug problems.

I also put in ladybugs, the gardener's little helpers. They control any unwanted insects by eating as many eggs as they can find.

In a garden of 100 plants, 5,000 California ladybugs a week are good for giving the garden a ladybug stronghold. Ladybugs eat the eggs of the vegetarian plant eaters—spider mites, thrips, white flies, root gnats, and aphids—so they protect cannabis against



The ladybugs are at work. They like to hang around the ventilation tubes.

its most common pests. They can coexist in your garden right up to harvest. Since you now have these happy little creatures feasting on pests in your garden, they are another reason to avoid toxic treatments, which not only introduce toxins to your plants, but may also kill off your little helpers.

Between the neem oil and the ladybugs, the crop is protected.

Organics with Buddha's Sister & New York City Diesel

In 2004, I grew Buddha's Sister and New York City Diesel for the Cannabis Cup using the organic methods described here. These varieties competed and won awards in the Cannabis Cup— Buddha's Sister won second prize in 2002 and NYCD took second prize in 2004.

Here was my regimen:

I put the clones of both varieties in vegetation for 14 days. Then I put them into 12/12 lighting. During their first 2 weeks of growth and the first 3 weeks of flowering, I sprayed the plants with neem oil every 2 to 3 days. After that time, no more neem oil, just some ladybugs.

In these first 5 weeks, I gave the plants marine algae, both foliar and in the soil. It made them healthy and strong. For foliar feeding I made sure the pH of my water was between 6.2 and 6.6. At the end of the first week of flowering I gave them some organic bloom stimulator—in this case, I used B'cuzz Bloom Stimulator®—to kick-start the flowers.

In the second and third weeks, I gave the plants small doses of



Buddha's Sister

Canna Bio-Flores®, an organic flowering food low in nitrogen. When they were in the fourth week of flowering, I started to give them guano tea made from Guano Kalong®. Flowering plants and fruits love having guano as a food and the taste and quality of buds fertilized in this way are beyond compare.

At the end of week 7 I began to flush the plants, giving them only moderate amounts of water. This cleared any remaining nutrients/fertilizers and allowed their true luscious flavors to come cleanly through. In the last weeks, I let the soil get a little dry so they didn't form any mold.

At week 10, the buds were nice and ripe and ready to take on the competition.

Organics Outdoors—Container Gardening

Even though I am primarily an indoor grower, when spring-time comes around, I can't help but have a few plants outside. It is so nice to see the sun at work. Growing plants outside during the summer can be a great learning experience.

Watching cannabis grow out in nature makes me think about how we are participating in a long spiraling cycle that extends back for hundreds of human generations and thousands of plant generations.

There are a few rules to consider for outdoor gardening.

Choosing the correct genetics becomes critical when gardening outdoors. Think about the climate in your area. Is the season short? Is the weather especially humid? Select strains that are well adapted for these conditions. Strains that take too long to finish should be avoided. Also, you want to have a bud structure that is not so dense that it will be susceptible to mold.

The shape of the plant may be a criterion. Plants that lend themselves to pruning or that have a growth structure that blends in might be worth considering when making a selection.

As an urban gardener, space is at a premium, so when I grow outside, I make a container garden on my roof or balcony. However, many of the same principles apply when planting directly in the ground. There is an advantage to growing in containers when gardening in a yard or urban setting—the plants can be moved to get the most sunlight as the sun's position changes.

It is important to provide cannabis with a friendly and supportive soil mix. The same mix that is used for indoor gardening is perfectly good for the plants out of doors. (Making your own mix is explained on pages 17-18.)

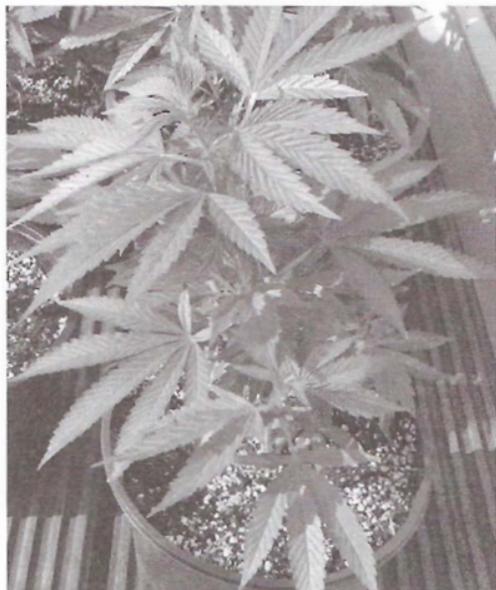
If the plants are placed directly in the ground, the soil in that area should be replaced with cannabis friendly soil. Make a hole deep and wide enough to allow the plant to spread out roots, about 3 ft. x 3 ft. Then replace the outdoor soil with the soil mix.

In dry areas, it is helpful to add a water holding polymer. This is available through gardening stores. If you are not mixing your own soil, a great pre-mixed soil to use is Canna Pro-Mix®.

Many soil mixes are the wrong pH. The soil's pH should be between 6-7. Maerl (sea chalk) is a great additive for balancing pH to a neutral 7. I mix in 5 grams per liter of soil (3/4 ounces per gallon of soil) to achieve this result.

In all areas, but especially in areas that tend to be wet, make sure that the soil has good drainage so it can handle the season's rain without becoming too soggy. One way to do this in an outdoor garden is to place clay hydro-corals in the bottom of the pots, a few inches deep. Adding extra perlite to the soil in wet regions can also help create better drainage. With summer rains, the plants can receive quite a drenching so it is also very helpful to have good drainage holes in the bottom of the pots.

The sun's heat is intense. It is a good idea to purchase light-colored pots, or to paint them a light color. This allows the pot to reflect the sun's heat instead of soaking it in and making the roots too hot. Another possibility is to place pots inside light colored baskets. The roots will be much happier.



A young plant basking in the sun.

I start out with large pots, about 50 liters (15 gallons). This gives the plants plenty of room for the roots to grow and keeps them from drying out too fast. Plants are moved gradually to bigger pots. I transplant three times, waiting until the plants become root-bound before going on to a bigger container.

One trick I have learned is to take old mothers and put them outside in the spring. Since they already have large root systems they really take off.

Cannabis plants love full sun. When growing in containers, the plants are moved to take advantage of the sun's changing position throughout the season. As the plants get bigger and heavier, it is possible to use plant trolleys or rollers, which are designed to go underneath pots to make them mobile without heavy lifting.

Growing in a climate like Holland, most cannabis has a hard time finishing up before it gets too wet and cold. One solution to this is to make a lightproof box big enough to place over the entire plant. A lightproof box does not have to be fancy, but it does have to be constructed well enough to allow no light leaks whatsoever, since the plants need a period of uninterrupted darkness in order to flower properly.

Flexible PVC tubing used with thick black plastic and some heavy weights or large rocks works well. In some regions the temperature remains warm late in the season, but either late summer rains or other factors make it preferable to force flowering before the days are short enough to accomplish this naturally. In warmer climates, white/black plastic covering is recommended. This is plastic that is white on one side and black on the other. The white side is left facing out so that it reflects the heat and keeps the plants from getting too hot when they are covered.

If you start to give the plants 12 hours of light in the last days of July, they will finish by the end of September, before it gets too cold and wet. Obviously, the sun sets the schedule for light and dark periods outside. Still, if you decide to use a lightproof box over the plants, you must be accurate with your timing. If the box is put on and taken off at different times, the plants may get confused. Irregular lighting can lead to hermaphroditism.

Staking

Staking is very important. It offers support for heavy branches, taking away stress and giving the plant a chance to grow into a desirable structure. I recommend using strong bamboo stakes with wire twist-ties or plastic branch clips.



Supercropped and staked plants.

Plants should be staked as soon as buds start to form. I prefer to stake plants so that they grow wide instead of tall. That is, I stake the branches out toward the edge of the pots, opening up the middle of the plants to more light and keeping the tops of the plants lower to the

ground. Each plant has at least one stake supporting it as the buds get heavier and heavier. I will eventually supercrop the branches in relation to where I stake them (supercropping is covered in the next chapter).

Watering & Nutrients

Rainfall obviously has to be taken into account when watering outdoor plants. The plants need to be watered every 2-3 days when the weather is dry. They may require slightly more watering than indoor plants because the sun is such a more intense source of light; also because the temperatures may be higher than the controlled temperatures of the indoors.

I always correct the water's pH to 6.0. I use citric acid for this purpose. While the plants are still growing, I add some organic nitrogen—27% at about 3 milliliters per 10 liters of water (1 cc per gallon). I like to use Bio-Nova's N27, but there may be comparable products. Just make sure they are organic! Until they are fully into the budding state I spray them with neem oil twice a week. This insures me an insect-free crop, with no poisonous side effects.

I give plants liberal amounts of black and brown seaweeds,

both foliar and in the soil until the end of the third week in flowering.

Foliar feeding should be discontinued as the plant progresses into flowering, but the plant can still be given seaweed in the soil after this point. Black and brown seaweed and kelp organic food mixes can be used once a week. I like Bio-Nova BN-Algaemix® or Maxicrop® Seaweed.

A good pump sprayer works best for foliar feeding the plants. It can also be used to apply neem oil (although they are applied separately, of course).

With outdoor plants, safety is always an issue. I have found keeping them low to the ground to be an advantage, especially in locations where there are other plants growing. This is a good argument for using supercropping, the method explained in the next chapter. Always think creatively to camouflage your plants.

I often find myself sitting with the live plants, just communing with them, enjoying their color and scent as I watch them manufacture oxygen and take in excess carbon dioxide, waving their leaves in the breeze as they absorb the sun's energy.

Getting a chance to study this magnificent healing plant out in the sunshine is a real treat. As you get to watch the body language of your plants going through the changes in the outdoor climate, you start to better understand exactly how to cultivate them to be the best plants they can be.

Supercropping for Success

I always supercrop my plants—it is a great technique to use for maximizing yields in an organic garden.

What is supercropping? Essentially, it is the intentional and structured bending of branches to control height, shape, and to create more and better primary bud sites.

Here is how it is done.

When plants reach a height of about 10 inches, they are at a prime age for supercropping. Choose branches that are stretching too much and need to go in a sideways direction to enable the plant to receive more light. These are the branches that will be bent. Branches are bent at about 3 inches back from the tip.

Grasp the branch between thumb and forefinger at a point about 3 inches back from the tip and roll the stem between the fingers gently squeezing. You can feel a crunching sound as the inner pulp of the cannabis plant is pressed together.



Here is a plant that has just been supercropped.



Here's a good look at what a branch should look like a day after bending.

Learning the right amount of pressure is intuitive and may take a little practice. You don't want to squeeze so hard as to make the stem break, but many times you will see a tear in the outer bark. Don't worry, it will heal. If you have not bent it

hard enough, the branch will stay upright; too hard and you won't leave enough healthy tissue to repair itself. However, even after a deep crease in the stem, it will heal and turn upright.

After a plant has been bent, you must leave it alone for a few days, making sure that the bent part does not receive any extra stress. The main way to avoid stress after bending is not to touch the plant for at least 24 hours. Right after being bent, the branch should hang down. Within 24 hours you will notice that the tips of the branches are already starting to point upwards again, and within a week have turned directly back to the sky.

"Elbows" start to form where the bend was made. With time these points get stronger and stronger. All of the side branches next to the elbows get much bigger and stronger to make up for the injury and stress.



Elbows created by super-cropping.



Here you can see where the elbow was added. This plant has straightened itself back out.

When I first started out I used to cut off certain tops. Now I only bend and prune the bottom third of the wispy branches off the plant. I do this 3 weeks into flowering, and it is the only time that I prune the plants during the entire flowering cycle.

Plants can be bent multiple times to obtain the desired dimensions. While bends can be made quite a few times on the same plant, they should be added one at a time, and only while the plants are in the vegetative phase. It takes about a week for the plant to recover from one bending, so I usually wait at least that long before adding another.

If you make multiple elbows, you end up with a plant with several top colas. All of these buds will mature to a large size. I create one to five bends on each plant.

Besides getting more tops and a larger yield per plant, bending also improves the overall health of the plant. The main stalk becomes very thick and strong. This technique is also a great way to prevent your plant from getting too tall. I always work on the tallest plants in the garden first.

Every variety and phenotype of cannabis I've worked with has responded well to bending. I have compared buds taken from the supercropped plants with buds from the same strain that were not supercropped, and my feeling is that the supercropped plants were always better. They had larger buds, and I believe that the extra stress makes the trichomes hold more resin.



A bushy supercropped Buddha's Sister. So many tops!



A supercropped NYC Diesel.

Supercropping is recommended for indoor gardens, but is especially effective when growing outdoors. This is because it greatly strengthens the main stalk. Every time a branch gets bent, the energy goes below to the rest of the plant. Having a strong stalk is beneficial for surviving damage from strong summer winds or heavy rains. The stronger the stalk and branches are, the better they are for supporting the buds that are soon to form. I do all of my bending on outdoor plants in the first 3 weeks of flowering.

Indoors, supercropping helps to manage the overall canopy in the grow space. Whether you have plants in pots or beds, when you look at them as a group, the tops of the plants form a canopy. If some plants get taller than the others, the canopy is uneven, and the tall plants begin to shade the plants below them.

Supercropping the tallest plants can help create a more even height. Every 3-4 days I look at the plant canopy as if I were looking at a table top. Through the 6 weeks available to me for supercropping, I end up with a very even canopy assuring that all of the plants in the group are getting equal light.

Finishing with Finesse—The Harvest

Now we are getting to my favorite stage of growing: the ripening of the fruit, the flowers. The most important thing to remember is this: **Don't get so excited about your sweet smelling bud that you pick it before it's done.** The worst thing you can do is pick it early. My motto is "if it looks ready wait a week." Knowing how to judge ripeness in fruits, plants and people is an art worth cultivating.

Quality Ripening-The Final Weeks of Flowering

In the sixth week of flowering, you probably have about 3 or 4 weeks to go. There are a few extra precautions you can take to insure a healthy, insect-free harvest. Assuming that you sprayed neem oil twice a week up to the beginning of the fourth week of flowering, you should have no insect problems. At this point you cannot spray neem oil any longer, as you would ruin the taste of the weed. What you can do is put a container of ladybugs in your grow space as well as a container of predator mites. I like to think of my space as the place where the ladybugs come to dance, these friendly little creatures are great role models for us, never fighting amongst themselves. When it's the hot time of year spider mites can multiply very quickly as can thrips and white flies. With the ladybugs and predator mites getting the stronghold first, possible invaders have no chance.

In the last weeks the plants start to use less water so it is important not to over-water them. Keep close contact with your plants and their hydration needs. Over-watering can cause the buds to mold from the inside out. From the outside, the bud looks perfectly fine but is ruined on the inside. I only feed the plants through the seventh week, then for the last 3

weeks I water them just enough to flush the fertilizer from the soil, which leaves the plants tasting clean.

When your plants are in the sixth week of flowering there is a fine technique of rolling a special type of spliff. You roll a joint of some of your favorite weed (preferably some you grew with your own hands and heart), then you take it and gently roll it on the resin glands of your glistening buds. After a few moments of gentle rolling, you will see clear sticky resin coating the outside of the rolling paper with a natural kind of hash oil. You are ready to light it up. It's one of my favorite ways of smoking cannabis and can only be done in the sixth week of flowering.



Knowing When to Harvest

I know I've said it before, but I can't stress this enough—in my three decades of cannabis cultivation and research, I again point out that the most common problem growers have is picking their plants too early. I am always repeating this because it is the most common problem with cannabis growers. It is one of the most important things I can tell you.

Not knowing the correct time to cut plants down is the downfall of many growers out there. In the Amsterdam coffeshops, shop buyers continually turn down marijuana that has been picked too early. Growers that count on their crop to feed their families would have to change jobs if they picked their crop early.

Anyone who has tried a green banana knows that they don't taste very good, especially when compared to a nice yellow one with some brown spots. With cannabis it is even more drastic. Buds that are not ripe are not fun to smoke, providing you with burning cellulose instead of THC. Only ripe buds have THC with enjoyable and medicinal effects.

Cannabis that is picked early has the chlorophyll smell of fresh cut lawn grass. When it is picked on time it has a strong perfume that smells like the finest hash.

Since it matters so much, why is harvesting early such a common mistake? Why do growers pick early? Most home growers pick their plants too early because of money stress. The other reason is often a security breach of some sort.

New growers may get seeds, check the flowering time for the strain, and proceed to pick their plants on an exact calendar date whether they are ready or not. What they forget is that many factors can stunt a plant's growth, prolonging its maturation time.

As the smell becomes more intense, potential trouble with neighbors may cause a gardener to become paranoid. The fear of getting in trouble or losing the rewards of one's efforts often makes people hurry to harvest.

Another reason people pick too early is not having anything good to smoke. When there's nothing to smoke and the plants are close to finishing, a few more days may seem insignificant. But harvesting plants before they truly finish will result in missing the best part. Most people don't realize what they have done until the weed has dried and they taste it.

Therefore, the next part may seem obvious, but I want to stress some things *not* to do.

Don't look in your wallet for the date of the harvest. In your wallet you will only find things that have to do with money. Money should not be a factor for determining when the harvest is done. Try to avoid this mistake.

Harvesting by the calendar does not work well at all. Don't look at the calendar except for knowing when the full moon and new moon are taking place. When the moon is waxing it's a good time to plant and transplant; when it's waning, it's a good time to harvest.

Plants can be stunted by things like over-watering, over-fertilizing, cold or hot temperatures, and insect damage that can throw your calendar date off. If you experienced any setbacks in the course of gardening, expect the crop to take a little longer than the suggested times, or longer than other crops you've grown of the same variety without such problems.

Harvest with your heart, let your heart guide you. Become good friends with your plants, and look to them for the right moment for harvesting. It takes patience to grow good medi-

cine. You can't push the river. Always look to the plants. Just as there's an exact point in time when the green tomato turns red, or the green banana turns yellow, the plants will tell the gardener with the green thumb who is paying attention to their language. Study your plants closely at the time of harvest to make sure they are truly ripe, and you will be rewarded with true medicine.

So what does ripeness look like? White hairs are no longer forming on the buds of your cannabis plants. All the places where the red hairs are, the calyxes, are very swollen, and many visible THC crystals can be seen. These are the indications of ripeness that mean it is time to harvest. The second color section shows plants at different stages of ripeness to help clarify what you are looking for.

To double check, smell the top of the plant. Rub it with your fingers and smell your fingers. If it smells like the most wonderful hash perfume you ever smelled, then you are ready to harvest the fruit of your labor.

Remember: It's not the white hairs that get you high; not the red hairs either. The part of the cannabis plant that gets you high is the trichomes on the calyx of the plant. Letting the calyxes get swollen with trichomes is the secret to great tasting weed.

One of the handiest tools to aid you in harvesting at the right point of ripeness is a small microscope or photographer's loupe. With this little device, you can check out the trichomes on your live plant. You are looking for slightly amber-colored, liquid-filled balls on top of a stalk. If all the trichomes are clear it is too early to pick. When they start to look a little milky they are getting close. When one-third of the trichomes are amber, you are looking at ripe marijuana.

Harvesting & Drying

Harvesting cannabis has got to be one of my favorite acts on planet Earth. It is a fulfilling experience to harvest any crop that you have been cultivating with your heart and hands. I think that cannabis is even more gratifying—after all, you are serving as a guardian to one of the main sacred plants.

I want to remind all of you that your thoughts create your reality. It is important to think positive life-affirming thoughts when working with your plants. These sacred plants are sensitive to what kinds of thoughts are happening around them. They dislike thoughts of greed and power, but of course it's up to you.

Harvesting cannabis is definitely more intense than harvesting other crops, such as apples. In many ways, though, it is similar to an apple harvest. In harvesting a fair amount of apples, you need a good working team who you can trust and depend on, and you need the tools of the trade. You need ladders, apple baskets, a place to wash the apples, containers for storing and packing, and someone to do quality control, making sure that there are no bad apples in the bunch.

With a cannabis harvest you need a totally reliable team of people you can trust, and you need some important tools of the trade. You need some pruning shears, sharp sturdy scissors, clothesline that you can hang the plants on, a smell-proof room that's dry and cool, and if possible a T-55 silkscreen to work over when manicuring.

List of Supplies

Pruning shears (enough for your team)

Sharp sturdy scissors (enough for your team)

Clothesline

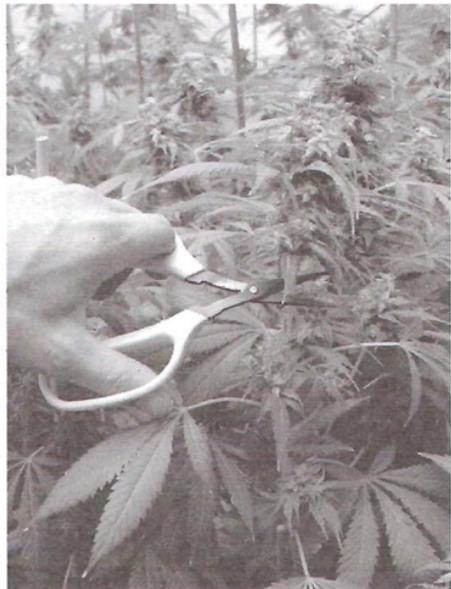
T-55 silkscreen

It's important to give a lot of thought to where and how you will dry your crop. Drying cannabis has an extremely strong odor and can grab the attention of your neighbors, so you must prepare for this.

Charcoal filters work well. The filter sucks the smell through the charcoal making it undetectable. Some growers already have a filter in their grow room, and they turn the grow room into the drying room after they turn the lights off. The room where the plants are dried should be cool in temperature and low in humidity.

Taking the pruning shears you cut the plant underneath the bottom branch, and then you remove only the large fan leaves, saving them to cook with. Then you hang the plants up.

Hanging the plants upside down on a clothesline is easily done by using the natural crooks of the plant. Select a strong bottom branch, then hang that branch over the clothesline. Keep hanging your plants in a row being careful not to crowd them too much. I leave them hanging with just the exhaust fan sucking air out through the charcoal filter. This lets them dry slowly with no heaters or dehydrators. It usually takes at least 10 to 14



The trimming scissors in action.

days to dry before you start the final manicuring. Drying faster makes the taste disappear and makes the buds crumbly. Again, patience pays off. Letting the plants dry slowly makes them taste much better and helps them to keep much longer. They are dry enough when the stem snaps. Buds dried in this fashion are usually teardrop-shaped.



Plants hung up to dry.

The ladybugs will disperse as the plants dry. When I hang the plants upside down in the room, they make their exodus. Many stay alive until the next planting. They also make many babies. You know that your ladybugs have made babies when you see strange looking crawling bugs that are longer than the adult ladybugs. They have different markings than adult ladybugs. They don't mate, they only eat.

Manicuring

Now comes the part when you call in your trustworthy team of friends. To manicure efficiently, you need a sturdy large table (glass ones work very well) with your T-55 silkscreen

placed over it. Make sure that the table is underneath the entire screen. Next arrange comfortable seating around the table for you and your friends, with each person having their own sharp sturdy scissors. Really fun music enhances the mood.

Make sure the plants are dry enough. I take one of the stems and try to snap it. If it is still rubbery, it's not dry enough to manicure. You have to wait until the stem snaps with a good snapping noise. Only then do you know it is ready for manicuring.

I only use scissors when cutting the stems. I take the extra-fine leaf off with my fingers. After a while you adopt quite a fine technique of moving your fingers carefully around the dried buds, making sure not to damage the best part, but also making



A manicuring party.

sure to remove every bit of extra leaf. I keep the fine leaf trim that is manicured from the buds in a bag to use later for making water hash, which is one of my favorite medicinal products. It is described in chapter 8. As the plants are moved and clipped, resin glands fall off and collect under the silkscreen. The silkscreen has filtered them separately from the leaf material, so the loose glands can be collected when the manicuring is complete. This material is kief and can be smoked as-is or pressed into hash.



Resin accumulates on the fingers while manicuring. This fresh finger hash is worth collecting and saving.

While manicuring, resin builds up on your fingers where you have been constantly touching the plants. This is finger hash and is worth saving. When you have a good amount, first gently rub off any leaf that is sticking to your fingers without disturbing the resin. Then rub your resinous fingers together over a small bowl until the hash comes

off. You can roll the hash in the bowl together into one piece and voila: you have a fresh piece of organically grown charas.

As the buds are manicured, I place them on top of a screen to finish drying out or cure. They should snap when broken in half. This may just be a few hours or overnight.

I place the cured buds in glass jars or sealing bags and let them rehydrate for 8 hours or overnight. Being in the closed jar makes the buds draw moisture from the inside of the stem to the outside of the buds. I then crack open the jars and leave them open for a few hours. I wait until the buds are feeling just right in consistency, texture, smell, and flavor. They should not be wet, nor should they be crumbly. They should burn well when lit and have a tangy smell to them. They are now ready to be stored. I keep the jars in a cool dark place. They are good for at least 18 months.

Smoking sacred herb that you grew with your friends and family is one of the most fun and fulfilling actions that can be done by any aspiring hippie. Seeing the medicinal grade weed that you grew truly help someone who is very ill with something like cancer, can bring tears to your eyes. Growing sacred herb is powerful stuff, treat it with integrity and it will help you find integrity within yourself.

The Wonders of Hash

It is quite amazing when you realize that cannabis can make over 50,000 useful products. I thoroughly enjoy wearing my clothing made from cannabis, using paper made from hemp, and putting hempseed oil in my smoothies, but of all the products made from cannabis, hash has long been my favorite.

Most humans are what I call hash illiterate. They often do not even know what hash is. Hashish is a concentrated marijuana product. It is made by separating the glands that contain THC and other cannabinoids from the leaf and other vegetative matter. These glands are then pressed or formed into bars or balls that vary in color from sandy to dark chocolate.

In days of old, traders would travel far and wide in search of the finest hash. Hash first came to be used because it had a much longer shelf life than the dried flowers. It could be stored in clay jars and stay good for many years.

In the Afghani and Hindu Kush regions, it was highly unusual to smoke the buds—it was much more common to make hash or possibly to use various parts of the plant to make common drinks such as Bhang Lassis.

Traditional hashmaking was considered an art. Most commonly, fine silk scarves were used to dry sift the ripe plants. The powder that collected after sifting through the scarf was collected and pressed. It was common to age the hash before smoking. In some regions, it was considered crazy to smoke hash that was under one year old. Aged hash was considered connoisseur quality.

Modern Hashmaking

Making hash is still an art, and one of the places you see it practiced is Amsterdam, the cannabis capital of planet Earth.

When I first moved to Amsterdam, almost everyone was making hash using Pollinators® developed by Mila Jansen's Pollinator Company. Pollinators operate kind of like clothes dryers. They are a variation of the dry sift method that is similar to traditional methods, but without the manual labor. The Pollinator tumbles the plant matter mechanically, sifting out the glands through its fine screen lining. Loose glands, known as "kief" collect in a tray at the bottom for easy retrieval. The kief can then be pressed to make hash if so desired.

In 1997 Mila started experimenting with different ways of making water extracted hash. Water extraction works on the same principle as dry sifting—it separates the glands from the plant material. This method uses ice and water to sift out the glands and the final product is usually cleaner and purer.

I was very interested when Mila started developing her water extraction method and paid close attention. Soon I started making my own water hash, and began to perfect my technique. Then Mila came up with her Ice-o-lator® bag system and it was a big hit. I immediately switched to her system, and started learning to use it to get the best results I could.

The Ice-o-lator® is a set of mesh bags that serve as screens. The cannabis leaves are placed in the top bag with the coarsest screen. A few fine mesh bags lie underneath the top bag. A bucket holds the bags. Very cold water is poured over the leaf and lots of ice is added in small chunks. A cake mixer is used to blend the weed and ice into a frothy, sudsy, white mixture. I usually do two 15-minute blends.

After allowing the trichomes to settle, the screens are removed one by one. The hash has collected on the bottom ones. The leafy matter in the top bag is tossed, while the trichomes that have collected on the bottom screens are each collected and placed in a dehydrator. After 2-3 days of drying you have a few different grades of fresh hash. Depending on the variety and the size of the trichomes you may prefer one screen mesh more than another. With time you will have your technique running smoothly and efficiently.

Another system for making water hash was developed later. It comes from western Canada. The Bubble Bag® system developed by Bubbleman has additional screen meshes in its process. There is a three-bag and a six-bag system. The multi-bag system is great for separating the lower grades, which are better used for cooking, from the more primo grades which are better for smoking. I have used both the Ice-o-lator and the Bubble Bag systems with excellent success.

Hash Strains

Making great hashish has to do with using the correct strain. In cannabis there are two types of glands (also called trichomes): hooked and straight. The amount of straight trichomes or hooked trichomes varies from strain to strain.

Straight trichomes make the best hash. This is because hooked trichomes carry a piece of the hook, which is leaf matter, with them through the screens. Water hash that contains vegetative matter does not bubble when touched by a flame as its more pure counterpart does. “Bubble hash” is the type sought out by hash connoisseurs.

When made properly with the finest cannabis, water hash is translucent and amazingly pliable. It can be twisted many times over without breaking. When it has these qualities I call it Jelly Hash.

In working with my own varieties, I have found that Rockbud, Citralah, and Amnesia Haze make the finest water hash.

As you get to know the hash compatibility of different strains, you will find favorites. Some varieties make great finger hash, some great dry sifted hash, and some fantastic water hash. When you are lucky, the same plant will deliver connoisseur quality hash using all three methods.

The last step of hashmaking, whether from dry glands or water hash, is to press it. There are different ways of pressing and forming hash.

Pressing can be done manually, but to do a good job, more intense pressure is needed. Most methods use a combination of pressure and mild heat.

Space Case® has a small handheld Pollen Press that works well for pressing small amounts, and it is very affordable. Another product for the job is The Piecemaker® from Green Harvest. This is a more heavy-duty option. It can press up to 20 grams (3/4 ounces) of kief or water hash at a time. There are other types of hydraulic presses that can also be used. Car or truck jacks have been adapted for hash pressing as well.

Another possibility is using a laminating machine. Many laminating machines, available at office supply stores, can be adjusted for pressing. The kief or water hash is placed in a sealing bag and passed through the machine. It is automatically heated and pressed and comes out in a flat sheet.

Breeding for Connoisseur Quality

New growers usually start from seeds. When a gardener decides to maintain an ongoing garden, the first step toward consistent results is to make a mother plant or plants (this is covered in chapter 2). Once a quality mother is chosen, a gardener can propagate plants by taking cuttings for each successive garden. Since the cuttings or clones are identical to the mother, they are all females. The gardener can concentrate on getting the conditions and harvest time right for optimum results.

When I pick a female for a mother plant, I always choose something that I just adore to smoke, the type of marijuana that one hates to run out of. The thing is, sometimes pot that's great to smoke is a low yielder or takes too long to finish. That's when the breeder's creative energy can put a magic touch on the cannabis plants.

Gardeners also decide to try breeding when seeking a more ideal high and flavor. Whether the goal is enhanced qualities of the high or improved growing characteristics, breeding takes time, space and patience.

Breeding & Phenotypes

In order to reproduce an already-great female, all you need is a mother to clone from, but in order to breed you need a few good males, too. Actually, one male can be sufficient to pollinate hundreds of females.

In my opinion, the best way to breed is to start out working with quality genetics. Then you can enjoy the experimental nature of the whole thing. Breeding is an exercise in imagination. Start off with something you like and then think about what would make the plant better to grow or smoke.

It is necessary to start with plants that have already exhibited different desirable qualities. For instance, maybe one variety has a terrific flavor and high but is a finicky grower or takes a long time to finish. Another variety might be a hardy plant and finish quickly, but the high isn't as mentally stimulating or the flavor isn't as tasty as it could be.

Once the gardener decides which plants have traits that would make a good combination, one variety becomes the donor parent (male) and one the recipient parent (female). These two parents are known as the P1 generation.

The female is the plant whose traits you like but want to improve. The male is used to add traits to the female in order to improve a certain characteristic, such as finishing time. In other words, the male is used to "donate" new characteristics to the female.

The best way to identify a good male candidate is to experience a female from the same strain. After a suitable strain is identified, the most vigorous male is chosen. Sometimes it can be difficult to get a male plant of the variety you want. It may require obtaining additional seeds of the variety. If you think you might undertake any breeding, this is one reason to preserve seeds or possibly even males from the varieties you are working with.

When different varieties are crossed, the resulting plants are hybrids; that is, they are a genetic mix of the two parents or P1 plants. This cross is the F1 generation. When grown out, the F1's have only subtle variations. Significant variety in this generation probably means that the parents were not completely stabilized strains. The F1 generation is like a big family of siblings. They are similar but none are precisely the same. They will exhibit slightly different combinations of their parents' characteristics, but will still be more alike than they are different.

The first time you cross two different kinds of cannabis together, you get a phenomenon that's called "hybrid vigor." F1 plants often exhibit impressive vitality. When F1 plants are made into mothers, their clones possess a near super strength.

It is now possible to go in two directions with the F1 generation. If the desired characteristic is present, the best F1 males are selected and crossed back to the female parent or clones taken from this parent. This is called backcrossing. Usually

breeders backcross a number of times to introduce a desirable characteristic to a strain. Eventually, successful backcrossing results in a stable strain.

The other possibility is to cross F1 males and females with each other. Plants grown from the seeds of this cross are called the F2 generation. Whereas the F1's were fairly uniform, the F2's are heterogenous. This cross increases diversity. The plants will exhibit a wider range of characteristics from which to select.

I basically get three dominant phenotypes and one recessive phenotype in the typical F2 generation. One plant will be like the father, one like the mother, one a combination of both and one a recessive phenotype that may exhibit some non-dominant genetic traits.

Selection is key in winning breeding programs. The hallmark of selection lies in the human ability to choose the best from a cluster of many. Selection is partly talent and partly understanding the plants. It necessitates that the breeder knows what to look for and also knows his or her plants and their needs.

Selecting Winning Plants

Cannabis breeding allows a gardener to come up with an endless number of combinations.

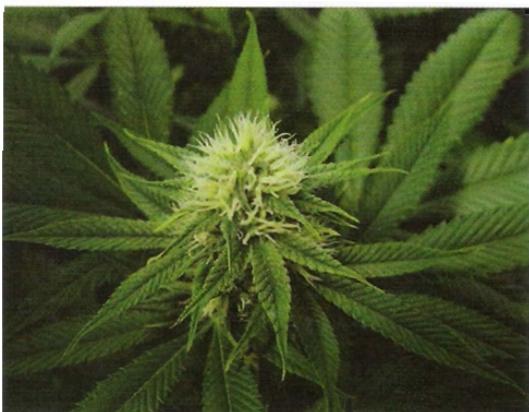
When I choose strains I always select for medical potency first, yield and finishing time second. When assessing cannabis plants, I look for a few main things: the length of stem between nodes, the profuseness of THC trichomes, the finishing time, the aroma, and last but certainly not least, the effect.

It is desirable for the nodes to grow close together. Nodes are the places where branches come off of the main stem. Internodes is the term for the space between the branches. The less stem between branches, the better. Of course, THC glands are best when they are found in massive clusters rather than sparsely distributed. Most people prefer short finishing times. When growing outdoors, the finishing time is especially important and should be suitable to the region. Aroma and effect are more subjective. Some people like fruity, some pine. Whatever the desire, both aroma and effect will be enhanced



NYC Diesel

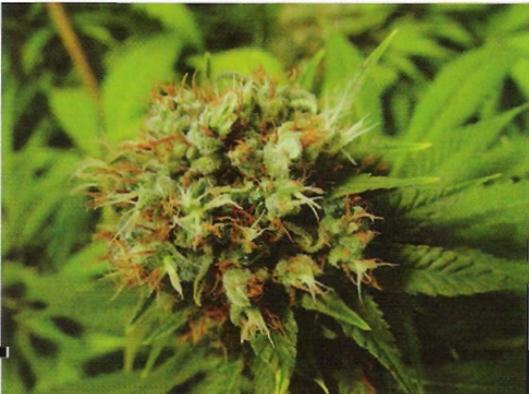
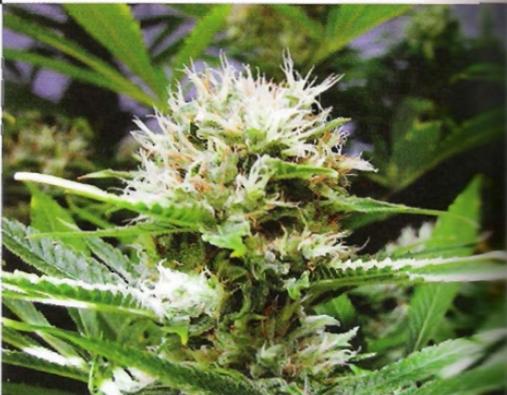
This indoor NYC Diesel is nearly ripe and ready to pick. NYC Diesel is a sativa/indica mix. It has a grapefruit flavor and a sunny creative high with a touch of body stone effect.



Buddha's Sister

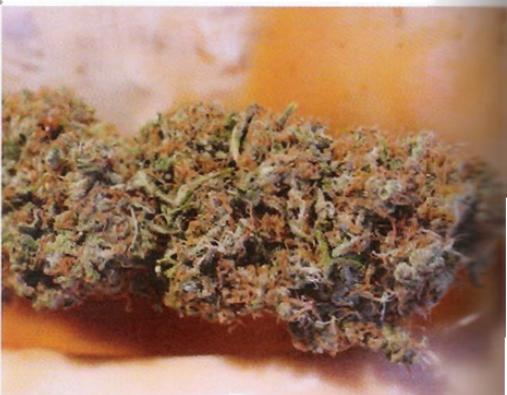
This young Buddha's Sister has a healthy profusion of white hairs and a glossy green glow.

Buddha's Sister plants have a characteristic powder-puff-shaped bud. Here the plant has started to ripen as evidenced by the appearance of orange hairs.



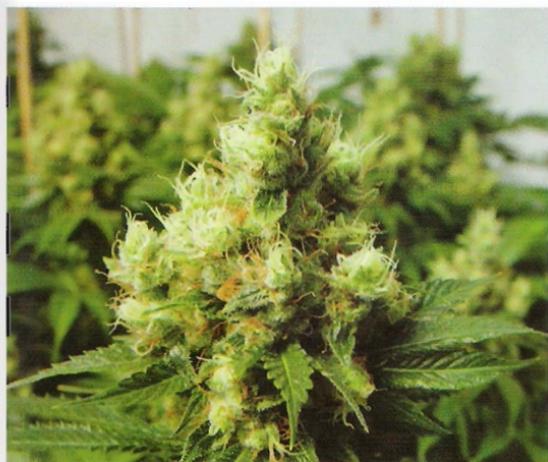
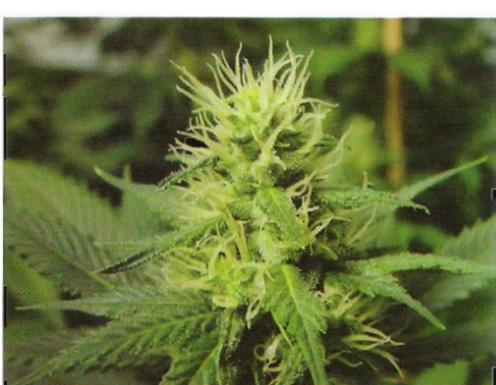
At 10 weeks, this Buddha's Sister bud is ripe. A photographer's loupe would show glands filled with liquid and slightly amber in color.

Here is a Buddha's Sister bud after being manicured and dried.



NYC Diesel

The NYC Diesel has formed many long white hairs after a few weeks of 12/12 lighting.

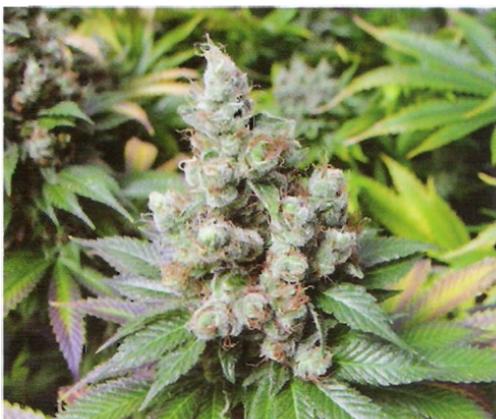


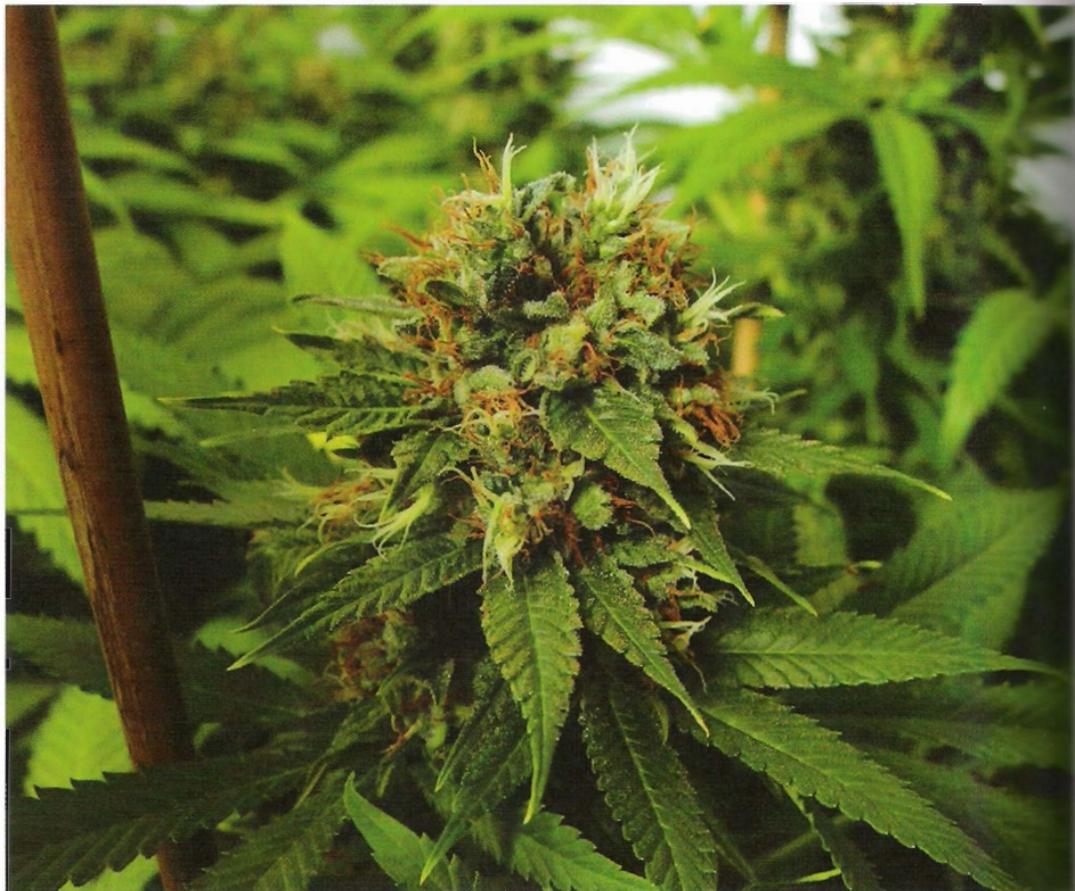
Recognizing Ripeness

One of the most important things I can tell you is don't harvest too early! Here are some photos at different stages of ripeness. See chapter 8 for more info on recognizing ripeness.

(above) This NYC Diesel is still a few weeks away from ripeness. Some of the hairs have started to turn color, and the bud is getting the corkscrew-shaped flowers that are often seen on this variety.

This NYC Diesel is ripe at 10 weeks. Always pay attention to the plant's indicators of ripeness rather than harvesting by the calendar alone.





Buddha's Sister

This indica variety has a tart cherry flavor and a powerful cerebral high. This plant looks quite robust with a week or two left to go before it will be ready to harvest.



Water Wash

The Ice-o-lator[®] (left) from Mila Jansen's Pollinator Company, and Bubble Bags[®] (right) from Fresh Headies are designed to make it easy to process leaf or bud into hash. These products are described in chapter 8. Information about these companies can be found in the resource appendix.



Males for Breeding

The male flowers have begun to open, releasing pollen. Chapter 9 describes how to use males in breeding.

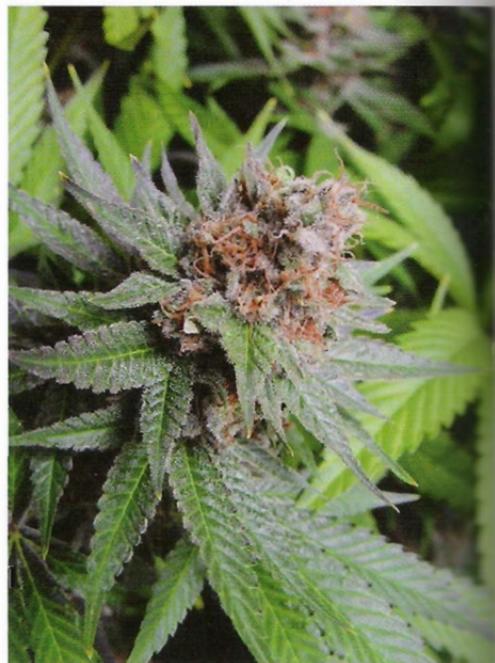
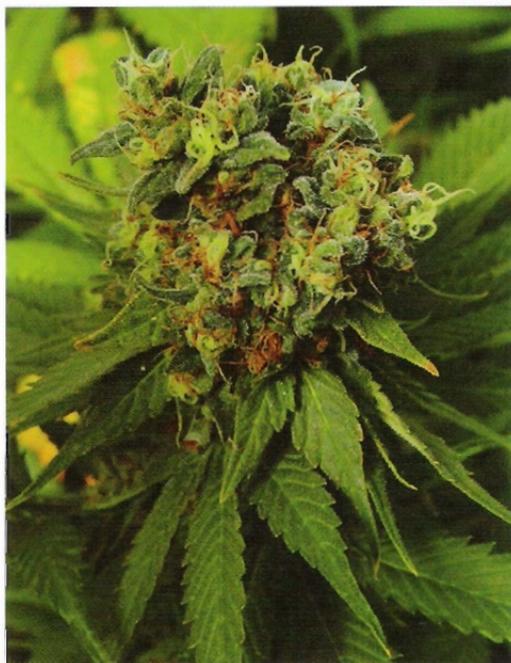
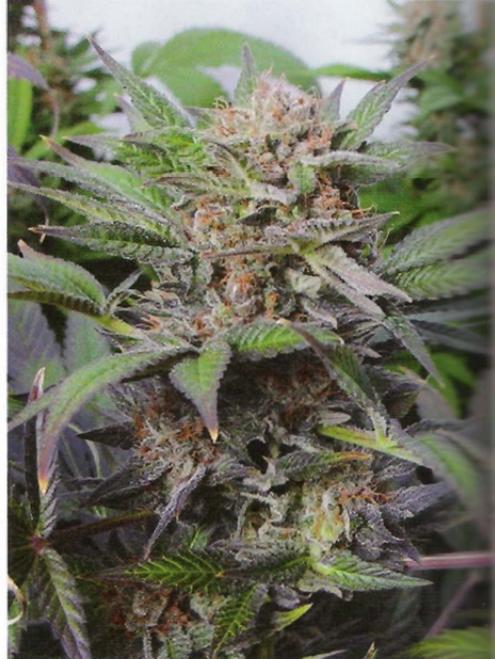
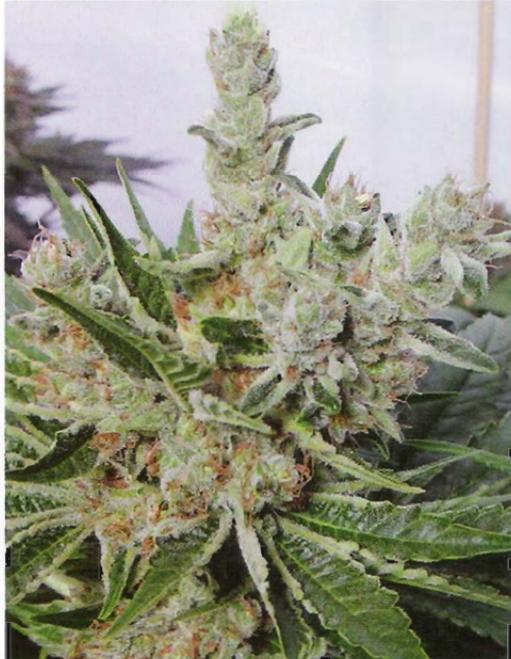




Here you can see that a male flower has formed on a female plant. The plant was flowered for an additional 10 days to 2 weeks beyond ripeness to force male flowers. When female plants produce male flowers, the pollen creates all-female seeds. Feminizing seeds is described in chapter 10.



Females grown longer for pollen do not usually form seeds, but occasionally they do. This plant has both a male flower and a seed in close proximity.



Soma Varieties

Here are 4 other Soma varieties: White Willow (upper left), Somango (upper right), Amethyst Bud (lower left), and Lavender (lower right). Stories about the evolution of Soma's varieties are included in chapter 11.

by using organic methods of cultivation and by harvesting and curing properly.

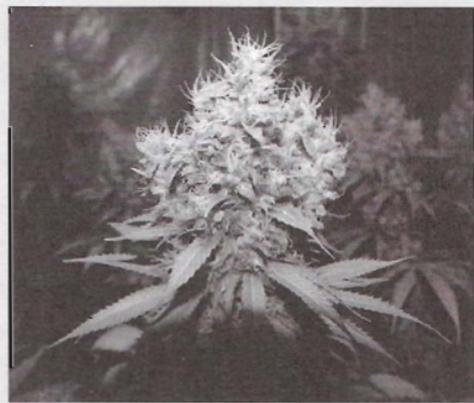
The first thing I typically notice about a new variety is the shape of the leaf and the tone of green it has. Even before harvesting any buds, I can tell by the shape of the leaf if it is going to be special. Flowering out strains is the ultimate way of knowing the full range of a strain's qualities. Most strains take 3-4 months to finish a complete cycle, so seeing how each strain grows takes a good amount of time and space. Once you get to know your plants you can organize your garden by grouping plants according to height or similar harvest time. This can be quite helpful for cross-pollination projects that use many different females and one choice male.

It is usually trickier to select a desirable male than it is to choose a female you want to cross. This is a good reason to select several males and cross each of them with the female variety that you like, and then see which produces the most promising hybrids.

Breeding with NYC Diesel

NYC Diesel is a blend of a Mexican sativa and an Afghani. It tastes like ripe red grapefruits. Everyone I smoke it with loves it, so I thought it would be a great male.

I planted several Diesel seeds and got three males, each one showing a slightly different growth habit. I'd read that it was possible to achieve greater genetic depth by breeding



with more than one type of male from the same genetic pool.

With this new information, I conducted a little genetic experiment. I placed fifteen different varieties of female plants in my grow room and crossed them to two of the male NYC Diesel's. One of the males had closer internodes and wider leaves, and the other had more stretch between nodes and thinner leaves. I put both of these males in the room with the females, and as the pollen flew, the two of them pollinated all the plants.

I liked the results. While all the crosses had NYC Diesel genetics, I had greater variety from which to make my selections.

When deciding what to breed for, another factor to consider might be what other people want. For instance, many outdoor growers are looking for a fast finishing strain. For some growers, fast finishing strains may be desirable even though they are often less potent. Medicinal users may also be looking for specific characteristics in a strain's effect.

How to Cross

Having enough space to breed is important. When working with cannabis you may have to produce hundreds of plants before you discover the winner you have been looking for, so patience is a virtue. The more plants you are able to grow out and select from, the more likely you will find something unique or precisely to your liking.

I put the females under 12/12 lighting a week before the males are added. This gives the female plants a head start, so they have more time to produce flowers. Also, after harvest when all the seeds have been removed, the leftover material makes excellent water hash.

It takes the male cannabis plant about 3 weeks to start throwing pollen. It continues for about 3 weeks. Female calyxes that are the first to get hit make the first seeds. The females continue to make new calyxes. As they become ripe, the male pollen touches them and seeds start to form. The last calyxes to get pollinated usually don't get a chance to finish, and the seeds come out white.

In my quest for the best medicinal genetics, I am constantly trying new techniques and genetics, constantly learning about this sacred plant and all the gifts she holds. Spreading quality seeds around the world has brought me many new friends and adventures, and I truly think that it changes not only the topography of planet Earth, but her soul as well.

For so many years, I grew only seedless ganja because it smokes the best, but sometimes I have daydreams about what would happen if every ganja smoker grew one seed crop and spread them around....

The Soma Way of Female Seeds

Making cannabis seeds is an art. As in any art, there are different methods of application. I have tried using gibberilic acid, pH stress, light stress, and fertilizer stress to force my female plants to make seeds. All of these methods are harsh on the plants, and some, such as gibberilic acid, are not organic.

In my search for cleaner, more earth-friendly ways of working with the cannabis plant, I have found a new way to make feminized seeds. This method of making female seeds is Age Feminization Technique (AFT). I like to call it “Rodelization,” after a friend who helped me realize and make use of this way of making female seeds.

Stressing for Seeds

Female seeds happen from stress, not genetics. That’s right. I am saying that all cannabis varieties have the capability of making male flowers on 100% female plants. Stress is the cause of this phenomenon. In the 32 years I have been actively growing cannabis, I have come to know every form of stress a cannabis plant can experience.

It takes many harvests before you really get to know a type of weed. Just like getting to know human friends, it takes time. Some strains prefer a higher pH, some a lower one. Some like a lot of food some like much less. There is quite a lot of variety in marijuana genetics, and you can’t treat every plant the same way.

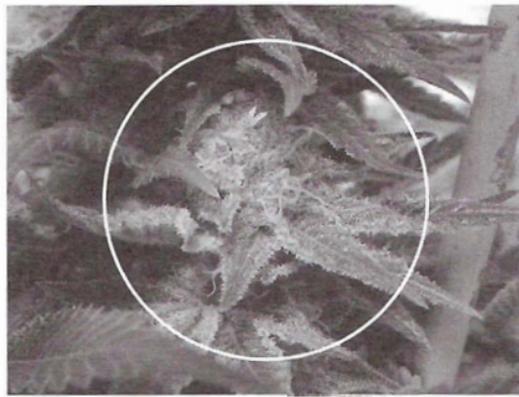
I have grown the same strains now for close to a decade, and am truly getting to know every bit of body language that my plants exhibit. I can recognize them now from a distance.

After growing crop after crop of the same plants in the same conditions, I noticed that if I flowered the plants 10-14 days

longer than usual, they developed male flowers. In AFT, plants are grown 10-14 days longer to induce male flowers.

To me, a male flower is quite a beautiful thing. It has the potential of making all-female seeds. Many growers have male phobia. They see a male flower and have heart palpitations, want to cut down the entire crop or at the very least take a tweezers and pluck the little yellow emergency devices out. I call them emergency devices because they emerge at times of stress.

Most of the time when females are grown longer for pollen, no seeds are found in that crop, but once in a while you do find some.



This White Light female has an induced male flower.

Pollination Techniques

Pollination can be accomplished in a few ways. The first way is more exacting, or for when you are growing multiple varieties. The pollen is collected from the plants as they dry, and then used in a successive crop.

After growing your female plants 10-14 days longer and hanging them up to dry, they are carefully taken off the drying lines and inspected for male flowers. Each and every such flower is removed and placed in a small bag and labeled accurately. These sealed bags can be placed in the refrigerator for up to 2 months and still remain potent.

To use this method, it is necessary to have another crop underway soon after the male flowers are collected. When the new crop is 2½ weeks into flowering, you take your sealed bags of pollen out of the refrigerator and proceed to pollinate your new crop of females.



This Lavender female has a male flower side by side with a female seed.

First, match the female plant with the pollen from the same female in the previous crop. Turn off all of the fans in the room. With a fine watercolor brush, remove some pollen from the bag and paint it on the female flower. This is repeated for each variety. I have done this successfully with up to ten strains in the same room.

I pollinate the lower flowers, leaving the top colas seedless for smoking. This method requires two crops to produce seeds, but it is completely organic. It also lets you have great quality smoke at the same time and from the same plant you are using to make female seeds. If you have never grown seeds for fear of not having something good to smoke, you will love this method.

You can also use the collected pollen to make new female crosses by cross-pollinating. This is a great solution when you want to use a variety you like as the “male” part of the cross, but you don’t have access to seeds or males.

The second way is less controlled, or may be used when you are gardening a single variety. Rather than drying and saving the pollen, the females with male flowers are brought directly into the room with a second group of females that are 3 weeks into the flowering cycle. The circulation fans are turned to high and the little particles of pollen circulate around the room for several days. Six to seven weeks later you have ripe 100% feminized seeds. This method does not produce as many seeds as crossing with a genetically male plant, but it is productive enough to keep a variety in circulation.

Feminizing methods can be extremely valuable in the effort to preserve strains, as well as being useful for any breeding program. Having been a farmer who moved my genetics far away from where they started, I know the value of seeds. My friend Adam from TH Seeds in Amsterdam has a motto that I love to borrow: “Drop seeds not bombs.”

Soma's Varieties

I have a few stories about how I developed my strains.

When I began breeding cannabis, it was 1975. Indoor growing was not common at the time, and I was only growing outside. The results of any experiments with breeding had to wait from one growing season to the next. I was working with a handful of other growers, which made the learning process move along more quickly, but it was still incremental.

Now, after thirty years, I have had the good fortune to acquire many interesting strains from some of the famous cannabis regions of the world. I have 35 mothers and 29 strains. The advent of the Internet and the creation of my seed bank have allowed me to learn about my different strains at lightning speed. I get e-mails and photos from people around the globe who have grown out the seeds and made their own selections. In doing so, they contribute knowledge that it would take me years to find out on my own. In this way, many people are helping to develop my varieties, selecting for their own needs and preferences, and experimenting, while all of us look for the best.

In those early years, my friends and I collected seeds and traded amongst ourselves. Seeds that would pop out of a Thai-stick, or be found in any excellent Columbian or great Mexican weed would be immediately labeled and put away.

Friends brought me back seeds from Afghanistan in the days when Afghani strains were quite fine. I had also saved seeds from some unbelievable Laotian weed. I was living in Northern Florida, so the climate was semi-tropical, ideal for the varieties I had.

That year, I grew the Afghani and Laotian plants outdoors in the hot sun. In the early fall, the Laotian plants were over 18 feet tall. They turned hermaphroditic and pollinated the

short 3-foot-tall Afghani plants. I ended up with self-pollinated Laotian seeds and cross-pollinated Afghani-Laotian seeds. This was when I first realized that female cannabis was able to make male pollen and all-female seeds.

Over the years, I acquired other genetics through travels. I visited India and brought back seeds from Kerala. Friends gave me seeds they'd gotten while traveling in Cambodia.

In 1988 I started gardening indoors. This made it possible to grow year-round and collect information much more quickly. In 1994 I went to Holland where I was a celebrity judge at the *High Times* Cannabis Cup. When I returned to the states, I had over a dozen new quality seeds to expand my library.

The Start of Soma's Varieties

I'd already been working with a variety that my friend had bred in the states. It was a mix of Skunk # 1, Big Bud, and Korean. We called it Big Skunk Korean. I was also working with what I still think was the very best Super Skunk, as well as a strain we called Hash Plant #1. I started the fourteen different types of seeds from Holland and together with the three types I was already working with, I had all seventeen strains together in one large grow room.

I didn't live in the house where the grow room was located but other people did. I wasn't aware that every time the washing machine was turned on, it blew the circuit that controlled the grow room lighting. The people who lived there would reset the breaker and everything would work again. The only problem was that the timer in the grow room was constantly thrown off and no one realized it. The lighting in the room became very chaotic, because the lights were inadvertently being turned on and off at different times.

One day, the lights went off when I was in the grow room. They were supposed to be on, and immediately I realized that this might have happened before. If it had been happening regularly, then the plants' cycle had been thrown off. I took a close look at the beautiful buds that I had sniffed for the last 5 weeks. The Big Skunk Korean had become a hermaphrodite and developed many male flowers. Many of them had already

opened and their pollen had flown around the room. I inspected the other varieties and saw seeds forming on every single plant.

The friends with whom I was gardening were very upset as we were all growing this for head stash. I bought their share of seeds so it would not be a total loss for them. I then brought all the seventeen varieties to Holland where I continued my underground seed bank.

I started ten seeds from every strain I had and began making selections. I was lucky to find a large grow room already built that came with a living space. At the time Amsterdam was cannabis heaven.

At first I labeled the plants by number only, i.e. Soma Skunk #1, Soma Skunk # 5, Soma Skunk # 10. As certain plants finished and I got to taste and compare them, I chose the winners and gave them new names according to their flavor and color. Soma Skunk # 5 tasted just like a fresh mango—it became Somango. Soma Skunk # 10 turned the color lavender—its new name became Lavender. What started out as Soma Skunk V was later named Reclining Buddha.

The Afghani-Hawaiian Crosses: Buddha's Sister

The seeds I'd brought with me were from hermaphroditic female plants, so they were all female. In order to cross them, I needed to bring a male in. My friend Shantibaba shared a choice male with me, an Afghani-Hawaiian.

I took many of my types and crossbred them to this new male. When Reclining Buddha was crossed with the Afghani-Hawaiian male, a mother plant was selected and became what is now known as Buddha's Sister. This variety has become one of Amsterdam's favorites.

Since I had crossed with a male plant, the resulting seeds offered more males to choose from. Through time, certain males were selected and crossed back to the females and, through backcrossing, the strains were stabilized. Other varieties of mine that came out of this generation were Afghani Delight, White Willow, Free Tibet, Citralah, Amethyst Bud, Haze Heaven, Big Kahuna, Somanna, and NYC Diesel.

SOMA SEEDS FAMILY TREE

OUTDOOR

- 1971 Colombian Wacky Weed (Sativa)
Vermont Outdoor
- 1972 Thai Seeds (Southeast Asian)
- 1974 Afghan Seeds (Indica) Laotian Seeds (Sativa)
- 1975 Afghani-Laotian Cross
- 1976 Afghani-Thai Colombian Seeds
- 1979 Kerala Seeds (Indica)
South Indian
- 1980 Afghani-Kerala Cross

INDOOR

- 1988 Big Skunk Korean
(Big Bud, Skunk#1, Korean)
- 1990 Hash Plant#1
- 1994 Super Skunk-Jack Herer-Holland's Hope-Bubble Gum
Soma Skunk
- 1996 Afghani-Hawaiian White Widow
Nepalese Hash Plant Hindu Kush
Northern Lights#5 Haze
- 1997 Haze Heaven Reclining Buddha Lavender Afghani Delight
Rockbud Buddha's Sister Kahuna White Willow
White Light Citralah Somango Big Kahuna
Free Tibet Amethyst Bud Somanna Kilimanjaro
Sour Diesel
- 1998 NYC Diesel
- 2001 G-13 Haze
- 2003 Rockbud x G13 Haze NYC Diesel x G13 Haze White Light x G13 Haze
Lavender x G13 Haze Buddha's Sister x G13 Haze Citralah x G13 Haze
White Willow x G13 Haze Free Tibet x G13 Haze Somango x G13 Haze
Somativa x G13 Haze Reclining Buddha x G13 Haze Amnesia Haze

Varieties in shaded bubbles are strains that I acquired and used in breeding.

Varieties in clear bubbles are Soma strains that I developed.

The Origins of NYC Diesel

In 1997 a friend of mine brought me some seeds as a gift. He said they came from the best weed he ever smoked. He had gotten the grass in New York City and said it was called Sour Diesel. I started the seeds and they were all female. I selected mother plants and as I flowered out their clones, I found some that I adored and some that I thought were flat. I kept the good ones and crossed it to my Afghani-Hawaiian male. I took the crossbred seeds and sprouted them to select mothers.

Once I had found the right female and the male that had the best genetic traits, I backcrossed them, got them stabilized and the New York City Diesel strain was born. Since 1999 it has won multiple prizes in every cannabis contest it has been in.

The Haze Crosses

In 2001 I tried sprouting some very old G-13 Haze seeds that came from Neville of cannabis genetics fame. They were created in 1988. I had ten of these 13-year-old seeds. Only one sprouted and it was a male. That left me with but one choice—in order to use the genetics, I had to breed the male to some of my existing strains and select some choice female phenotypes. As the G-13 Haze crosses circulate the globe, many growers are totally enthused by what they come up with from these seeds. It has brought a heavy sativa influence to all the strains it has been hybridized with.

Working with cannabis genetics is much like working on a fine oil painting, deftly mixing the paints to achieve the exact color you are searching for to paint your masterpiece. I wish you the best in creating and taking pleasure in your own unique cannabis artistry.

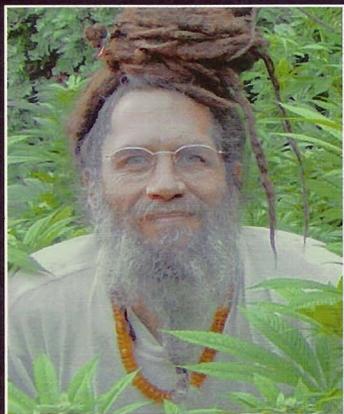
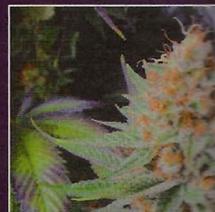
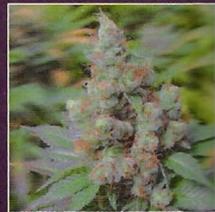
Grow organic with Soma

Let this sage of the cannabis scene be your guide to a greener garden. Find out how organic methods can bring out marijuana's true flavors and connoisseur qualities.

Learn how to:

- *sprout seeds and care for seedlings*
- *make your own organic soil*
- *build indoor grow beds for organic success*
- *use the best organic fertilizers and supplements*
- *control pests organically*
- *maintain a mother garden*
- *select varieties and begin breeding*
- *produce all-female seeds naturally*

Plus: 16 pages of Soma's lush photography, breeding tips, and an appendix of organic resources.



About Soma

Internationally known as an award-winning breeder and expert cultivator, Soma's dedication to the green lifestyle is reflected in his longstanding vegetarianism and his decades of work with the cannabis plant.

"May this book help to make you and our planet greener."