

# Cannabis: A Compilation



August 15 2009

# Some Words

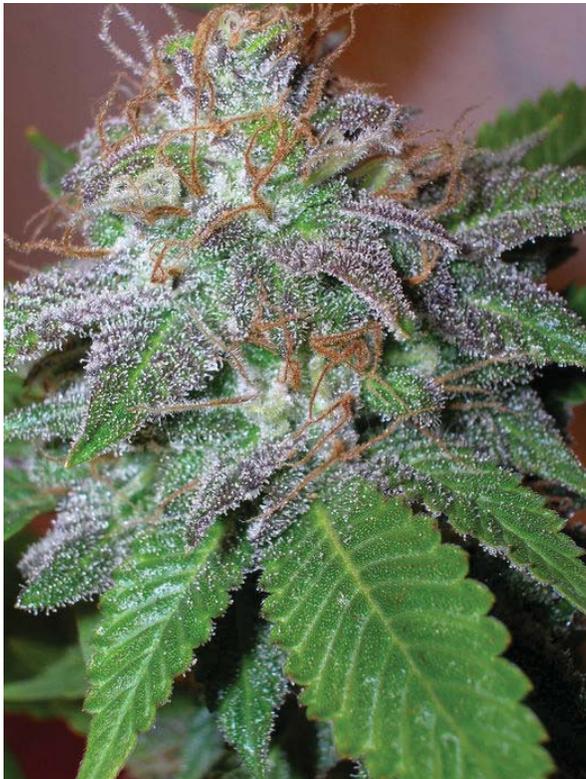
Hello to all you cannabis growers and tokers!

I want to take this page to say a few words. First I need to say thank you to the entire cannabis community. I'm honored to be part of this great group of people. Next thank you to the online community. If it wasn't for sites like overgrow I would have never grown my own cannabis. Particularly thank you to all the people who have posted quality, detailed, and helpful information on the internet. Your knowledge has led many hopeful growers to bountiful crops of some of the best cannabis. Without your DIY threads and grow journals many of us would be lost.



Now let me explain what this whole book/file thing is about. During my years of growing I've always gone to the forums to find answers to my questions. Sometimes it can take a little longer than I would like, wading through all the post with little information. I thought maybe I would copy all of the most useful information that I've found and put it in PDF form. This way I could just include the information, allowing myself and others to look back through the PDF as a reference. This was one of the reasons I decided to create this. The book is NOT intended as a replacement for the forums. Please check the online communities regularly for the most up to date information.

The other reason is to try to preserve the best information in another format other than the forums and websites that host the original material. As I'm sure you've heard of a site called overgrow was shut down a several years ago and a lot of information was lost or only partially recovered. This PDF should aid in the preservation of cannabis knowledge.



Let me note that this book will not just contain grow information. I would like it to contain anything cannabis related, from the vocabulary, to the medicinal effects, all the way to legal issues. I want this to be a go to resource to people just entering the cannabis world and for old time tokers.

This is going to be a continuing project, carried out by myself, alone. So please be patient in waiting for updates to the book. I want to try to keep it as up to date as possible, but we all have our lives outside of cannabis and the internet. Updates may happen once a month or once a year, but I will do my best to keep releasing this as I find more up to date and useful knowledge.

Finally I will currently be releasing this as a torrent on demonoid and as a pdf on scribd.com. Future means of release will be announced here. If you find this the least bit useful please spread the file by any means.

Peace & Love - Phr3

# How To Use This Book (Effectively)

To get the most out of this book you should know how to use it properly. I've put the book together as a reference book rather than a read from beginning to end read. Of course you could read it beginning to end, and maybe this is best if your a beginner, but if your looking for a specific topic then reading from beginning to end would be time consuming. So first let's look at how to find what your looking for.

When looking for a specific topic you will need to know what category it is in. This book will divided into several main categories and then within these main categories will be sub categories. The main categories are:

- Cannabis History & Culture
- Consuming Cannabis
- Growing Cannabis
- Medical Cannabis
- Legal Issues
- Glossary

There will be no table of contents within the book though so you must listen carefully here if you wish to find something. This book should be read with a PDF reader which allows the use of bookmarks. If you look through the book marks you will see these 5 categories. If you expand on category you will see the sub categories. Finally if you expand the sub categories you will see the individual articles within.

Let's say your looking for info on carbon filters. You would expand the "Growing Cannabis" category, then expand a sub category like "security." Then you would look through the articles to find one's about carbon filters. In the future there may be so much information that even the sub categories will need sub categories, but for now it should be fairly simple.

Another way to find specific information is to use a PDF reader which will let you search the document. You could then search for "carbon" or "carbon filter" and click through to see where the word appears. This may be a little more time consuming in the future as articles not directly related to the search term may contain the words.

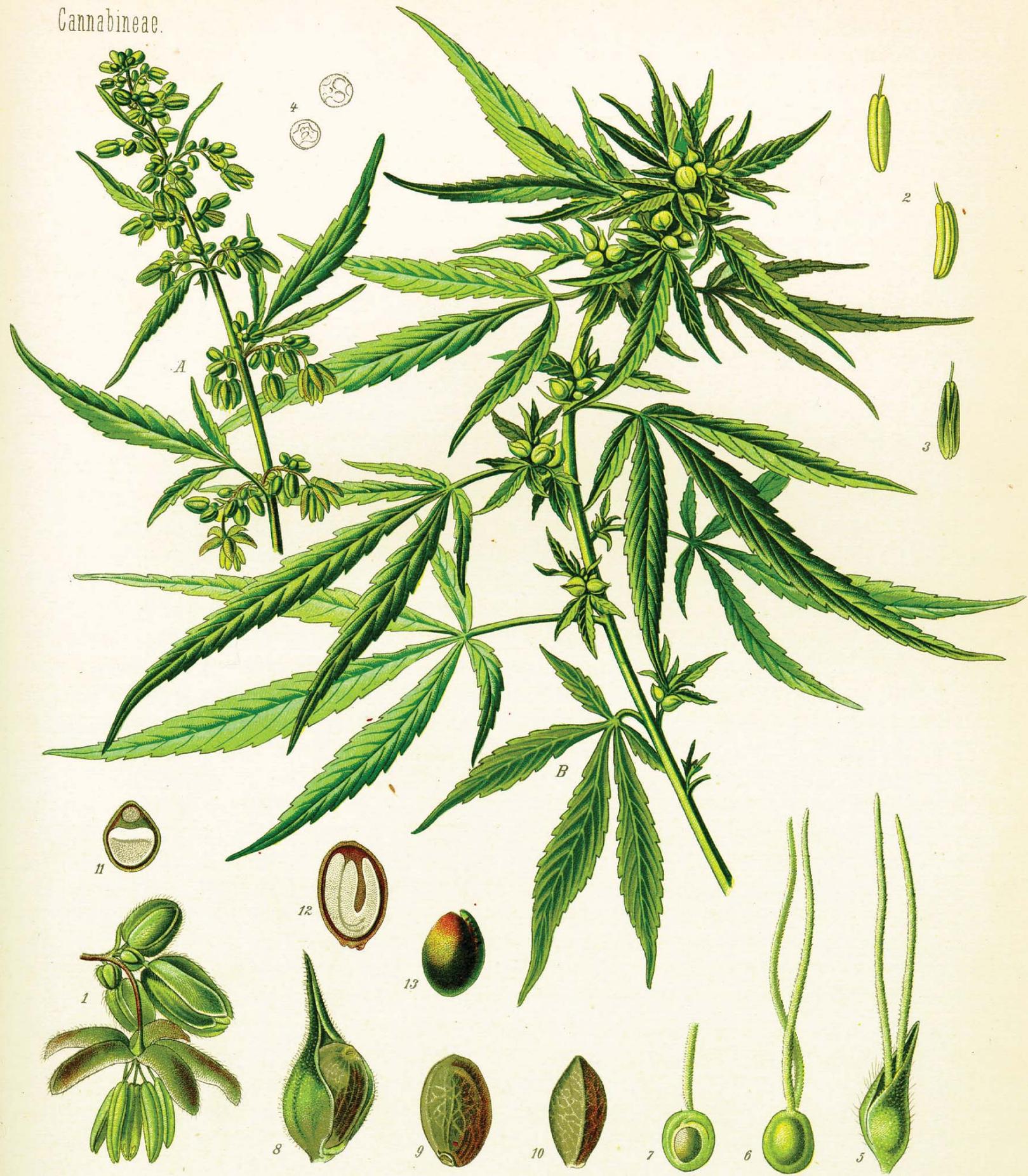
The book will also include a glossary of words/slang used both in speech and on the internet that is related to cannabis. There may also be unrelated cannabis terms, but only if they frequently appear in threads and are difficult to understand.

One last note on using the book. Within the articles themselves you may see different colored text. At the moment I'm only using black, blue, and red. The black text is the main content, or what the original poster has posted. The blue text is relevant information posted by people other than the original poster. Say in a thread someone ask a question about why the original poster added so much perlite to the soil. Then the original poster replied back with an explanation. I've decided to included the question and the answer so it's more clear for everyone. Lastly red text are comments of my own. This may be a further explanation that I think is needed, or it could simply be a citation of where the original content was found. If I feel the need to put some of my own words in I will put it in red text so it's clear that it's my view.

Now that you understand how to use this book in the most efficient way, set out on an information journey!

# Cannabis History & Culture

Cannabineae.



# Inside Cannabis Castle!!!

## The incredible story of the man who would be King of Cannabis

By Steven Hager

### **The Importance of Seeds**

It is Thursday, November 6, 1986, and Nevil has just returned from his daily pilgrimage to a nearby post office. It is raining lightly and a cold breeze blows off the Rhine River. Although the sun made a brief appearance early in the day, it has since been obliterated by massive, billowing clouds.

As Nevil enters his house, he is assaulted by his watchdog, Elka. He climbs the stairs to his living room, flops on an old couch, and starts opening his mail. "Breeding is a matter of bending nature to your will," he says while drawing a toké on a joint of Skunk #1. "There's not a coffee shop in Holland that can produce better weed than this. But I don't sell it. I give it away---or I throw it away."

In a few short years, Nevil has made an incredible transformation from penniless junkie to wealthy entrepreneur. Although he's an effective and efficient businessman, marijuana is his business, so things are run a bit differently around here than at most companies. For example, resinous buds of exotic types of cannabis are strewn haphazardly about the room, as are large chunks of hash and bags filled with seeds.

Nevil is a displaced Australian of Dutch heritage, and has a quiet, understated sense of humor. He lives in relative seclusion on his estate, breeding marijuana, playing pool, watching video, waiting patiently for his many cannabis experiments to bear fruit. He has his doubts about the future of the marijuana business in the Netherlands, but these doubts are likely to disappear in a whiff of smoke whenever he samples a new, successful hybrid.

"In the beginning I was quite keen for people to come here and visit me, but I found it takes large amounts of my time," he says. "I have to sit around and smoke with them. Now it has to be someone worthwhile, someone who has a large project in mind. Most American growers are looking for the same thing: strong, overpowering, two-toké indica with huge yields. My number one seller is Northern Lights."

After the mail has been sorted and delivered to the in-house accountant, Nevil visits the basement to inspect his prize plants. The doors to four grow rooms are wide open, disclosing the blinding glare of dozens of sodium and halide lights. Powerful exhaust fans circulate the air, and the smell of cannabis is overpowering. Three of the rooms are devoted to seedlings, while the largest contains 40 flowering females in their spectacular resinous glory.

It's no secret that an explosion of indoor marijuana propagation has taken place in America: grow stores are sprouting across the nation and sodium and halide lights are selling faster than Christmas trees in December. The reason for this sudden interest in indoor growing is no secret either; for the past two years high-quality marijuana has been nearly impossible to find---unless, of course, one personally knows a grower. But any pot farmer will tell you good equipment does not guarantee a good harvest. The most important element, in fact, is good seeds. And until recently, good seeds have been as rare as a \$15 lid of Colombian gold.

Thanks to Nevil, however, this sad situation has changed. Every day letters pout into his post office box, letters containing American dollars wrapped in carbon paper to avoid detection. The money is for seeds. Not ordinary pot seeds, but the best, most potent seeds on the market, seeds that will grow gargantuan buds dripping with resin, seeds that cost between \$2 and \$5 each.

Nevil's seed factory has been in business for three years and is perfectly legal. The Dutch government views Nevil as a legitimate, tax-paying businessman. Seed merchants are held in esteem in Holland, and even though Nevil is something of a small fry by seed merchant standards, he is a protected national asset nonetheless. Last year his company supplied \$500,000 worth of seeds to 15,000 American growers. If you smoked high-quality marijuana sometime in the last three years, chances are good the buds were grown with Nevil's stock.

There is a big difference between growing marijuana and breeding for quality. The best-known example of the long-term effects of breeding are the cannabis indica plants that arrived in the United States in the '70s. For hundreds of years indica plants were bred by Afghani farmers for disease resistance, early flowering, large buds, and wide leaves. The strain was developed for hash production, but it was also useful for American growers who had difficulty with sativa strains, most of which require longer growing cycles.

Ever since indica arrived in this country, breeders have been creating hybrids that take advantage of indica's hardiness and sativa's clear, bell-like high. The results of these experiments first appeared at secret harvest festivals in California, Oregon, and Washington. Then, in the early '80s, a legendary underground organization called the Sacred Seed Company began distributing these remarkable hybrids. Nevil's company, The Seed Bank, sells many strains originally developed by the Sacred Seed Company, including the famed Skunk #1, Early Girl, and California Orange. In the past three years, however, some of the most mind-blowing strains have come out of the Pacific Northwest area: Northern Lights, University, Big Bud, and Hash Plant are adequate proof that Seattle and Portland now hold the breeding crown. Needless to say, Nevil's Seed Bank has obtained cuttings and seeds of all these varieties and will soon be offering them for sale.

Who is Nevil and how did he come to found this amazing company? As usual, the truth is wilder than anything HIGH TIMES could invent.

### **The Making of a Seed Merchant**

The man who would be King of Cannabis is the son of Dutch migrants who settled in Perth, Australia, in 1954. His father worked as an instructor for telephone technicians, while his mother became a counselor for unwed mothers. They were adventurous, hardworking Catholics, and they raised their six children strictly, sending them to Catholic schools.

"I wasn't the most malleable child," admits Nevil. "From an early age I had an aversion to authority. I was the first-born, and I saw myself as a sort of path breaker for the rest of the children."

Despite his rebellious nature, Nevil was intelligent enough to jump two years ahead of his peers, a leap that resulted in his being the smallest in class. "I got beat up a lot," he admits. "A typical day would start with the teacher calling me up in front of the class to smell my breath. 'Yep,' she'd say, 'you've been smoking.' And I'd get six of the best straight away. And that was just the start of the day! Usually a thing like that would put me into a bad mood, so the rest of the day wasn't much good either. It worked out I got the strap 900 times in one year, the school record."

Nevil was not your typical juvenile delinquent. At age seven, he began raising parakeets; two years later he joined the Parakeet Society of Western Australia. "My best friend across the road got some parakeets," he explains, "and I got extremely jealous. After he started breeding I became quite adamant I'd do the same."

He eventually became friends with one of Australia's leading parakeet breeders, Bob Graham. "I learned an awful lot from him," he says. "He was a quadriplegic and he was incredibly intelligent." Nevil learned Mendel's laws of breeding and began charting dominant, recessive, and intermediate traits for his birds (something he would later do with cannabis plants). "I bought some of Graham's stock and got immediate results," he says. "When you

breed parakeets, you breed to an ideal. It's like sculpting with genes."

When he was 15, Nevil was sent to a state school and forced to repeat his third year of high school. Consequently, he caught up with his classmates in size. "I got into a few fights," he says with a smile, "just to get back for all the times I'd been beaten up."

Although discipline at the school was considered harsh, it proved a cakewalk after catholic school. "the first time I was brought before the headmaster to be punished, he made me hold out my hand and he tapped it twice with a cane." recalls Nevil. "I thought he was just aiming. I closed my eyes and waited for the real pain, but it never came. I was quite shocked. I thought, 'Well. Now I can do anything I want.' I ignored dress code and dressed how I pleased. That didn't go over well and I managed to get kicked out within three months."

He also discovered marijuana.

### **Nevil's First High**

"I had an American friend who suggested we buy some," he says. "I remember thinking, 'okay, I'm not scared.' We both pretended we'd done it before, when in fact, neither of us had. After scoring from someone at school, we went back to a shed outside his house. I volunteered to roll joints, even though I'd never done it before. There were three of us and I rolled three joints, one for each of us, hahaha. It seemed logical at the time, still does, actually, even though it was more normal to pass joints. But we didn't know any better. It was Indonesian weed and we got extremely ripped. I really liked the sense of time distortion---everything happened so slowly."

There was plenty of high-quality reefer going around Australia, and to insure a steady supply for himself, Nevil made the jump from smoker to dealer in a matter of weeks. Meanwhile to satisfy his parents, he found a legitimate job.

"As long as I couldn't be the pope, my mother wanted me to be a doctor or a veterinarian," he says. "My father didn't see this as a possibility and just wanted me to get a job. Fortunately, I was offered work as a lab assistant at a local university, which was semi-professional, eh? And I was working, so they were both satisfied."

Nevil did well at the position. So well, in fact, that he was made acting head of the anatomy lab with responsibility for the operating room, animal room, and office. He was given the only set of keys to the drug cabinet and placed in charge of ordering drugs when supplies ran low. For someone interested in sampling illicit chemicals, it seemed like the perfect job.

"Having heard horror stories about cannabis and how horrible it was for you, I decided everyone in authority lied about drugs," says Nevil. "I knew cannabis wasn't harmful. I concluded the harmful effects of other drugs must be exaggerated as well. I started with barbiturates. I knew many people used them for sleeping tablets. Eventually, I tried morphine. I was quite good at giving injections. There's something very professional and doctor like about giving yourself an injection. I had to inject rabbits and mice all the time, and if you can hit a vein in a rabbit's ear, you can hit any human vein. I veined the first time I tried. Morphine made me feel good. I had friends who were already addicted to heroin and they encouraged me. Soon, I had a bag filled with tablets, pills, and chemicals of all sorts from the lab." Unfortunately for Nevil, this situation was not destined to last. Within a few months, he was arrested for drug possession. And it didn't take long for the police to figure out where the drugs had come from.

The head of the anatomy department suggested Nevil be sent to a treatment center. His parents agreed and had their son committed to a university psychiatric ward for six weeks. "I wasn't addicted at the time," says Nevil. "I used far too large a variety of ingestible to become addicted to any one thing. After I was released I had the option of working part-time at the University---to build up my position again. But, uh, I felt the stigma of being a

known user. It was a bit unbearable. So I left and started hanging around with people who supplied smack. Even though I started shooting smack, I never sold it. I just sold weed.”

One day Nevil woke up with a terrific backache. His hips and the base of his spine hurt terribly. He went to a doctor and was given some pain pills, which proved useless. The doctor couldn't find anything wrong. Nevil went home and the pain still wouldn't go away. “Then I realized, ‘Shit, I'm addicted,’” he says. “It was quite a substantial shock even though I knew it had to come eventually.” He enrolled in a methadone program, which proved to be an extremely dehumanizing experience. “They made me beg for drugs,” he says. “I didn't like that. I was scoring weed in Melbourne and shipping it back in huge speakers, telling people I was in a band. I was making what seemed like a huge sum of money---\$5,000 a week.”

Unfortunately, Nevil gave a free sample to a girl who was later arrested by the police. The girl identified Nevil as her supplier and a long court case ensued, one that eventually reached the Australian version of the Supreme Court. Throughout the trial, Nevil was enrolled in a methadone program and under psychiatric supervision. “I got the feeling things were coming to a head,” he says. “My drug problem seemed quite insurmountable and the case didn't look promising. So I flew to Thailand.”

### **Escape to Bangkok**

For several weeks Nevil lived in a cheap hotel in Bangkok, shooting heroin until his money ran out. He skipped out on the bill, moved to another hotel, and began hawking his valuables to raise money. “I found a taxi driver who would take me to exclusive shops in the city,” he says. “The driver would get a kickback from the store for delivering Europeans to the shop, whether they bought anything or not. After we left the driver and I would split the kickback.”

However after they'd visited every shop in Bangkok (and were no longer welcome at any of them), Nevil telephoned his parents and asked for a plane ticket home. Unfortunately, the police had already appeared at his house with a warrant for his arrest. “It didn't seem prudent to return to Australia,” says Nevil with typical understatement. His parents sent him a ticket to the Netherlands and the address of an uncle living in the countryside.

After Thailand, Nevil's habit was really out of control. Upon arriving in Holland, he immediately enrolled in a methadone program and discovered he required 24 tablets a day to stay straight. “I handled that for about six months,” he says. “I was trying to cut down, trying to fit in. I had unemployment benefits, which is enough to survive in Holland. But I was feeling quite lonely.” Six months later he moved to Tillberg, the center of Holland's smack scene.

Obviously, Tillberg was not the sort of environment conducive to kicking heroin. Junkies had taken over the city, converting pubs and hotels into shooting galleries. “My first day in town, I went to a bar called the Lawyer's Purse,” says Nevil. “Smack was being sold up and down the counter. It was a madhouse. Apparently, the police didn't---or couldn't---do anything about it. It went on like that for quite some time. When the police would close one place down, everyone would move to another bar. It was a fairly rough town and I went through a time of hardship. I had no money except welfare. I had a raging habit. I was living in a town known for being tough and criminal. I cost the state large chunks of money as I went through all the available drug rehabilitation programs. After having made numerous failed attempts at stopping, I decided no one could help me. Which is true. No one can help a junkie. He can only help himself. So, I decided to kick heroin on my own. I convinced a doctor to give me 'ludes to sleep and a synthetic opiate, which probably didn't do anything. I stayed home and suffered for six weeks until I reached the point where I could handle alcohol. Then I started drinking every day, a half bottle of scotch in the morning, a half bottle at night. I used the 'ludes to sleep, so that there was always a certain part of the day blocked out. Eventually, I got sick of hangovers and turned to grass. I decided it was probably the only acceptable drug.”

In 1980, while still trying to kick his habit, Nevil stumbled across a copy of the Marijuana Grower's Guide by Mel Frank and Ed Rosenthal. "I'd grown some weed in the bush in Australia," he says. The book helped reawaken Nevil's interest in genetics. Why not combine his two favorite pursuits, breeding and drugs? Nevil applied for a loan to build an indoor growing chamber for marijuana. Only in Holland could such a request be taken seriously. "The drug program I was enrolled in gave grants to drug addicts to get them started doing something useful," he explains. "I told them I wanted to grow weed indoors. They weren't thrilled with the idea, but they gave me the money anyway." The unit consisted of eight 5-foot fluorescent lights. "There was a vacant lot behind my apartment and I filled it with weed. I had Nigerian, Colombian, and Mexican seeds. The Mexican was the best. I still have the strain. My dwarfs come from it." Although there wasn't much demand for homegrown weed in Holland, hash oil was a valuable commodity and could be sold easily. So Nevil became a professional hash oil maker.

### **The Fire**

Nevil used petroleum ether, an extremely flammable liquid, for the distillation process. "I was heating it with thermostatically controlled electric plates," he says. Unfortunately, however, Nevil didn't realize that the thermostat on the heater had to be placed in another room because the thermostat sparks when turned on. He had a sink filled with 40 liters of petroleum ether, as well as a can with another 10 liters on the floor. One day he turned on the thermostat and it sparked. The spark turned into flame, which instantly turned into a raging fire.

With eyes closed, Nevil ran to the adjoin room and dove out the window, bouncing off a roof and rolling onto a sidewalk. "My first thought after hitting the ground was to save my dope," he says with a laugh. He ran back inside, grabbed whatever hash oil he could find, and buried it in the backyard. He went back again and collected whatever valuables he could find. "Then I went next door to tell the neighbors," he says. "They were shocked by my appearance. I didn't realize my hair was singed, my face was black, and my clothes were torn. I had first- and second-degree burns and was covered with blisters."

Twenty minutes later the police arrived, followed by the fire brigade and an ambulance. At the hospital, the burn specialist told him he was lucky to be in such pain because it meant the burns weren't first degree. He was given a shot of morphine to kill the pain. The next morning, however, Nevil refused further shots. "I knew I'd turn into a junkie again." He says.

Despite horror stories from his doctors about being scarred for life, Nevil was released tow weeks later with no visible damage. There was one permanent change, however: Nevil decided not to make hash oil anymore.

Since Nevil had been reading HIGH TIMES, he knew revolutionary new indica strains were appearing in the United States, even though none were available in Holland. If only he could grow weed the Dutch would consider palatable, then he'd be in business and could sell marijuana instead of hash oil. He searched through copies of HIGH TIMES, hoping to find an indica seed supplier. "I looked for hidden meanings in all the ads," he says. "Of course, it was just fantasy on my part. I knew how difficult it was to get good Nigerian and Indonesian seeds in America and I wanted to trade with someone."

Eventually, Nevil realized there was only one way to obtain good seeds, and that was to become a seed merchant himself. He hired a lawyer to investigate the legal implications and discovered it was possible to sell cannabis seeds in the Netherlands. Within a matter of months, he sent his first ad to HIGH TIMES.

"I expected there were thousands of people just like me, and as soon as they saw the ad, I'd be in business," recalls Nevil. Business, however, was disappointingly slow for the first few months. Why? Probably because most readers found it hard to believe high-quality seeds could be obtained so easily. Nevil doesn't discuss his distribution system, but there is no doubt the seeds were getting through. Most of the money Nevil received went back into improving his seed strains. Nevil went to great expense to obtain seeds, a commitment that is best illustrated by a secret trip to Mazar I Sharif in Afghanistan. According to the Moslem legend, one of Mohammad's

sons died in the city. Consequently, it is a very holy city. It is also known for high-quality hashish. Although hash from the area had been readily available in Holland in the '70s, the soviet invasion of the country greatly reduced exports. In 1985, an Afghan refugee told Nevil the fields around Mazar I Sharif were being destroyed. "That was all I needed to hear," says Nevil. "I caught the next plane to Pakistan to save the strain."

The story of this adventure was first reported in *Regardies Magazine* and written by former *HIGH TIMES* reporter A. Craig Copetas. "After being smuggled into a refugee camp near Peshwar while lying on the floor of a car, Nevil made contact with a 30 year old Muslim fanatic who had a throbbing vein that ran from between his eyes straight up his forehead," wrote Copetas. "The man took a lump of black hash out of his pocket and told Nevil that it had been processed by his uncle, a man known as Mr. Hashish. Surrounded by four men who were pointing machine-guns at him, Nevil set about negotiating with Mr. Hashish, a Mujahedin commander, and finally persuaded him to send a squad of his men 280 miles into Soviet-occupied territory and come back with two kilos of healthy Mazari seeds."

"He thought I was ridiculous because I didn't want to buy hash or opium," recalls Nevil. "Nobody had ever come there before to buy seeds, and at first he had no idea what I was talking about. I stood there trying to explain genetics to this tribal hash leader in sign language. When he finally figured out what I wanted, he asked for too much money. I took a zero off his price and gave him ten percent up front. He called me a bandit, but I had the seeds four days later."

Nevil also went to great lengths to obtain ruderalis seeds, a little-known cannabis strain that grows primarily in Russia. Although some American growers have sold so-called ruderalis strains in the past, Nevil undertook the necessary trip to Russian-Hungarian border to authenticate the plant. Ruderalis is not known for spectacular resin content, but it flowers automatically--regardless of photo period, which makes it an extremely useful hybrid, especially for outdoor growers. Nevil plans to cross ruderalis-indica hybrids with his Mexican dwarfs. The result? The ultimate cannabis strain: a potent indoor/outdoor bonsai marijuana tree that matures within two months and never reaches a height over two feet. The plant would be nearly impossible to detect from the air and it could take years before the DEA even figured out what it was. Nevil is so close to perfecting this strain that seeds could be available by the time this article is published. This and other miracles can be expected soon from Cannabis Castle.

"Since becoming a seed merchant, I've directed all my energies and money into finding people superior strains of cannabis and getting seeds out of them," says Nevil. "And I can honestly say, I've never heard of a strain I wanted that I wasn't able to get--one way or another. Theoretically, there is someone out there growing better stuff than I am using my seeds. Why? Because tens of thousands of plants are being grown with my stock. Selection from tens of thousands gets phenomenal results, while I can only select from a few hundred. I'm not holding back anything. Any grower in America can experiment with the same stock I do."

# Consuming Cannabis



# Methods of Using Cannabis

By THC Club

**Smoking/inhaling:** Burning or vaporizing cannabis and inhaling the smoke into the lungs is the fastest route to the blood stream. Conventional wisdom is that holding in the smoke increases the effects felt. Recent research shows the opposite; it causes more harm to the lungs without increasing the amount of THC absorbed. Studies done in Australia indicate that 95% of the THC in cannabis is absorbed in the first few seconds of inhaling. Holding in the smoke longer just allows more tar and other noxious chemicals to be absorbed. Take small, shallow puffs rather than deep inhalations.

Irritation of the throat and lungs is one of the most obvious adverse effects to the marijuana smoker as is the inevitable cough upon inhaling. The cough is the body's reaction to the irritation of the numerous constituents of the smoke. Prolonged and repeated exposure to these irritants can lower resistance to, and aggravate infections from viruses, bacteria, or fungi. The lesser coughing, the safer the smoke. The fewer puffs the better; the more potent the cannabis used is the fewer puffs required. For these reasons, it is preferable to use only the more potent flower tops, or high grade hash for smoking use.

Despite the obvious dangers of inhaling hot smoke, there is evidence that in some cases (ie. Asthma) smoking could be a beneficial medical use of cannabis. Another advantage of smoking is that it allows the user to control their dosage better as the effects are almost immediate, unlike when eating, or using THC in pill or spray form. In general however, smoking is not the best way to take cannabis, especially for pain, being a less efficient use of the herb than eating. However, many medical users find they appreciate the immediate and pleasurable effects of smoking cannabis and the harm of smoking can be reduced in various ways. One alternative to inhaling smoke is to release the THC through Vaporization; inhaling vapor rather than smoke, see vaporization.

**Joints:** Smoking cannabis in 'joints' is one of the least harmful ways of smoking. A loose, fat joint is preferable to a thin one because the temperature of the smoke is lower in a thick joint. Mixing cannabis with tobacco counteracts the positive effects of THC. Some research suggests that Cannabis may actually offset some of the harmful effects of tobacco but there is also evidence that the relaxing effects of cannabis on the lungs allows the toxins in tobacco to get in deeper. There is evidence that a thin joint gives a more stimulating 'high', while a fat joint has a more sedative effect (due to different burn temp in 'fat' or 'thin' joints). Avoid rolling papers with 'strawberry' tasting chemicals and the like, 'rainbows' and any use of colored inks.

**Pipes and Bongs:** Many ingeniously designed products are on the market that claim to offer a cooler smoke but they are not all safe or efficient to use. Avoid wood, aluminum or plastic materials. Use glass, stainless steel or brass pipes and bongs.

**Water pipes:** Recent research suggests that water pipes are the most harmful and least efficient methods of smoking cannabis. The water absorbs a great deal of the THC in the smoke (up to 50%!), increasing the amount of tar the smoker must ingest to get the desired result. Using a water pipe with a mouthpiece less than 20cm from the water level can allow water vapor and water drops to enter the lungs.

**Vaporization:** Using a vaporizer which heats but does not burn the cannabis, is an alternative to smoking. The process involves releasing the THC as vapor which is inhaled rather than smoke. The effect is 'clearer' and it is far more economical and reduces the exposure of the throat and lungs to products of burning. Vaporization works because THC, the active ingredient of cannabis, is a resin that vaporizes at a lower combustion (burning) point than cellulose. You can make your own vaporizer very cheaply or buy various types starting at around £35 up to £300+ for the 'hospital standard' 'Volcano'. High heat destroys some of the THC in smoked cannabis (estimates vary). Vaporizers heat it more gently; the THC molecules decarboxylate and evaporate in a whitish vapor. A problem with vaporizers is with correct use. Many users tend to overheat and consequently burn the stuff. They are now 'smoking' not 'vaporizing' the cannabis, often without realizing - and just as many toxic tars are released as smoking in a pipe. Vaporizers sometimes fail to satisfy longtime recreational smokers who associate burning lungs with getting high. They distrust the incredibly smooth taste of the vapors, and they don't like waiting 20 seconds to 1 minute for each hit. However they always like the fact that their supply seems to last up to four times as long because vaporization wastes so little of the active ingredients lost through smoking. Some regular users of vaporizers have complained that they produce a fine dust along with the vapor. This can't be good and they should maybe be fitted with a filter system but vaporizers are still the safest way to consume cannabis using heat.

**Eating or drinking:** Simply sucking a small piece of hashish or eating cannabis prepared as a cake, drink or other food is a very effective and economical method of using cannabis. The effects take up to an hour and last 4-12 hours. Over dose is possible by eating too much (see 'Over-Dosage'). This could result in an unpleasant 'whirling-pit' feeling but no lasting physical damage. If in doubt 'self-titrate' the dose; experiment with a little, and then a little more. More worrying are the dangers of adulteration and infection encouraged by the unregulated trade in cannabis. These include smuggling methods and profiteering practices which can make eating the resulting product totally undesirable. In general avoid eating most hash especially 'Soap Bar' and 'Manali' or 'Squiggie' black. Eating Hemp seeds (see 'Hemp Seed & Nutrition') or their oil (which have no THC content) is a very valuable source of nutrition; a quality which can have considerable medical value and contribute to general well being.

**Creams and lotions:** Applied on the skin to treat complaints ranging from muscle pain and/or tremors to ache. You can make these your self. The simplest way to do this is to put leaves and buds of cannabis into a bottle filled with surgical alcohol available in any chemist. Leave in a dark place for 1-3 weeks, shaking every day or as often as possible, then use to rub on area suffering from pain.

**Tinctures:** The active ingredients of the plant are extracted as oil and can then be used either as drops taken orally, or the ingredient for creams and lotions to be rubbed on the skin to relieve pain and other symptoms. Cannabis Tincture was available by prescription for medical purposes in Britain until 1971.

# Growing Cannabis



# Tutorial to Growing with CFL's

By Dr. Chronic



## What is a CFL?

A Compact Fluorescent Light is a type of fluorescent that was originally designed to replace the standard E26 Edison Incandescent Lamp. The reason being, CFL's will put out the same amount of visible light using much less power and a significantly longer rated life span. Even though the price of the CFL's is higher than Incandescent bulb's, they are generally rated to run anywhere from 8,000 to 15,000 hours. There many advantages of using CFL's. Maybe you are growing personal smoke, or you can't afford a HID system, or a HID system just isn't practical. For some, HID lights aren't available in their area. However, CFL's are sold almost anywhere (Home Depot, Lowes, Walmart, etc...). CFL's are in general a much cheaper growing solution, and their just plain simple to use –self-ballasted and it screw's into a regular light socket. I'm NOT saying CFL's are better for growing than HID's, but in some cases it's the only thing that will work.

## CFL Wattage

Now sometimes there can be a lot of confusion when it comes to power of the light due to poor labeling but we will do our best to clear all of that up. Normally light manufacturers that make CFL's will put two numbers on the box your CFL comes in. One is Actual Wattage and one is the Incandescent Equal. As you can see here on this CFL the Actual Wattage is 23 Watts, and it's Incandescent Equal is 100 Watt's. You need to totally ignore the Incandescent Equal and pay attention only to the Actual Wattage of the Bulb.

## Color Temperature

You might see a lot of different labels when shopping at the store for CFL's. Label's including Soft White, Warm White, Cool White, Bright White, Halogen White, Daylight White, Full Spectrum. And also label's like 2700K, 3000K, 3500K, 4000K, 5000K, 6400K, and 6500K. These are all the color temperature of the light you are using. This is a measure of how warm





or cool the light given off by a lamp appears, with warmer colors having a yellowish tinge and cooler colors being tinged with blue. What confuses some people is that the warmer a color is, the colder its color temperature is. (ex. Warm White = 2700K). Bulbs ranging in the 2700K-3000K spectrum are usually labeled Warm White or Soft White, bulbs ranging in the 3500K – 4000K spectrum are bright white or cool white, 5000K is labeled Full Spectrum, and finally 6400K – 6500K is labeled Daylight. You can grow an entire crop with CFL's if you chose the right spectrum of bulb's. For Vegetation you will want to use 6500K or 5000K, and when you flower you will want to switch to 2700K or 3000K . The reason being, throughout the year the plant's outside receive more 6500K light because the day's in summer are long and hot and as Autumn/Winter get's closer the day get's shorter, and gradually receives less 6500K light and more 2700K light as the plant flower's. Do what you can to avoid bulbs within that 3500K – 4000K because they emit very little light that is useful to your plant. Notice in the photo the difference between the color temperature of these lamps.

### **How to use CFL's?**

In order to efficiently use CFL's to grow your MJ you will need to position the lights around 2 – 4 inches from the foliage of the plant. If you place the light too close, then your plant will have nothing to vertically stretch to and it will remain short and stocky. (Ex. My First Grow and FarmingToronto's) Some people combat this by adding CFL's to the side of foliage instead of on top of it. On the other hand if the light is too far away from the plant, the stem will suffer elongation (stretching), which will result in loose and fluffy bud's. It is very important to note that when using CFL's it's a daily "battle" to have lights in the right spot. Many of us are in our grow areas at least once a day anyway, so to move your bulbs a bit really isn't that big a deal. Also many people wonder is it better to have many low watt CFL's or just a few high watt CFL's. Both ways are capable of providing you a good harvest but I suggest you chose the configuration that is easiest for you and your grow area.

### **Where can I get these CFL's?**

Many low wattage (23-42) CFL's can be bought at locate retail giants , such as Wal-mart, Lowes, Home Depot, and just about any hardware store you can find. If you are looking to purchase higher wattage (42 – 200) CFL's I would recommend ordering them online. <http://www.1000bulbs.com/> has very good prices on CFL's ranging from 2 – 200 Watt's. <http://www.buylighting.com/> has a good selection ranging from 5 – 200 Watt's in a wide range of spectrum's. I have used both of these sites several times and I would recommend them to anyone that plan's to grow with CFL's.

In the end there are many different GOOD setup's so don't set your mind on the ONE perfect CFL setup. Just apply these basic tip's when starting a CFL grow and you WILL see success. If you have any questions or comment's I would greatly appreciate it. I want to thank the one and only, FarmingToronto for editing this Tutorial.

# Ventilation 101

By redgreenry

Hey guys,

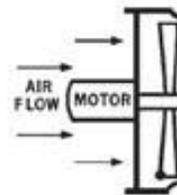
As you all know if the women don't find you handsome, they better find you handy... I've got some background experience and have wanted to do a good write up for a while. I have a collection of source material and will be cutting and pasting from it with a more detailed explanation that is more relevant to our hobby, building cabinets. One of the lads in the Lodge says that growing leads to carpentry LOL.

Here is an excellent fan sizing guide from Grainger Fans who produce the Dayton line which many cab builder use.

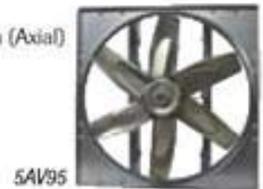
[http://www.grainger.com/images/vent\\_fundamental.pdf](http://www.grainger.com/images/vent_fundamental.pdf)

## Propeller Fans and Duct Fans

**Propeller Fan (Axial Fan)**—An air moving device in which the air flow is parallel or axial to the shaft on which the propeller is mounted. These fans have good efficiency near free air delivery and are used primarily in low static pressure, high volume applications. As SP is increased, HP increases and CFM decreases. Usually mounted in a venturi, ring, or other housing featuring simple construction and low cost.

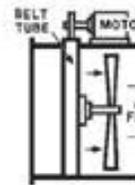


Propeller Fan (Axial)



5AV95

**Duct Fan (Tubeaxial)**—An air moving device in which the air flow is parallel or axial to the shaft on which the propeller is mounted. The propeller is housed in a cylindrical tube or duct. This design enables duct fans to operate at higher static pressures than propeller fans. Commonly used in spray booth and other ducted exhaust systems. As SP is increased, HP increases and CFM decreases.



Duct Fan (Tubeaxial)



3C411

## Centrifugal Blower

Centrifugal blowers are air moving devices in which the air flow is perpendicular to the shaft on which the wheel is mounted. The wheel is mounted in a scroll-type housing, which is necessary to develop rated pressures. The four classes of centrifugal blowers are determined by wheel blade position with respect to the direction of rotation. As SP is increased, HP and CFM decrease.

### Forward Curve (FC)

The tips of the blades are inclined in the direction of rotation; the most common type of centrifugal blower. Normally used in residential heating and air conditioning systems and light-duty exhaust systems where maximum air delivery and low noise levels are required. Capable of pressures up to approximately 1 1/2" SP.



Forward Curve



5C094

Forward Curve

### Backward Incline (BI)

The tips of the blades are inclined away from the direction of rotation. Used in commercial/industrial, heavy-duty heating/cooling systems that require heavy-duty construction, non-overloading characteristics and stable air delivery. These blowers operate at higher efficiencies than forward curved blowers. Not as quiet as forward curve blowers because they operate at higher speeds. Can be used in systems up to 3" static pressure. Smaller diameter wheels are supplied with flat blades; larger diameter wheels are supplied with air foil blades to improve efficiency.



Backward Incline



3C074

Backward Incline

### Radial Blade

Has straight blades that are, to a large extent, self-cleaning, making them suitable for various kinds of material handling and particle-and-grease-laden air. Wheels are of simple construction and have relatively narrow blades. They can withstand the high speeds required to operate at higher static pressures (up to 12") but usually are noisier than FC or BI blowers.



Radial

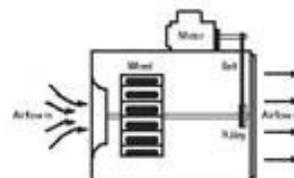


3C108

Radial

### Inline (Square Centrifugal Fan)

Air flow is developed as in a centrifugal blower, but after leaving the impeller the air is contained in a square housing and, by means of turning vanes, is discharged in an axial direction. Employs single-inlet centrifugal wheels, usually with backward inclined blades. The square centrifugal fan has performance characteristics similar to a centrifugal blower and the compact physical configuration of the tubeaxial fan. Can be vertically or horizontally mounted, thus providing a simpler installation by minimizing need for duct turns and transitions.



Inline



5AV78

Inline

I found an ventilation engineering course on the EPA website. There is a wealth of information here but it is very technical.

[http://www.epa.gov/air/oaqps/eog/bces/toc/full\\_toc.htm](http://www.epa.gov/air/oaqps/eog/bces/toc/full_toc.htm)

This site has some good info too

<http://www.mil-embedded.com/articles/id/?3281>

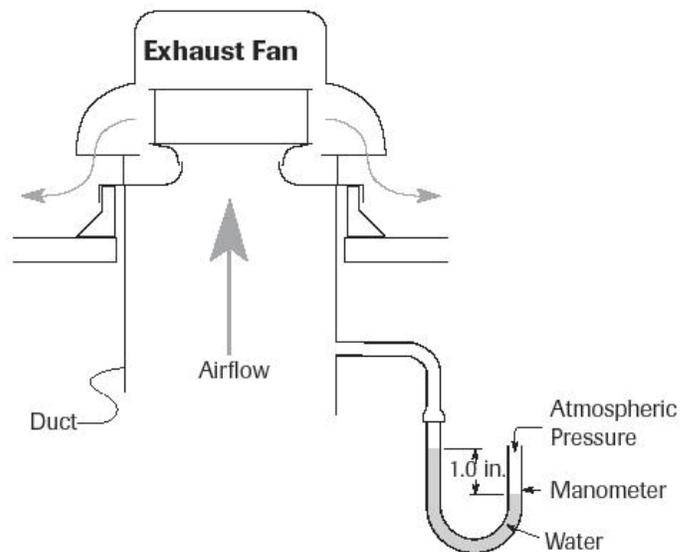
Fans are a pressure producing device which are basically an air pump. Air flow is created by the fan's pressure. It doesn't take much pressure to move air which has little mass compared to water or hydraulic fluid. Air pressure is measured in Inches of Water which are 1/28 of a pound per square inch.

Computer Fans (Axial) produce about 0.2 inches of water pressure and are ideal for unrestricted blowing. They can move a lot of air, but don't block them up.

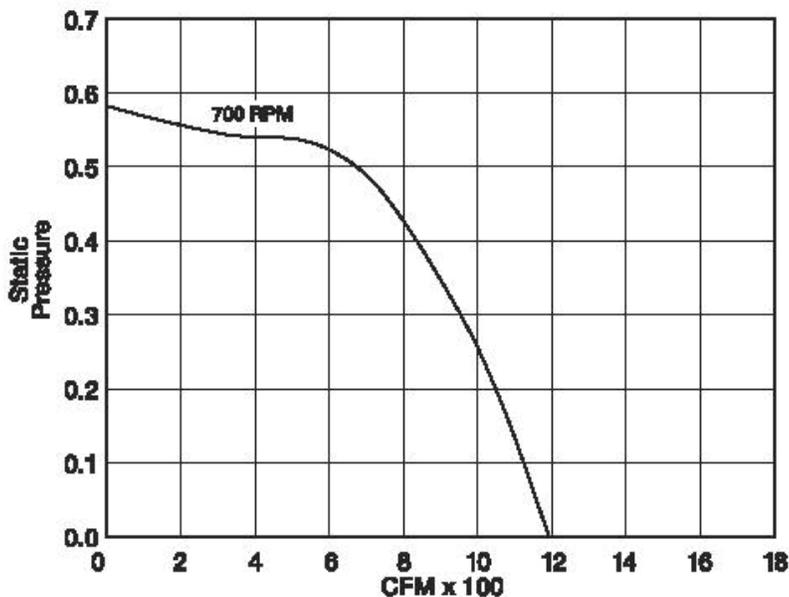
Centrifugal Blowers produce more pressure than an axial fan. Typically the ones used by most cab builders produce about 0.5 inches of water pressure and will work with more static pressure such as scrubbers. The shape of the fan blades make a big difference in the pressure produced by the fan.

Industrial blowers will produce much higher pressures but they require multiple horsepower motors to drive them.

Static Air Pressure is measured with a manometer which is just a U shaped tube filled with water. This picture shows the manometer measuring the intake side of the fan which has 1 inch of water pressure. If you stick a ruler next to the tube one side is 1" higher than the other.



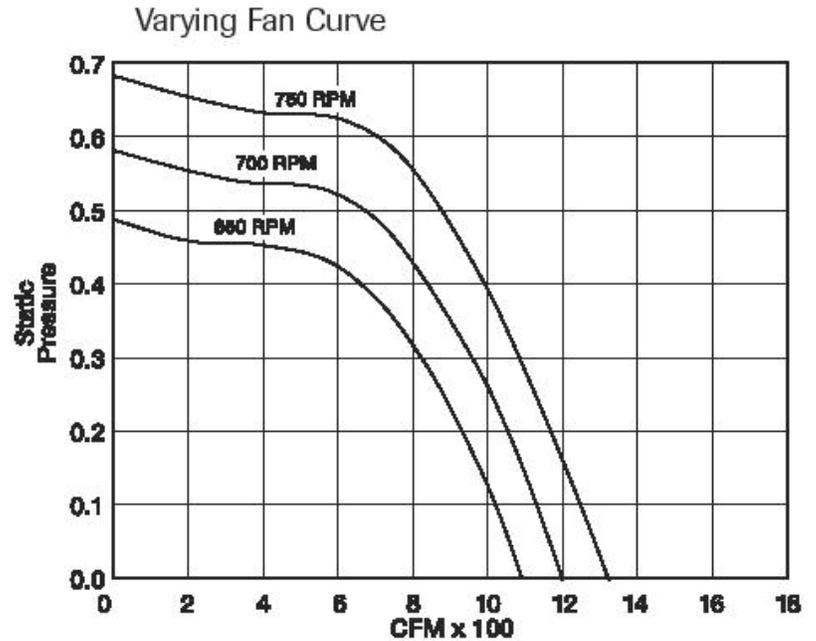
Fan Curve



Every fan manufacturer can provide you with a fan curve for your fan which is produced by operating the fan with various static pressures and taking flow measurements. All they do is put a variable damper on a duct and move it from fully open to fully closed.

This fan curve is for 1200 CFM fan that will produce 0.6 inches of water pressure. When the fan is fully blocked, it creates 0.6 inches of STATIC PRESSURE and 0 CFM AIR FLOW. When the fan is unrestricted, it creates 0 inches of STATIC PRESSURE and 1200 CFM AIR FLOW.

Now if you have a fan speed controller and can change the speed of your fan this is what happens at different speeds. The fan operates with the same shaped curve, just shifted outwards or inwards depending on speed.

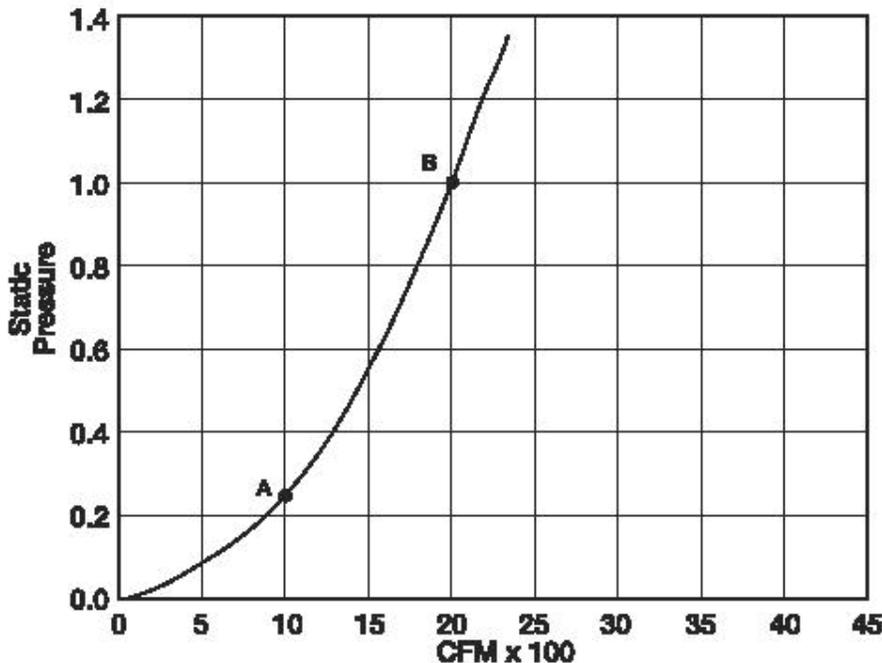


Every ventilation system can be described by a SYSTEM RESISTANCE CURVE where the static pressure and airflow are graphed together.

If you took a big fan and connected it to your growbox, then put a duct on the exhaust with a damper so the air flow could be adjusted, then measured the static pressure as the air flow is increased, this curve would be made.

Every "SYSTEM" has a unique resistance curve.

AIR FLOW =  $K * \text{SQRT}(\text{PRESSURE})$  where K is a unique system constant



Point A is my cab with an Axial Fan producing 0.2 in of static pressure and 1000 CFM of air flow (not too realistic eh!)

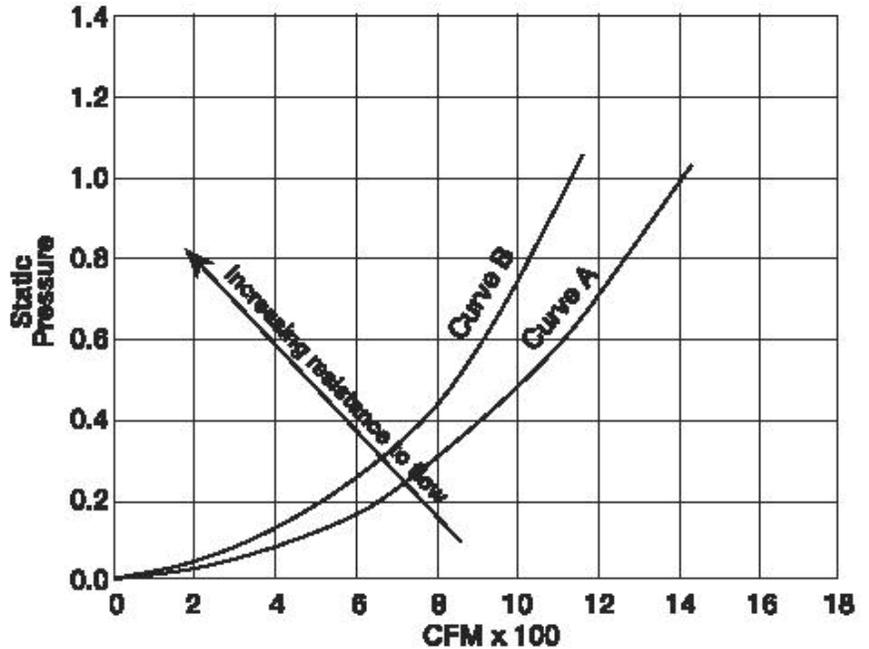
Point B is my cab with an Centrifugal Blower producing 1.0 in pressure and 2000 CFM air flow.

Now let's do something to our cabinet to change the system constant K. Let's say our cabinet has two intakes and Curve A is normal. If we block up one intake, we have changed our system constant K to a new number and we get Curve B.

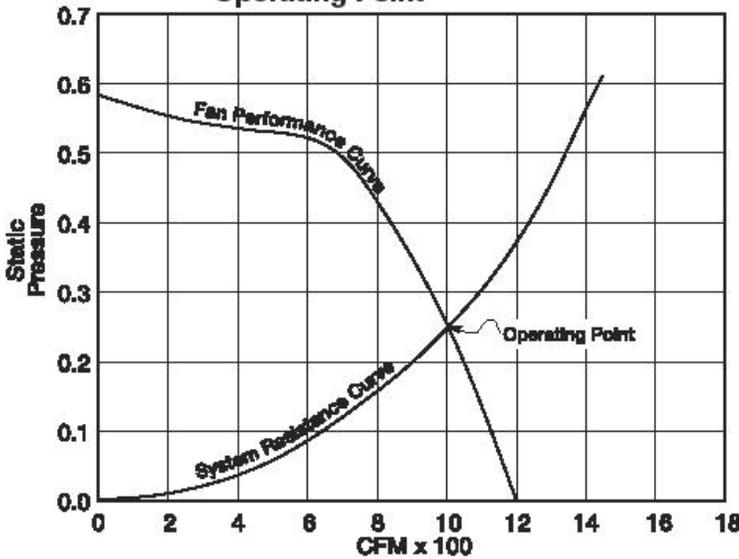
My cab with 2 intakes and an axial fan producing 0.2 in static pressure has an air flow of 700 CFM on curve A

My cab with 1 intake and the same axial fan at 0.2 in static pressure has an air flow of 500 CFM on curve B.

Changing the system will produce a new system curve and a new system constant K.



### Operating Point

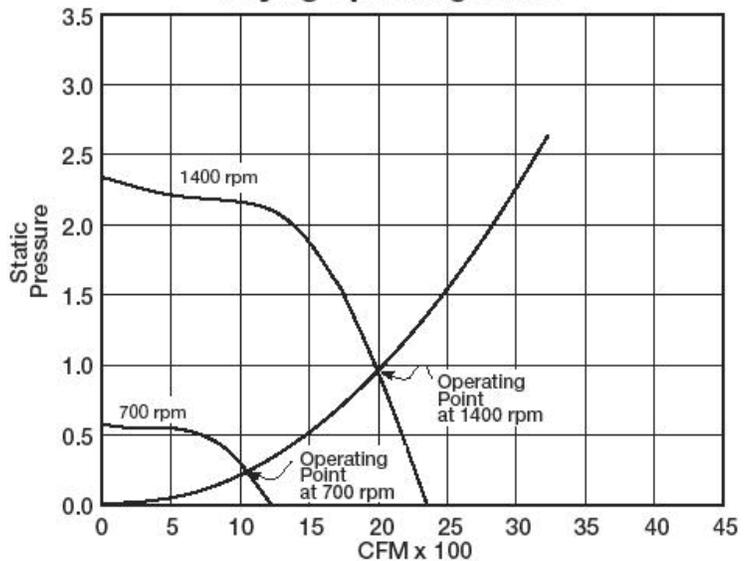


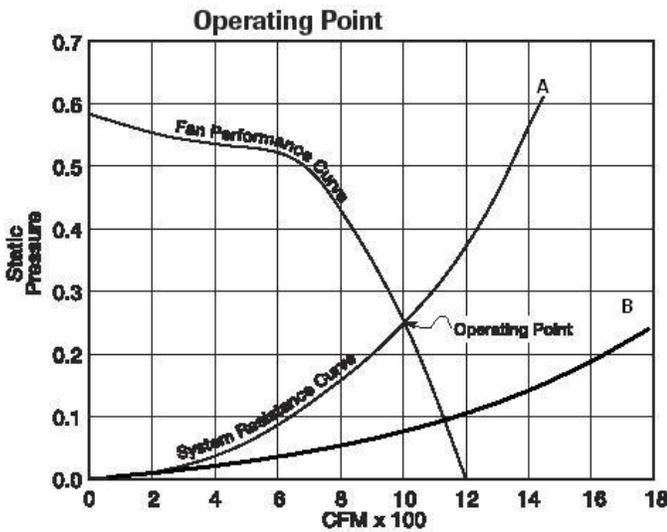
The Operating point is where the Fan Performance Curve crosses the System Resistance Curve. In this case a 0.6 in of Static Pressure and producing 1000 CFM fan is operating with 0.25 in of Static Pressure and producing 1000 CFM. The resistance of the system causes reduced performance.

STATIC PRESSURE WORKS AGAINST AIR FLOW AND IS CAUSED BY RESISTANCE

A new operating point is created by changing the speed of the fan without making any changes to the system. This is the same as upgrading from a low performance fan to a heavy duty industrial type.

### Varying Operating Points





Changing the System Resistance moves the operating point along the Fan Performance Curve. In this example I cut a new intake and reduced the System Resistance from Curve A to Curve B that increased air flow from 1000 to 1150 CFM. A while back I threw out a simple formula for calculating air flow. Here's a better calculation that takes Area into consideration.

$$CFM = K * \text{SQRT}(\text{PRESSURE}) * \text{AREA}$$

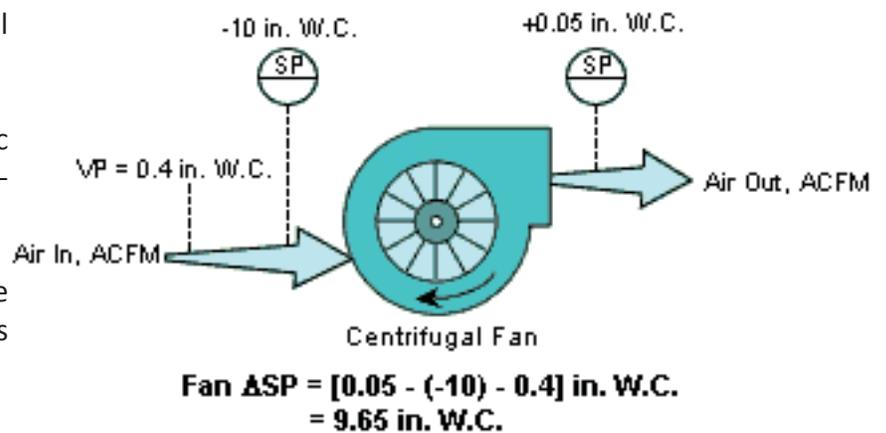
What's interesting is that doubling the intake area will double the air flow. You have to change the pressure produced by a fan by 4 times to double the air flow. If you want to improve your cabinet, adding intakes, increasing duct size and adding more surface area to scrubbers is the way to increase air flow.

So what actually makes the Air move? All a fan does is makes a difference in pressure between the intake and exhaust. Let's call this the Total Pressure.

Resistance to the air flow is called Static Pressure and what's left over is called Velocity Pressure.

It's the Velocity Pressure that pushes the air. The Static Pressure is best described as pressure losses in the system.

**Figure 1. Static Pressure Rise (ΔSP) Across a Fan**



$$\text{TOTAL PRESSURE} = \text{STATIC PRESSURE} + \text{VELOCITY PRESSURE}$$

or another way to look at it is:

$$\text{VELOCITY PRESSURE} = \text{TOTAL PRESSURE} - \text{STATIC PRESSURE}$$

Static pressure is your enemy in a good ventilation system. If you find your cabinet door hard to open, then you have high static pressure. If you open your cab door and the air flow from the exhaust increases, then you need more intake area.

The fan curve is useful for converting static pressure readings into actual airflow.

Let's say I have a nice fan that is rated at 0.5" WC. Measuring the static pressure at the exhaust I find 0.05" WC and the static pressure at the inlet is 0.25" WC which would give me a Total Static Pressure of 0.3 and an air flow of 950 CFM.

The velocity pressure would be  $0.5 - 0.05 - 0.25 = 0.2$ "

## Duct Air Flow

Here's the full formula for calculating the air velocity in a duct knowing the Velocity Pressure

velocity =  $4005 * \text{SQRT}(\text{velocity pressure}) * \text{SQRT}(0.075/\text{air density})$  where 0.075 is the density of air at 68°F

Let's ignore air density for now.

$$v = 4005 * \text{SQRT}(V_p)$$

To calculate the air flow in a duct

$$v * A = 4005 * \text{SQRT}(V_p) * A$$

with velocity in ft/min and area in square feet

$$\text{Flow} = 4005 * \text{SQRT}(V_p) * A = \text{Airflow in CFM (cubic feet per minute)}$$

### Static Pressure Losses

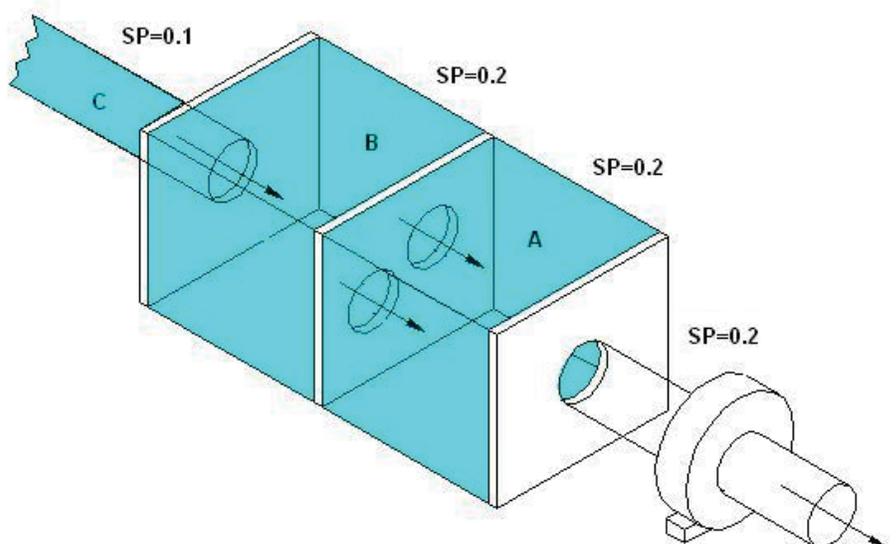
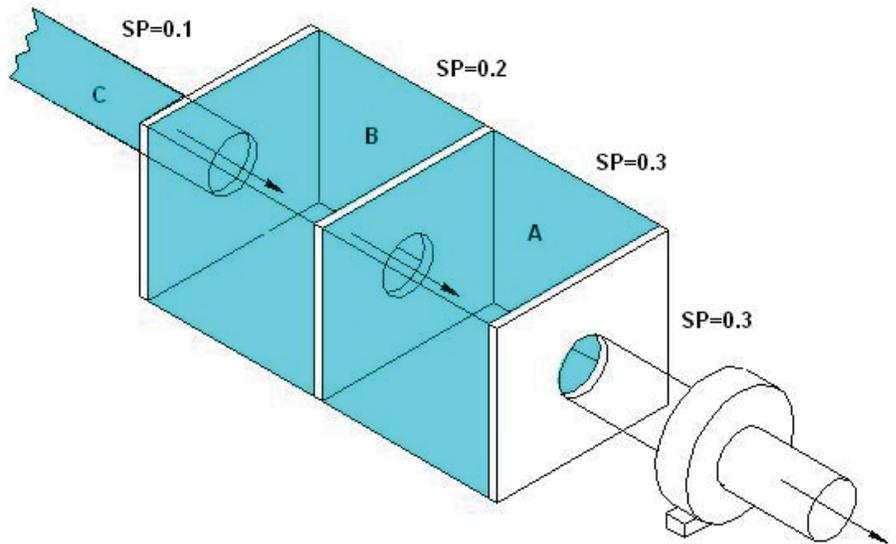
Now let's say I have this growbox with two chambers and some inlet and outlet ducts connected to a 0.5" 1200 CFM Fan. The Total Static Pressure at the fan is 0.3" which will give me a flow of 950 CFM using the fan curve.

The  $V_p$  is  $0.5 - 0.3 = 0.2$

The Total Static Pressure loss for the system is 0.3" which is 0.1 for the inlet air ducting, 0.1 between chamber B and A and 0.1 between A and the outlet of the fan.

Now let's try to improve the airflow between chamber A and B by adding a second vent.

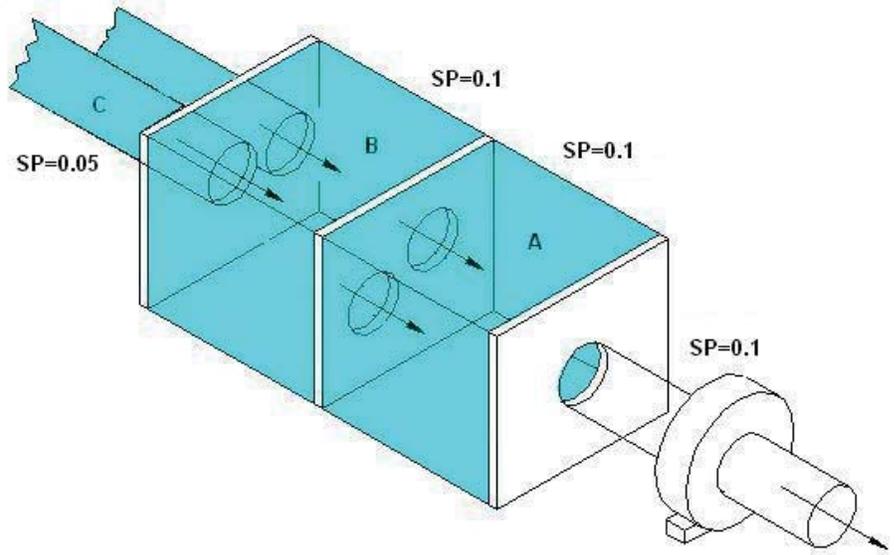
Wow, the static pressure in chambers A and B are the same so there is no more loss and it also dropped the static pressure at the fan inlet to 0.2". Going off the fan curve the airflow increased from 950 to 1050 CFM with the velocity pressure increasing from 0.2 to 0.3.



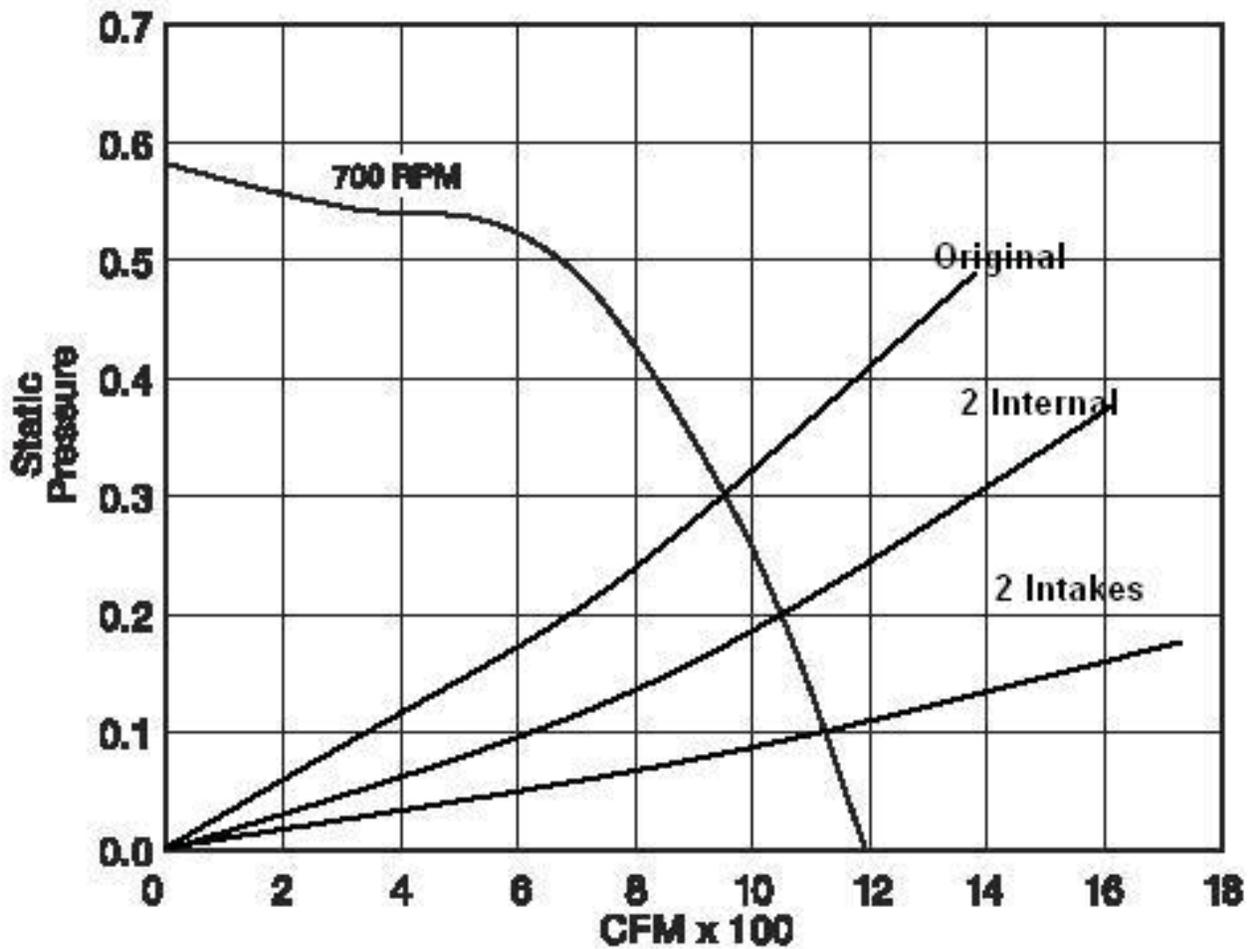
Let's add a second intake. This reduces the Sp down to 0.05" in each intake duct and drops the Sp down to 0.1" at the Fan.

The overall airflow is improved to 1125 CFM which is almost the full rating of the fan at 1200 CFM.

In this example by removing an internal restriction and opening up the intakes, the airflow was improved from 950 to 1125 CFM.



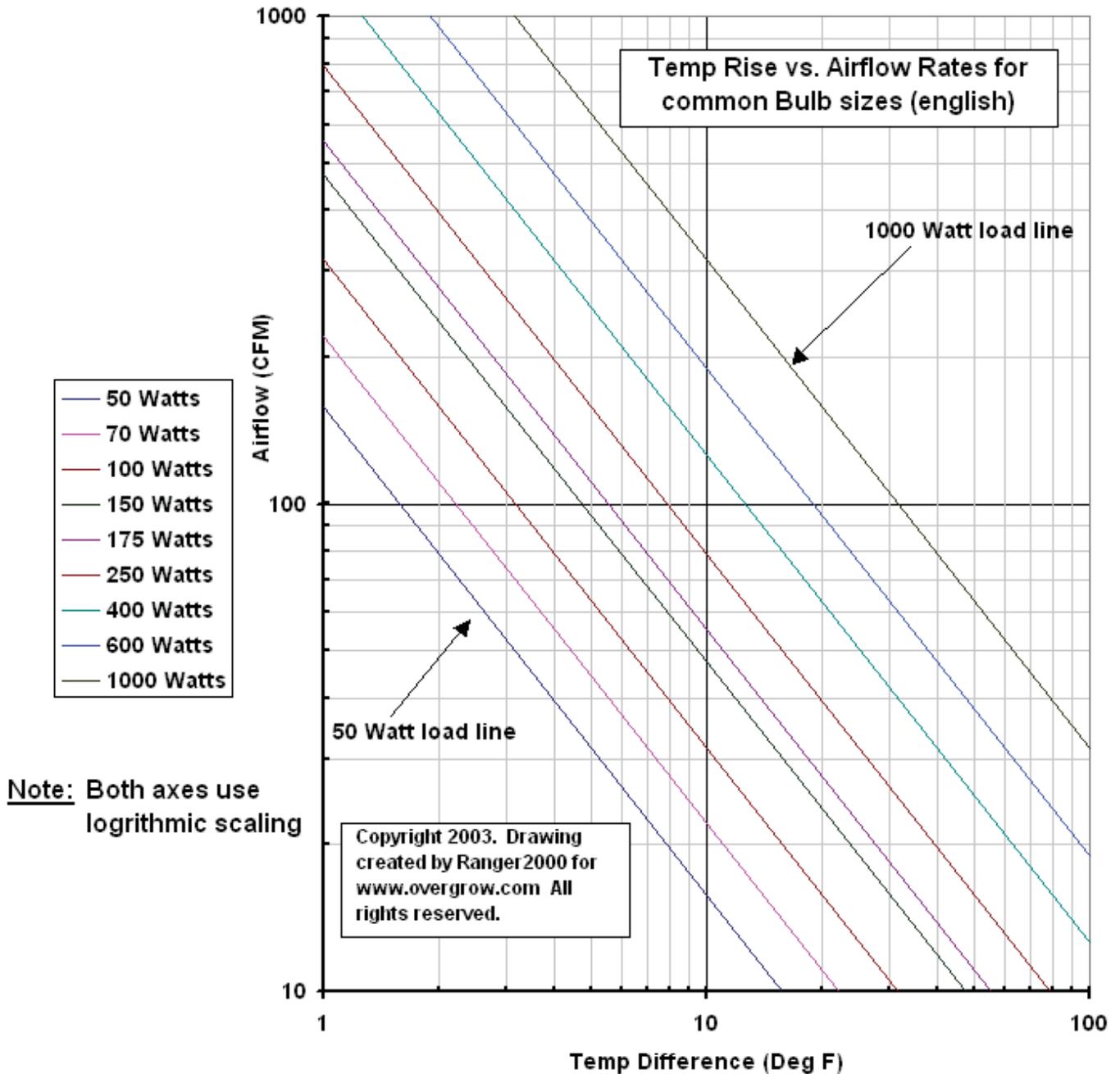
Fan Curve



This is the handiest chart that I've ever seen. It's based on a cooling formula that I've come across in a few places during my research.

$$\text{CFM} = 3.16 * \text{Watts Dissipated} / \text{delta T}$$

Where "delta T" is the change in temperature in degrees Fahrenheit.



If I had a dollar for every time someone asked how many CFM's do I need for my Cabinet....

I picked up this graph a long time ago and have verified it against a ventilation program for cooling electronic cabinets. This chart is for the airflow needed to cool a simple cabinet with just a light bulb and enough intake area not to cause any static pressure loss.

Cooling lights and providing ventilation for your plants are two different things. One air exchange per minute is all you need to keep your plants happy. Measure your grow box in feet and multiply height x width x length and that's the CFM you need for one air exchange per minute.

A has an inline scrubber blocking the air flow (VERY BAD)

B is a growbox with not enough intake space (POOR)

C is an unrestricted fan cooling your grow box with negligible Static Pressure losses (EXCELLENT)

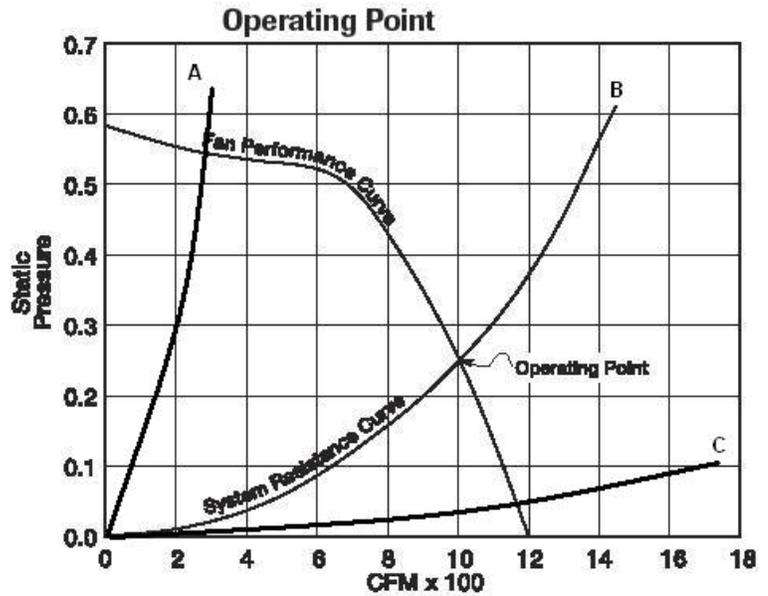
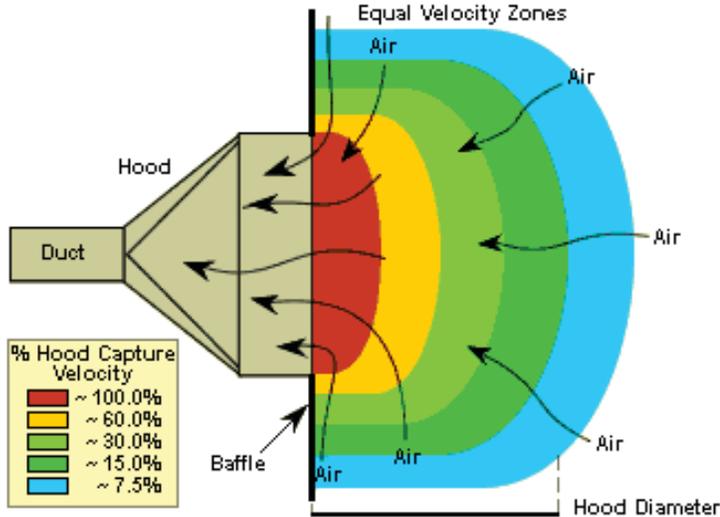


Figure 3. Beneficial Effect of Side Baffles on Hood Capture Velocities



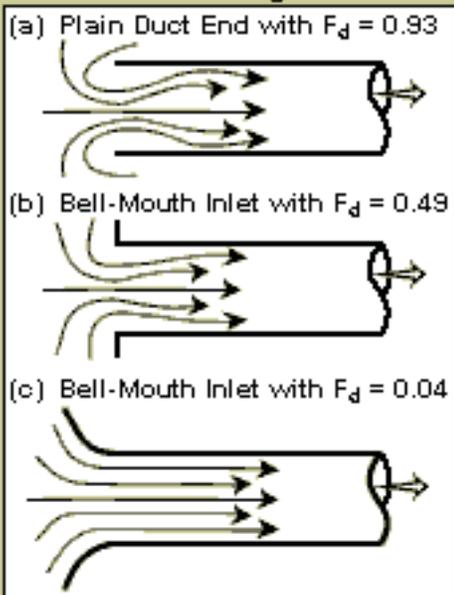
At an intake to a duct, Static pressure inside the duct is converted to Velocity pressure which makes the air move.

$$\text{Air Flow (cfm)} = K \sqrt{\text{SP}} * \text{Duct Area}$$

Now all the air around your intake is sitting still and it has to be pulled into the intake and accelerated up to the velocity of the air travelling in the duct.

All the air being pulled into the inlet causes an effect called the vena contracta. Some of the air around the inlet isn't moving at all while some of the air is compressed and expands as the velocity pressure is converted to static pressure.

Figure 3. Hood Entry Loss Coefficients ( $F_d$ ) for Various Duct Designs



converted to static pressure. The duct static pressure and entry losses are related to the size of the vena contracta. The shape of the intake is very important in reducing the hood entry losses.

$$Sp = (1 + F_d)V_p$$

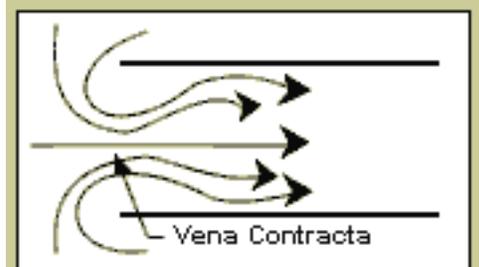
$$V_p = Sp / (1 + F_d)$$

$$\text{Assuming a } F_d \text{ of } 0.96, V_p = Sp / 1.96 = 0.5 * Sp$$

So the Velocity pressure is only 1/2 the Static pressure with the so effectively we are losing 1/2 our air flow at the entrance to the duct.

The way to combat Static Pressure losses at the intakes is to reduce the Velocity of the air at the intake by increasing the area of the intakes.

Figure 2. Air Flow Convergence in a Duct



### Intake Sizing

Sizing intakes causes people lot's of grief so here's all the work done for ya.

$$A = \pi * \text{radius} * \text{radius} = \pi * \text{radius}^2 \text{ m} = (\pi * \text{diameter}^2) / 4$$

Areas for common duct and pipe sizes

Diameter-----	Area
Inches -----	Square Inches
1-----	0.8
2 -----	3.1
3 -----	7.1
4 -----	12.6
5 -----	19.6
6-----	28.8

### Intake Calculator

Exhaust-----	Intake-----	Square-----	# of-----	# of-----	# of
Inches-----	Area-----	Hole-----	1" PVC-----	2" PVC-----	4" PVC
4 -----	25.2-----	5"x5"-----	32-----	8-----	2
6 -----	56.6-----	8"x8"-----	70 -----	18-----	5

Don't assume that a 4" exhaust needs four 1" inch PVC intakes. You really need 16 to match the exhaust area and up to 32 to make it work right.

### Darkroom Vents

I see lot's of guys using darkroom vents which are an excellent way to light trap the intake. From my observations, it appears that they are an obstruction to the airflow and seem to cut the air flow down by 1/2.

### Noise

Let's make some noise about noise. Our ears are some pretty special instruments that can pick up very faint sounds to all the way to a rock concert at over 100 db. Noise level is computed using the formula  $10\log(\text{Sound Pressure Level})$ . What's important to know is that every 3db difference in sound is double the noise. Every 10db difference is 10 times the noise. A 100 db rock concert is 10000000000 times louder than a whisper.

Another measurement to know about is SONNES

1 Sonne = 40 db and 4 Sonnes = 60 db where each sonne is 5 db starting at 40 db.

Bathroom fans are measured in Sonnes to make it easy for the average shopper to compare noise levels. A high quality bathroom fan runs 1 sonne and most of the cheaper ones are 3 sonnes or about 55 db. Computer fans are very quiet at 20-30 db compared to bathroom fans at 55 db or centrifical fans at 60-70 db.

While we are talking about noise, a big source of noise in ventilation comes from the rushing sound of the air itself.

Air Flow is the velocity of the air in ft/min \* the Area of the duct flow in square feet.

$$\text{Cubic Feet per Minute} = (\text{ft} * \text{ft} * \text{ft}) / \text{min}$$

I just helped out a friend that has a 440 cfm fan hooked up to a 4" duct and he can't stand the noise of it.

My suggestion is to increase the duct size or connect the duct to a large cardboard box to drop the air speed down while maintaining the air flow rate. This is the basic technology behind a muffler or silencer. Increase the area of the ducting to drop the airspeed. Add a grill or grid to even out the flow of air to reduce turbulence and the noise will be significantly reduced.

Air Flow Rate	Duct Size	Area sqft	Velocity fpm	Velocity mph
440	4	0.09	5045	57
440	6	0.20	2242	25
440	8	0.35	1261	14
440	10	0.55	807	9
440	12	0.79	561	6

Case Study

One of the key features of a good growbox design is fitting a carbon scrubber to the ventilation system. Let's take a look at CANFAN's stuff. They publish decent spec's with their equipment. I'd like to fit a 6" CANFAN which is rated at 269 CFM with 1.5" WC pressure. This is a workhorse of a fan. [http://www.canfilters.com/fan\\_metal\\_home.html](http://www.canfilters.com/fan_metal_home.html)

Now let's get a nice CANFILTER 50 that's rated at 420CFM @ 0.75"WC. [http://www.canfilters.com/canfilters\\_50.html](http://www.canfilters.com/canfilters_50.html)

Hey this sounds pretty good, I think I can get 270 CFM out of this combo, maybe? Well let's take a look.

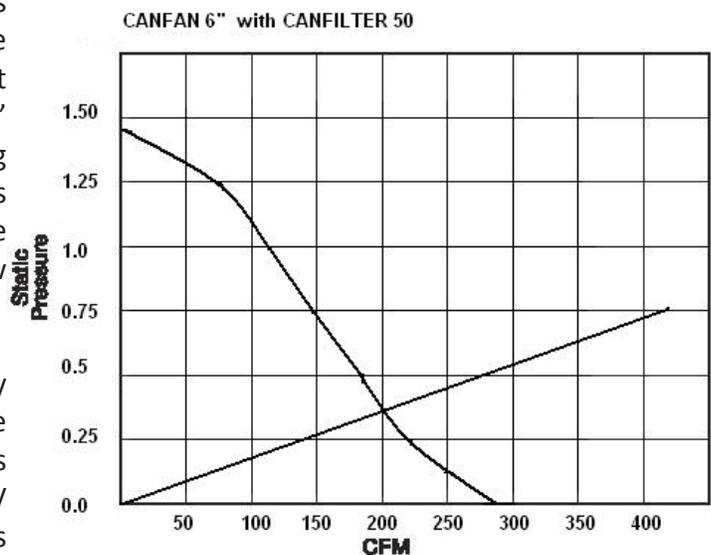
The operating point for the 6" CANFAN/50 combo is around 200CFM. Canfan says 210 CFM so that's close with about a 25% loss due to the scrubber. So what gives, the filter is supposed to give 420CFM @ 0.75" and we have a 1.5" Fan, how did we end up running at 50% of the scrubber and 75% of the fan? This is where the fan curve is needed to see how both these components make a system where the actual airflow is the operating point where the two curves cross.

Let's hook this puppy and see what happens. Holy cow this thing is loud. No wonder, look at the noise spec. 6 Sonnes, that's like 70 dB. Look up 70db, its a vacuum cleaner loud or the same as radio or TV music. And that's the noise of the fan, the fan spec's don't include the air rushing though the ducts either.

Am I happy? Let's see I just spent at least \$300 on this stuff, my cabinet is 90\* and I can here this thing on the street.

So what are my options. Add a speed controller, box runs hotter. Get a quieter fan, if it's less that 1.5"WC, the box runs hotter. Downsize the lights? Leave the door open? Every growbox you see fitted with a scrubber/fan combination is using this brute force approach to the ventilation. This is caveman engineering by Fred and Barney.

An alternative is to run unrestricted quiet fans to cool the lights. A high airflow, low noise computer fan will run with 15-25 db which is whisper quiet compared to this hoover. Add a second small fan pushing through a small scrubber and you're set. Cool, quiet and smell free.



## Putting Fans in Series vs. Parallel

One of the challenges in building a good ventilation system is to get the right amount of airflow. If you're stuck and you need to add or replace a fan, many times it doesn't quite work out.

One of the reasons is that the Air Flow is proportional to the square of the Pressure. Adding a second fan will not double the flow but will increase it by square root of 2, (1.41), or by about 40 percent. To double the Air Flow requires four times the Pressure.



There are two ways to add a second fan and they have completely different effects on the system. The first way is to add a second fan inline with the first. The fan curve is the single fan curve with the pressure doubled at the same flow rate value.



The second way is to add a parallel fan. This doesn't boost the pressure at all but doubles the air flow at the original fan curve pressure value.

Now let's see a fan curve comparison of these methods.

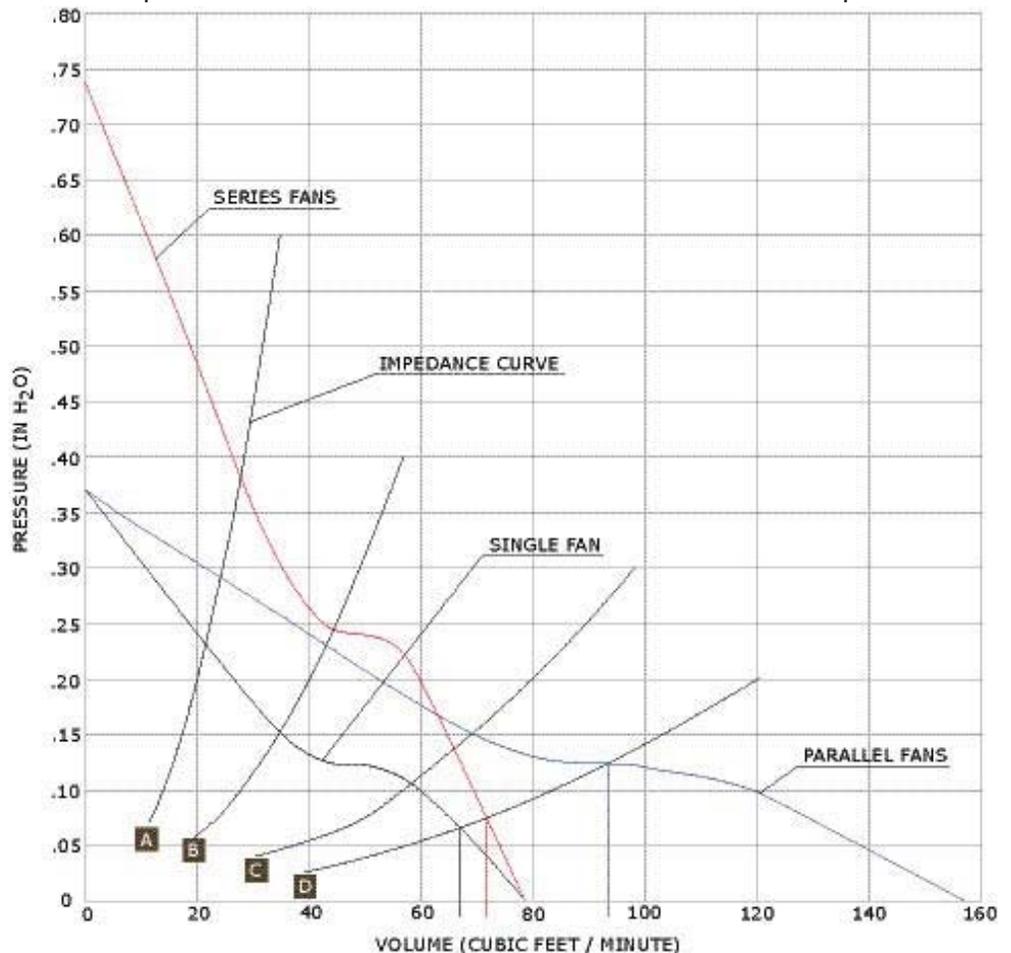
System A is very restricted. We can see that the air flow improves quite a bit with series compared to parallel.

System B and C are less restricted and the improvements in air flow are similar between series and parallel.

System D is an unrestricted system with the parallel fans providing a significant improvement over the series fans.

I did a little experiment a while ago with 4 computer fans. I connected them in series and boy did they ever make a good amount of pressure and they were pretty quiet too. Each computer fan can produce 0.2" static pressure. Four in series will produce the same pressure as a Dayton blower at 0.75". The noise of a computer fan is around 20 db with the noise doubling every 6 db so four fans would make about 38 db of noise which is way quieter than some of the noisy blowers that start at 65-70db.

This thread was originally posted on the icmag.com forums. Post have been edited for conciseness and clarity.



# Stealth Mother Chamber

By justanotherbozo



As I haven't posted here in some time, and as I just completed my new micro mother cabinet, I thought I'd share the construction details hoping maybe to inspire the noob's.

Anyway, I'm sure no-one will mind if I make this thread mostly pictures as I believe they are self-explanatory.



As you can see, this is “justanother” dresser conversion cabinet. Note that I’ve created a chamber within the dresser. My goal was a sealed “room” that would be muffled by the styrofoam between the inner and outer walls.

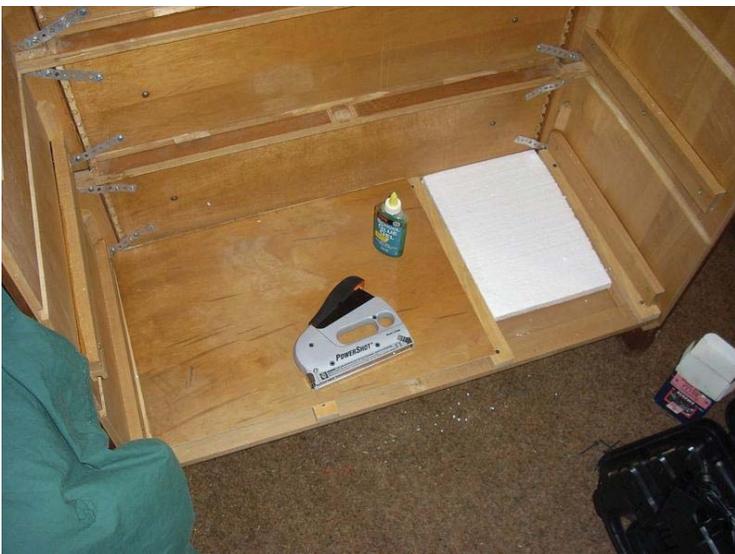


Photo #12 >





Here is the light I bought for the cabinet. It's a 2 foot T5 HO fluorescent fixture that runs four 24 watt bulbs (I'm using 3 blues and 1 red) for a total of 96 watts. These next photos illustrate my mounting solution. You'll note the notch I left in the Styrofoam to receive the excess power cord from the light.





*Looking great! So the top light fixture will swivel open for access to the cabinet?*

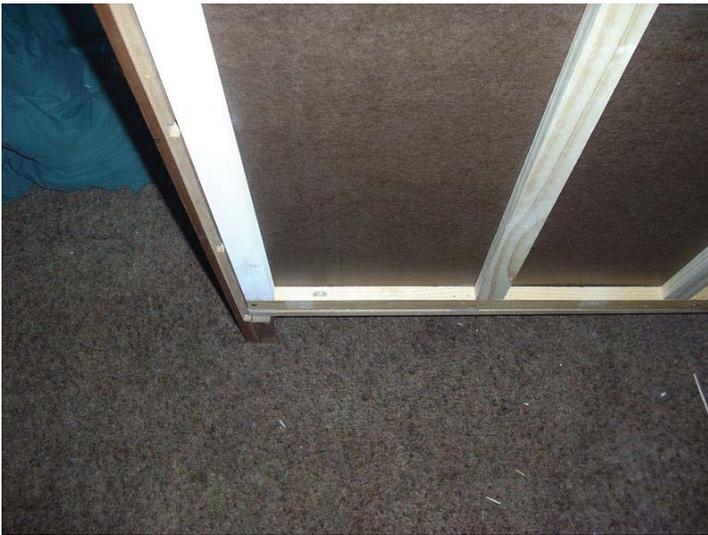
Thanks man and yeah, the top opens kinda like a foot locker. Here's the pictures to illustrate. Note also the chains I've used to keep the top from opening too far.



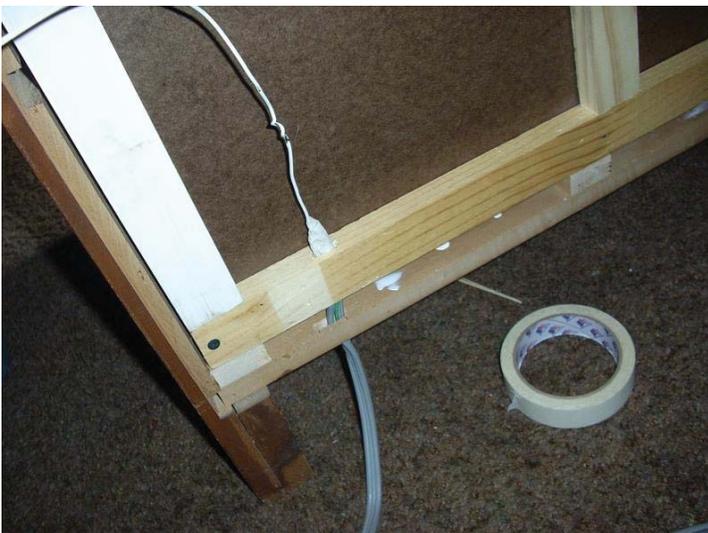
These photos show the beginnings of the exhaust. I built this little box to bump the fan deeper into the cabinet in hopes of further muffling fan noise. Truth is, with the fan situated as it is and with the foam insulation between the inner and outer walls, it is pretty damned quiet!





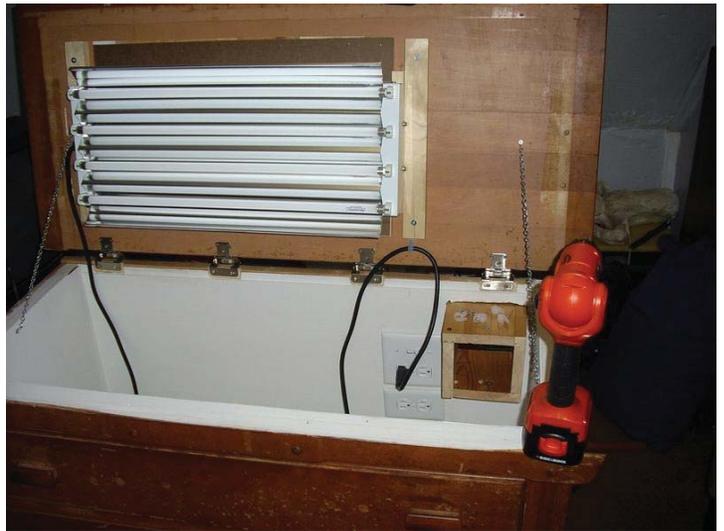
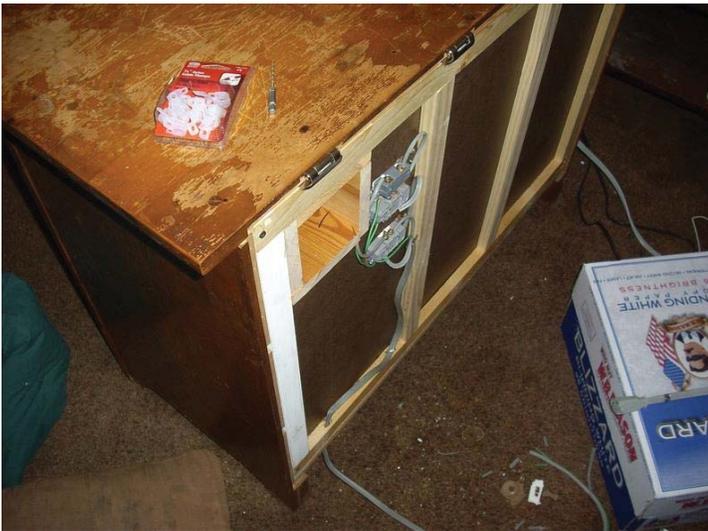


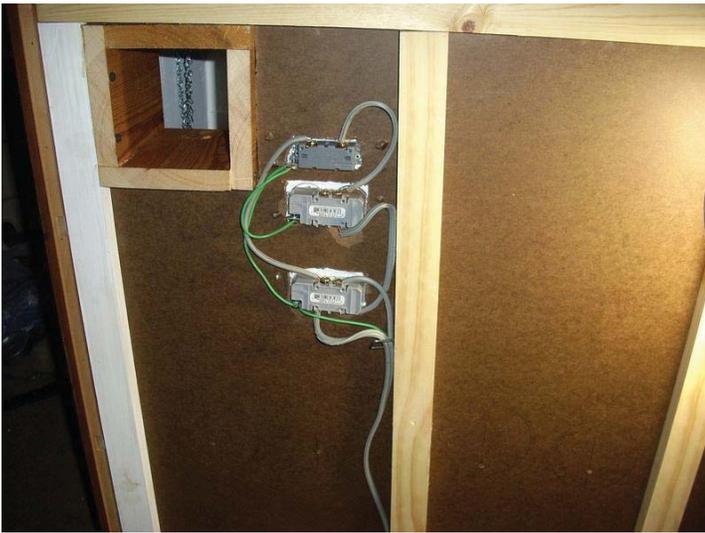
Here you can see why I drilled out the hole that was illustrated in photo #12.



Because this is a stealth cab, I wanted the electricals to be hidden.

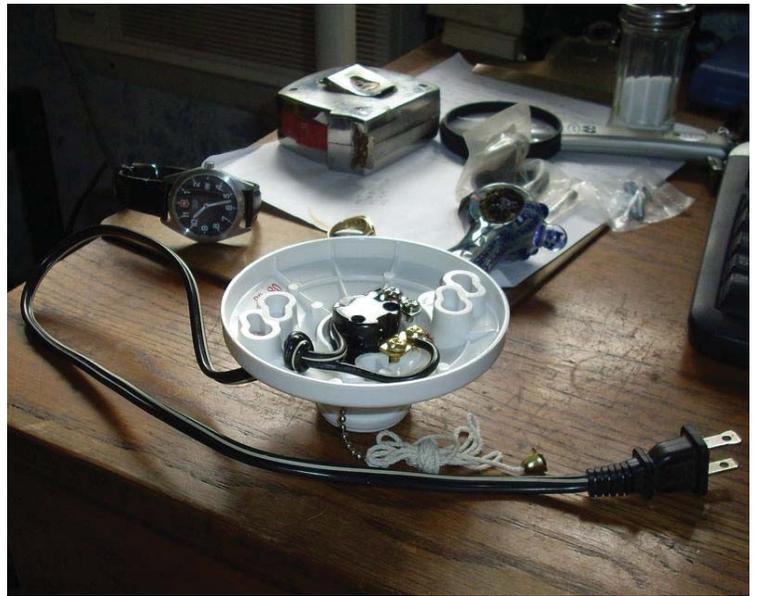
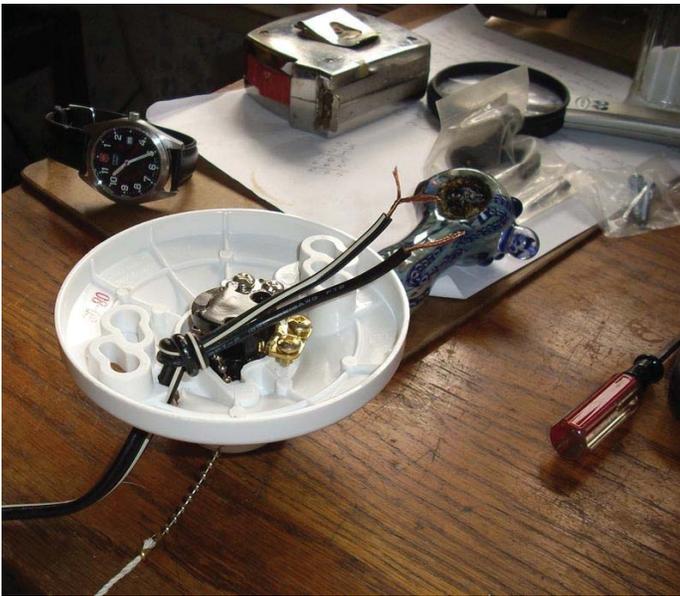






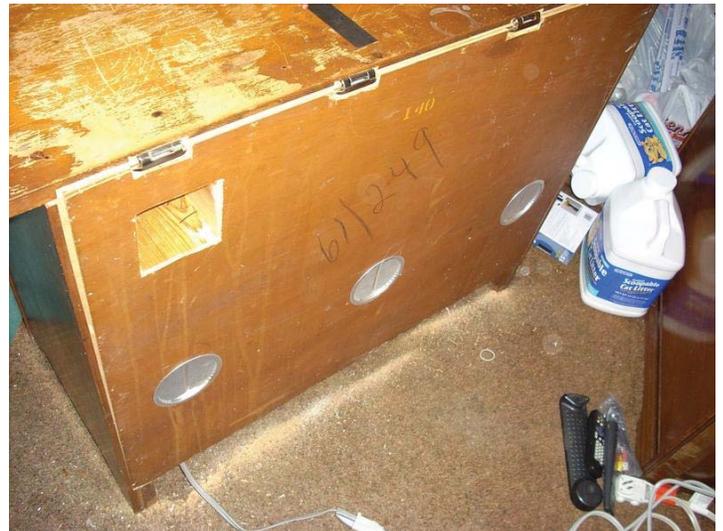
Note the 1 red bulb and 3 blues







Here's a few more pics to show the intakes.



***How are you tackling the light leaking from the exhaust and inlets?***

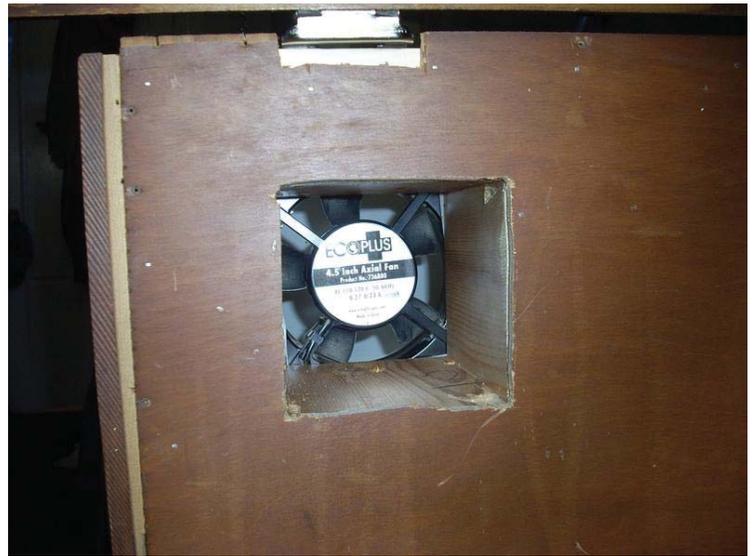
Well, it isn't enough to bother me, plus it's easy to hide. All I do is put some laundry on top and, unless you go looking, you'd never know it was there. Not only that, I'm just another old guy and I don't get much company so there just aren't that many people here that could notice. Otherwise, I'd use a darkroom louver.





That black fabric is the stuff you use to keep weeds out of your garden. It doesn't block out all the light, but it helps, plus, it filters the intakes.







Note the two PC fans for circulation.

***A random question...The dark, laminate stuff that is on the inside walls, did that have a strange smell to it before painting? I have something that looks VERY similar (it was really cheap) but the smell is making me doubt using it.***

First, that isn't a laminate, it's more like particle board as it appears to be some sort of compressed board. It's used a lot as backing material for cheap furniture and I'm pretty sure they call it 'masonite'. It's the same stuff they make pegboards out of, just without the holes. It did have a bit of an odor to it but I put several coats of paint on it and it no longer smells.

What I did was to take some flat white ceiling paint I had laying around and thin it with water so I could use it as a primer, I wanted it to soak in good. Then I put two coats of an elastomeric paint that is designed for patching roofs and such on trailers and whatnot. Next I took some of the flat white paint and mixed it in with the elastomeric paint, which btw is also white, mainly to thin it as the elastomeric paint is thick! Anyway, I then put two coats of that on as my final finish coat. The elastomeric paint is rubberized so it's waterproof, plus, it's mildew resistant. Another thing worth noting is that it's cheap at about \$15.00 USD per gallon.

***Are you using just one Axial computer fan for your exhaust? It looks like the purpose of your other one is to circulate the air inside.***

That fan isn't a PC fan, it is an axial fan, but it's 4.5 inches. So it's bigger than a PC fan, plus, it comes wired for 110 volts (I think it's rated at 112 cfm). If you look close, you'll see there are two PC fans in there for circulation. One to the right and one to the left.

***Is that one fan powerful enough to ventilate that entire dresser?***

Yeah, so far at least, it seems to be doing an admirable job, my temps are running in the mid to high 70's.

***Can you get those fans at local stores or did you have to order it?***

I bought the axial at a local grow shop for about \$30.00 USD. If you look online I'm sure you can find a wide assortment of sizes, cfm's and prices.

***It doesn't look like you have any odor control for this. I guess you will only need that for flowering?***

Actually, while it doesn't reek like flowers, it does have a distinct aroma. I'm thinking I'll try that activated charcoal fabric they make for air filtration units. I'll just cut it to size and use Velcro to hold it in place.

***I see you built a little wooden ventilation box for your fan, this reduces the sound? Would that fan really be noisy if you had just placed it directly inside the square cut hole, without any inner box?***

I haven't run it without that box so I don't know if it really makes a difference or not. What I do know is it's pretty damned quiet.

This thread was originally posted on the icmag.com forums. Post have been edited for conciseness and clarity.

# Grow With Wisdom - The First Two Weeks

By Soma

I truly love cannabis, and if you love cannabis the way I do, you too can grow this sacred plant. Don't let fear hold you back. Don't let politics hold you back. Approach this sacred plant with wisdom, and it will truly help you grow. In this article I'm not going to go into extreme detail explaining how to build your grow room, that will come later. As for now I assume you have one. I will however go over some important points to consider. Your neighbors; try your best to get along with them, at the same time being low key and not drawing unwanted attention towards yourself. Electricity; make sure you have safe wiring, good fuses and you don't have water and electricity mixing anywhere. Light; make sure you have no light leaks, go into your room when the lights are out in the daytime and see if you can see 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.

Genetics; is a very important subject 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. 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 and keep best when kept in a dark, cool, dry place. Sprouting the seeds can be done 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 take a clear plastic cup and label it with the name of the strain you are going to germinate. Next put your seeds in and add a third of a cup of distilled water. At first the seeds will float on the top. Put your cup(s) in a warm dark place overnight. In the morning when you look in the cup swirl the seeds around with your finger and all the good ones will sink to the bottom. On close observation you will see that the seeds have slightly split open and have begun to germinate. They are now ready for planting.

You must use very mild, airy soil with a good moisture level. I prefer to use a tray with sixty jiffy peat pots, but small plastic pots work very well. When putting the seeds in the soil be very careful not to plant them more than two seeds deep. If 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 in them must be then placed in a well lit warm environment. 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 away from the top of the plants. When the seeds first start to break through the top of the soil, many times the outside of the seed will stick to the top of the plant and the stem. You can sometimes help it off the seedling with a very gentle lift from a 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 their beginning set of serrated leaves that we all know to be cannabis. 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 little plant standing up as straight as possible. After the 7th day I give the plants a mild mixture of a vitamin B1 and kelp seaweed, mixed with 3 ml per 10 liters bio-N27. This isn't totally necessary, but it definitely helps.

With all the little plants standing straight with their little wire supports holding them up, the tray of babies is kept growing under the light at 24 hours a day. The temperature that I keep the room at is about 27C. I find that the roots develop quickly under that temperature. The colder the room, the slower the roots will grow. You don't want to go above 27C either. The tray must be checked daily to make sure it doesn't dry out and can't be left too wet.

It needs a kind of happy medium between being too wet and being too dry. At the end of two weeks, the little plants are carefully transplanted out of the tray into small pots. The soil mixture that I use is a mix of 2 parts all-mix, 1 part cloning soil, and 2 parts perlite. I then water them from the bottom using a product called power thrive, a mixture of kelp seaweed and vitamin B1. I make sure to use a mild mixture. These plants can stay in these little pots for 7 to 10 days, before needing to be transplanted. Check your plants every day, quiet time spent communing with your plants can be found to be a very rewarding experience. By growing biologically you can make it a non-toxic, life enhancing project that will help expand your consciousness, green up your thumb, and give you some good exercise.

Happy gardening, Soma

Until next time, Keep it GREEN, LOVING and full of LIGHT.  
Peace, Soma

# Water Cure

By NiteTiger

## Heads Up:

Do not use the water cure on seeded bud - the seeds will try to germinate and die.

Place your buds into a container that will hold enough water to cover the submerged buds by at least an inch. I personally use a cooler with a drain spout. For the first 2 or 3 days, the buds will want to float, so you'll need something to hold them underwater. I use thin fry baskets to prevent from compressing the buds, but you can use anything that will hold them under, like a plate or even a board.

Keep the container in a cool, dark place, out of direct sunlight. Do not cover the top of your container. Mine sit in the back of my closet with the lid of the cooler open. Once a day, drain your water and add fresh water. Repeat for 7 days.

On the seventh day, remove the buds from the water, and dry. Because the buds are water logged, dehydrators are preferred for drying water cured buds, but not necessary. Standard hang drying is not recommended, due to the high water content making mold an extremely likely occurrence. I personally use a cake cooling rack, with a fan blowing across and under it.

Water curing robs your bud of its aroma, flavor, and, some say, bag appeal. It will, however, leave you with an extremely smooth, stealthy smoke. You can also expect a slight increase in potency, because the water cure does remove more weight from the bud. With a standard dry and cure, you'll generally see 25% of wet weight returned, whereas with a water cure, you should only expect about 15%.

Water curing, in my experience, is best used for 'Stealth Stash' and edibles. A significant portion of every one of my harvests gets water cured, because I'm more likely to reach for my 'Stealth Stash' than my jar cured, and also because I love edibles. Edibles with water cured bud don't have that telltale taste and smell, and I have smoked my stealth bud with police officers walking within arms reach.

Water cure is also excellent for crops that have not been properly flushed, or were over fertilized. Some have also reported using it to great success on moldy buds, but I do not recommend it - moldy buds should be extracted or trashed, period. **DO NOT SMOKE MOLDY BUDS, IT CAN CAUSE SERIOUS, LIFE THREATENING MEDICAL CONDITIONS.**

The water cure is just like every other tool in a gardener's arsenal - use it correctly and you'll love it, use it wrong and you'll hate what it does to your crop.

This thread was originally posted on the [icmag.com](http://icmag.com) forums. Post have been edited for conciseness and clarity.

# Harvesting With Soma

By Soma

Harvesting the fruit of any crop you have been working your heart and hands with, is a very fulfilling experience. With cannabis it is even more fulfilling. After all you are working with one of the main sacred plants on planet earth, harvesting it is definitely more intense than harvesting 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 a few important 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 an even better team of people you can trust and depend on, and you need some important tools of the trade. You need some pruning shears, some real sharp sturdy scissors, some type of clothes line type of set-up 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 your doing the manicuring.

The most important factor in a marijuana harvest is that it is not picked too early, I can't stress this enough, it is one of the main mistakes humans make when harvesting. I'm going to go over 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 when the harvest should be done. Try to avoid this mistake.

Don't look at the calendar except for knowing when the full moon and new moon are taking place. Harvesting by the calendar does not work well at all. Some people start seeds that are supposed to take a certain amount of time to finish their cycle, whatever the particular seed package say's, and as soon as that amount of time passes, they harvest. Harvest with your heart, let your heart guide you. Having let yourself become good friends with your plants, you are always looking at them just like a good human friend. In looking closely at them, that exact point in time when the green tomato turns red, or when the green banana turns yellow is noticed by you, the gardener with the green thumb. When the white hairs on the buds of your cannabis plants are not forming any longer, and all the places where the red hairs are, the calyx's, are becoming very swollen and many visible THC crystals can be seen it's time to harvest. To double check, smell the top of the plant, rub it with your fingers, 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.

Taking the pruning shears you cut the plant underneath the bottom branch, 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 clothes line, remember these plants are being hung in a smell proof room with a dry, cool temperature. Keep hanging your plants in a row being careful not to crowd them too much. It usually takes at least 10 days to 14 days to dry before you start the final manicuring. Now comes the part when you really need your trustworthy team of friends. You need a good large table glass ones work very well. Place your T-55 silkscreen, over the table, making sure that the glass is underneath all of the screen. Next arrange a comfortable seating arrangement for you and your friends around the table, with each person having their own sharp sturdy scissors. Have some really fun music on to enhance the mood. To 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 you know it is ready to clip.

I only use the scissors for cutting the stems with and 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 sure to get every bit of extra leaf off. You keep putting the leaf in a bag as it builds up, and under the silkscreen you get the heaviest resin glands that fall off when the plants are being moved and clipped. On your fingers you start to notice resin building up where you have been constantly touching the plants. When you have a good amount you take it off by first making sure all the leaf sticking to your fingers is gently rubbed off, then over a small bowl you rub all your resined fingers together enough so all the hash comes off into the bowl. Next roll the hash in the bowl together into one piece and voila you have your fresh piece of organically grown charas.

The buds that have been manicured I place on a screen to finish drying out, I double check them for extra leaf, and if there is any I take it off. When the buds are dry enough for the stem to snap when broken in half, I place the finely manicured buds in a large glass canning jar, and leave them in there closed over night. Being in the closed jar makes the buds re-hydrate from the inside of the stem to the outside of the buds. I then open the jar again, making sure the cannabis is the perfect consistency, texture, smell, and flavor.

I then put my jars away in a cool dark place and they are good for at least 18 months or longer. All of the trim that is saved up is used for making water hash with the bag systems, Ice-o-lator and or Bubblebags. Smoking the sacred herb that you grew with your hands and heart, together 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 it within yourself.

Until next time, Keep it GREEN, LOVING and full of LIGHT.  
Peace, Soma

# Hybridization

By Soma

As a breeder of cannabis genetics, making hybrids is part of my life's work. I specialize in medicinal cannabis genetics. A hybrid is caused by the cross between two plants of different species, varieties or cultivars, or on occasion different genera. Hybrids today are often more resistant than their parents. When an atom hybridizes... This process of restructuring is known as hybridization.

What I do is take two plants and genetically cross them to produce a new plant that has some of the characteristics of the original plants but also creates additional characteristics that are unique to it. The fact that new combinations can be formed shows the continuous nature of the process of speciation. 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.

Through the years I have had an amazing kind of inspiration to find the finest medicinal cannabis genetics this planet has to offer. It has been my health. Since 1984 I have had cancer of the tongue and cannabis has been my medicine of choice. Having it as my medicine is a powerful driving force. When looking at different characteristics of cannabis plants, there are a few main things to look for. How much stem is in-between nodes, what the aroma is like, how much THC trichomes are present, how long the finishing time is, and last but not least the effect.

Once several valuable species are acquired the crossing can begin. You need males and females. One male can be sufficient to impregnate hundreds of females. One of my newest crossings was to mix a G-13 Haze male to 11 of my favorite strains. When I take seeds from these plants and sprout them I basically get 3 dominant phenotypes and 1 recessive phenotype. One will be like the father, one like the mother, one a combination of both and one a recessive phenotype that can bring earlier genetics back out to be seen.

Choosing which types of plants to use takes really knowing your plants well. Different strains have different traits. Once you have decided which traits you want to add to your new hybrid, you use one for the donor parent and one for the recipient parent. The male sending the new characteristics to the female. For this the two plants are mated or crossed and the progeny is screened for the desired trait. The progeny plants possessing the desired trait are then selected and crossed back to the recipient parent. This process is repeated until the desired plant type having all the characteristics of the recipient in addition to the trait being transferred is finally obtained. This exercise is known as backcrossing. Backcrossing involves both hybridization and selection.

Overall, the hallmark of selection lies in human ability to choose the best from a cluster of many. In his quest to find more variability, man started experimenting with hybridization of plants so as to achieve the perfect plant type. This process was actually the beginning of expedited evolution since it led to the formation of new plant types artificially or due to human intervention at a much faster pace than it would have happened in nature. For example the bread wheat that we eat today has taken about 500 years to evolve to its present form through human intervention. This form of wheat would have taken thousands of years to evolve had it been left to the natural evolution process.

In our modern world many things have accelerated. Today an item found on the other side of the planet can arrive at your door tomorrow. So it is with my seeds, they travel the globe. In this way many people besides me get to plant them and pick through different phenotypes, all of us looking for the best. For one person to do this would take many years, but with many people doing it and staying in touch via the internet the knowledge comes fast and with it new strains.

In my newest crossings between the G-13 Haze male (wanted to bring more of the sativa genetics into the mix) and Buddha's Sister, Somango, Somativa, White Willow, Lavender, Citralah, White Light, New York City Diesel, Rockbud, Reclining Buddha, and Free Tibet, I am finding some of the finest plants ever. I love plants, plants of all kinds, they are my favorite life form, they are teachers, I surround myself with plants in my home, at least 100 different kinds, and cactuses. Until next time, Keep it GREEN, LOVING and full of LIGHT.

Peace, Soma

Article originally taken from [somaseeds.nl](http://somaseeds.nl) and has been edited for clarity and conciseness.

# Collecting Pollen

By lilbuddie

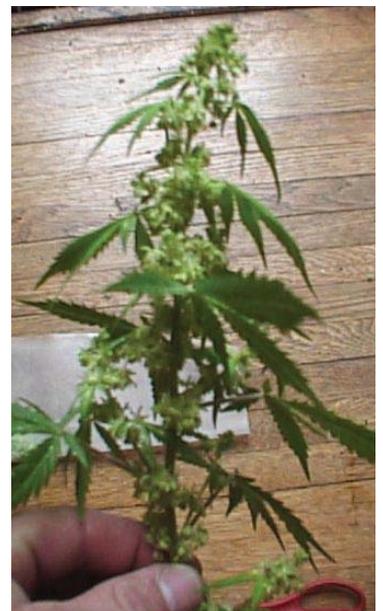
I was getting ready to gather up some pollen for the next round of flowering. I remember we really didn't have any pictures of this so I threw some together whilst I was doing it.

First, take a mature flowering male plant, like this one. I have waited until the majority of the flowers are open and spewing pollen. This is obvious from yellow powdery residue on the leaves.



Next, I get a pair of scissors, piece of wax paper folded in half, with one end folded over to form a corner. I use wax paper since it resists moisture which will spoil your pollen.

Then take the scissors and cut a nice big branch off just one so it is easy to handle.





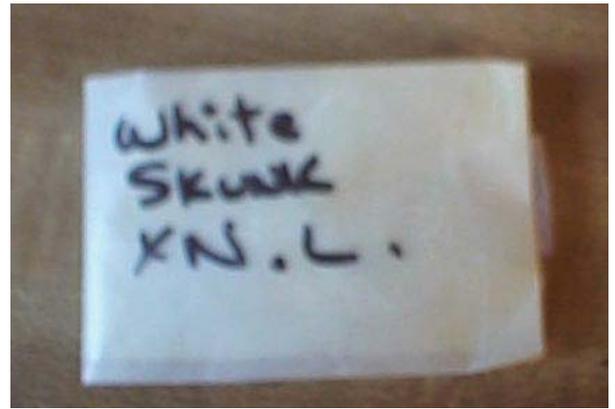
Then carefully lay the branch in the opened wax paper, close the sides with the holding hand so a breeze doesn't blow too much away. Then twist, jiggle, shake, and rub the branch against the wax paper.

After a few branches to see how much you have collected, remove some of the flowers that have fallen off and check out what you have so far.



Once you have run out of branches or you feel you have enough pollen then shake the pollen down into the cover you made and remove any additional flowers that still remain. Once all the male flowers are removed you can unfold the wax paper to be sure to get them all, you can transfer the pollen to a new piece of wax paper if you desire. It kinda sorta looks like a blonde hash eh?

Then wrap it up, tape it and you have enough pollen for a few million seeds. You can now carefully unfold it and use a small paint brush to dip into it and pollinate buds. Or if you are really lazy you just pinch some out and sprinkle it!!



This thread was originally posted on the [gardenscure.com](https://www.gardenscure.com) forums. Post have been edited for conciseness and clarity.

# Growing With Guano

By Soma

People I meet and smoke with always ask me, how do you get your pot to taste so good. I am an intense caretaker and lover of plants, when I do it I am fanatical in working with them, making little sacrifices in my own life so that the plants can feel the best they can. I always think medicine first, bills, money, problems, second.

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. I don't use pots to grow my buds, I use beds, flowering beds. These beds are made of wood put together with metal braces and screws; they are on wheels that rotate 360 degrees. They are 1.25 meters wide by 1.25 meters long and 35 centimeters high, (sorry after being here so long I think in centimeters). They are lined with waterproof plastic. The bottom 5 centimeters is clay pebbles called Hydrocorals.

I then take plastic coated chicken wire and place it on top of the hydrocorals. On top of that I put a layer of felt root cloth, the kind most nurseries use under their potted plants. 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. In each corner of the bed, I have a PVC tube 70 MM wide and 35 centimeters long. The tube goes down into the hydrocorals, through the root cloth, up through the 25 centimeters of soil, leaving 5 centimeters above the soils surface. These 4 tubes in each bed help the roots to have a constant air-flow, and the hydrocorals underneath make it almost impossible to over-water your garden.

The plants are spaced out as evenly as possible affording each plant as much light and space as they can get. They are given liberal amounts of black and brown seaweeds, both foliar and in the soil until the end of the 3rd week in flowering. Each plant has at least one stake supporting it as the buds get heavier and heavier. Leading up to the 3rd week in flowering, I have twisted and bent my tops in the tried and true method of super-cropping, giving them that added stress which makes the yield and taste better. In the 4th week, I give the plants some organic flowering food with an NPK of 1.5-13-14. I give it to the plants twice in that week. From the end of the 4th week in 12/12, I start to give the ganja my secret ingredient, Guano tea. The guano I use 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. I take 100 grams of the dried guano and mix it with 2 quarts of hot water, stirring it with a plant stake until it is almost all dissolved. I then take an 8-ounce cup of the tea and add it to 10 liters of water with a PH of 6.6. I water the beds twice a week with this tea waiting until they are dry before applying it. I keep doing this until the middle of the 7th week in 12/12. With 10-week plants like the ones I'm growing now, I like to give them a good flush with water for two weeks or more before harvest.

In the 32 years I have been growing this most Sacred of plants, I have tried all kinds of plant foods, from miracle grow, to 10-52-10 with all its heavy metals. I have never found anything that beat the guanos for taste, yield or potency. It is 100% organic besides.

The taste that the cannabis acquires when using this guano is so fruity and clean tasting that the taste lingers on your tongue for at least 5 minutes after finishing the joint. The bud quality and yield that comes from using the beds instead of pots is incomparable. I use nothing but neem oil and ladybugs for insect control, and I only take the large fan leaves off when I first harvest the plants, waiting until the plants are dry before the final manicuring. There are so many Mango farmers out there using guano fertilizers on their crops. If you want, the fruit of your labor to taste like mangos try growing with guano. Wishing all you farmers out there, bountiful green harvests with the taste and smell of fine fruit.

Until next time, Keep it GREEN, LOVING and full of LIGHT.  
Peace, Soma

Article originally taken from [somaseeds.nl](http://somaseeds.nl) and has been edited for clarity and conciseness.

# Understanding the Art of LST

By Quazi

First off I want to thank the creator of the mighty LST thread started by Caprichoso (LST training in detail. Why bushes are better) as it is highly informative and a wonderful collection of pictures of the LST process.

Not too long ago I did not even know what LST was until I started researching it. Now, however, it is apparent from some of the more recent comments (and some of the older comments) in the LST training thread, that there is a basic lack of understanding when it comes to LST. More than a few people are just imitating pictures and going "WOW! That worked really well!"

Hopefully this post (along with the research I've done) will help some people understand a few things when it comes to LST. There is a lot of information out there on how to LST but it is mostly comprised of diagrams and pictures. If you understand what LST is and what you are doing by tying down the stems of your plants, then you will know when and how to LST your plants. If you understood why and how LST worked, then you would not even need the pictures to help you in the first place.

So here we go ladies and gentleman, gonna drop a bit of info and science here from various sources and readings:

## **The Art of LST**

**What** LST Is

**Why** LST Works

**How** LST Works

Armed with this information, you should be able to LST until your hearts are content or learn about how to better your LST practices. Instead of looking to pictures to learn about LST, you'll be using pictures as examples of how to LST.

## **What LST Is**

LST stands for low stress training.

When it comes to marijuana growing, LST refers to a particular type of low stress training. It appears on the outside (and to the untrained eye) that the training of a plant is simply teaching a plant to be short and grow lots of buds. It is much more important and involved than that.

Topping the plants (or chopping as it is also referred to) is actually done for similar reasons that LST is done. Even though it is a completely different method. It, too, is a form of training (a high stress one). A lot of you might be thinking: "Topping and LST aren't even close to the same. You're full of crap. I'm done reading this post."

Well, **stay with me here** and you'll understand.

## **Why LST Works**

One of the #1 things you need to understand about LST: auxins. If you don't understand them, then you are just putting strings on your plant so they look like other plants in pictures.

Auxins are plant hormones that interact with other plant hormones to form the "plant nervous system" in the most simplest terms. Auxins are used to help stimulate nearly all facets of plant growth. Auxins are used to help

promote new root growth and is often part of what is used in rooting compounds or rooting hormones that are so popular in marijuana horticulture. There has also been research (in the 50s I believe) that indicates that levels of auxins also influence the sex of a marijuana plant. Some research has also indicated that levels of auxins also play a role in the ways flowers mature on a plant.

Most of all, auxins, in marijuana plants, are known for producing adventitious buds along the stem and in the roots. Adventitious is sort of like it sounds: it's the "adventurous" part of the plant that sprouts when the plant is wounded or trained. With LST, it is not as simple as: "Make more auxins. Plant grow big."

So why did we learn about auxins if we're not going to be making more of them? I mean, more is good when it comes to marijuana right?! Well: no, not in this case. This part is important so pay attention: auxins are most concentrated (and synthesized) at the apical bud or the tip of the plant closest to the light. The rest of the plant has the ability to produce auxins, but the cells must be triggered to do so. Now, although auxins are hormones essential for many facets of growth, it is also an inhibiting hormone for the other buds further down the stem. This is to prevent the plant from producing buds which may compete with the apical bud.

In other words:

The plant is very happy having one bud that it tries to stretch as close as possible to its source of energy. It will do what it can to inhibit other sprouts below it from becoming that bud as it would require the plant to push those sprouts up to that level again. If you are still a bit confused, think of images of trees and picture the growth that they have in a cone-shaped fashion. They are working to push the apical bud up to the sky.

Now that you understand what auxins are and how they are important for growth in marijuana, you can begin to understand how LST works.

### **How LST Works**

This is where I get to those people who were saying "Topping and LST aren't even close. You're full of crap."

When you top a plant, you are removing the apical bud (the bud closest to the light) where most of the auxin is concentrated and synthesized. The plant stresses itself out (high stress training) and eventually produces new sprouts along the stem that will form new growth so that it can get a new apical bud and send it soaring towards the heavens.

LST is helping to stimulate that growth near the bottom but by tricking the plant instead of chopping it. In nature, if something happens to a plant and the bud that is closest to the light gets blocked, it will try to move around that something. If it can't, then eventually new growth will form lower along the stem to try and send a new shoot out to head towards the light.

When you LST, the reason that you are tying the tip of the plant down is so that the plant gets confused. It is used to producing the auxins in the tip of the plant close to the light. However, because the tip of the plant is pulled down to such a degree, it is not receiving light at the very tip like it used to so it sends the auxins down the stem to produce new sprouts to become new apical buds (or so the plant hopes).

This is why some people continue training as the plant gets older, but like to start when the plant is new as auxin development starts with roots and continues through all stages of the plant. Continued training of the plant is helpful because, as you can imagine, each apical tip can be brought down to promote new growth further down the stem. Every time you bring the tip down, the plant will be fooled. As new tips of the plant are reaching towards the light, pulling them back down below 90 degrees (or close to it) will make those auxins start to flow again. This can continue on and on.

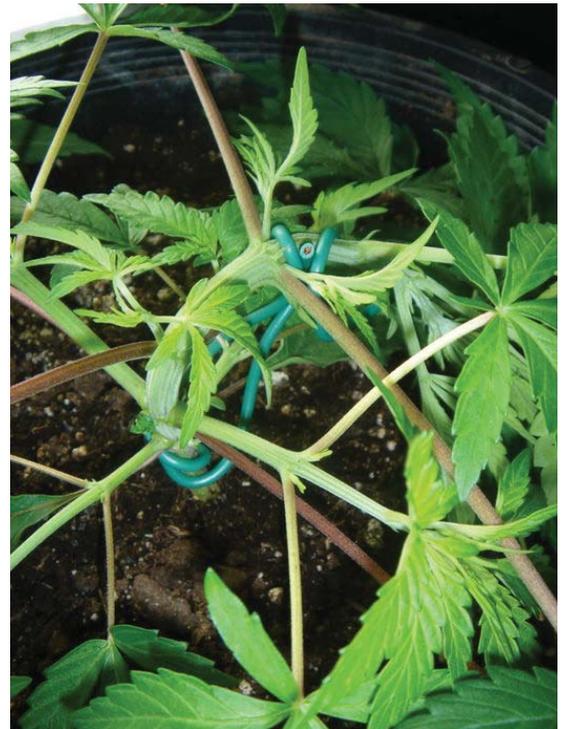
Now that you know how LST works, you don't even need a picture to look at. You just know that you need to trick the plant into thinking it's highest tip is no longer its highest tip. It's as simple as that, but it is also as complex as you want it to be.

So, what did we learn here?

- 1) LST can be done for all strains of marijuana
- 2) LST is another way of altering/stimulating the auxin hormone to produce additional growth just like other training methods
- 3) LST is not just for training height
- 4) Understanding auxins will help you understand LST
- 5) There is a lot of material available about this but most of it is in books which means if you really want to understand how auxins affect marijuana, you should look further than Wikipedia

I hope this information is helpful to everyone looking to figure out how to LST or why it works or when is the best time.

Just an additional note: using shielded copper wiring instead of string is not only easier as there are no knots to tie, but it is very reusable because there are no knots to untie. Here are some examples of my own LST just for posterity's sake:



This thread was originally posted on the icmag.com forums. Post have been edited for conciseness and clarity.

# Medical Cannabis



# Legal Issues



# Glossary

**Bong:** A device used to smoke cannabis. Bong usually refers to a medium to large sized water pipe. The smoke of the cannabis travels through the water before being inhaled. This is supposed to cool the smoke, allowing for a smoother hit.

**DIY:** The abbreviation for Do-It-Yourself. Refers to building or creating something yourself rather than buying it.

**Grow Journal:** This is a thread in an online forum which follows the progress of a cannabis grow. Usually following from germination all the way through harvest.

**Hash:** A potent product of cannabis. Hash consist mostly of the trichomes of cannabis, having very little or no plant matter. Also called "Hashish."

**Indica:** Refers to one species of cannabis. Indicas usually are shorter, have shorter flowering times, have more compact flower buds, and give one a more stoned/body high.

**Joint:** A cannabis cigarette, hand rolled with rolling papers. Usually does not contain anything but cannabis, although some users prefer to combine tobacco and cannabis inside the joint.

**LST:** The abbreviation for Low Stress Training. LST is used often in fluorescent grows. It helps expose many bud sites to the light.

**Sativa:** Refers to one species of cannabis. Sativas usually grow taller, take longer to flower, have less compact flowers, and have a more heady/racy high.

**THC:** The abbreviation for delta-9-tetrahydrocannabinol. THC is the main psychoactive ingredient in cannabis flowers.

**Trichomes:** The glands that grow on cannabis flowers. Trichomes contain the active ingredient THC.

**Vaporizer:** A device used to vaporize cannabis. Vaporizers are a healthier alternative to smoking cannabis because it allows you to only inhale the THC. THC va-

porizes at a lower temperature than the combustion temperature of the plant matter.

**Volcano:** A famous, high end vaporizer. Often used by medical patients.