

## Chapter 5: Basic Issues of Cannabis Cultivation



### The Cannabis plant: botanical description

Cannabis is an annual, herbaceous, dioecious, (sexually differentiated) woody plant. It grows outdoors in temperate climates worldwide on all continents except Antarctica. Cannabis is grown intentionally indoors in many countries in clandestine operations.

Cannabis can be subdivided into 3 main species: *C. sativa*, *C. indica*, and *C. ruderalis*. Each species carries unique genetic, botanical and biochemical traits. Breeding programs in the United States, Canada, Holland and Switzerland have resulted in hundreds of unique *cultivars*, plants selected for specific characteristics like floral appearance, THC content, disease resistance, size or vitality. These *strains* are grown in seed-breeding facilities in Holland, Canada and Switzerland by crossing different varieties to bring out some desirable trait. The genetic makeup of the parent plant determines the potency and other individual traits. Optimal growing conditions allow the *potential* of the genetics to develop.

*Sativas* are large plants grown in South and Central America. *Sativas* can often reach 8 feet tall outside with branching habit that resembles a Christmas tree. Large stature is not desirable for indoor cultivation therefore breeders have crossed *sativas* with smaller sized *indicas*. *Indica* plants are common in India and Afghanistan. *Ruderalis*, the third, and less common species, originated from northern Europe. It is notable for early flowering characteristics and thin-leafed appearance.

The unique chemical constituents of Cannabis are termed “Cannabinoids.” Cannabis contains some 60 cannabinoids that modify and contribute in complex ways to the medicinal or therapeutic properties.<sup>1</sup>

The highest-concentration cannabinoid present in Cannabis is termed Delta-9-tetrahydrocannabinol, or “THC.” Other cannabinoids (than THC) are present in smaller amounts. (Chapter 3 describes the common cannabinoids and their basic chemical functions.)

Cannabinoids are present in the leaves and flowers of the plant to varying degrees. The highest concentration is found in the unfertilized flowers (called “*sinsemilla*”) which have been harvested, dried and cured at peak cannabinoid production. *Sinsemilla* is quality Cannabis because the process of forcing flowers causes layer after layer of resinous *buds* to form. These are harvested when morphological changes indicate *peak floral maturity and highest cannabinoid content*. Left unharvested, the flowers begin physical and chemical decomposition as the plant enters



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“*senescence*,” its decline towards death. Senescence is sometimes interrupted by growers who “force” the harvested plant to grow new leaves, a process called “*regeneration*”.

THC concentration represents the fraction (or percentage) of THC in relation to all the cannabinoids present. Ten percent (10%) THC concentration means that ten percent of all the cannabinoids present are THC. (Ninety percent are other cannabinoids.) THC concentration can range from 0.02% (hemp) to 15-30% for some Dutch and Canadian hybrids. The U.S. government grows 2-4% THC Cannabis at a research farm in Mississippi. This Cannabis is of poor to medium quality, and is considered harsh and difficult to smoke by the few patients still enrolled in the *Investigational New Drug Program*.<sup>2</sup>

### **Plant varieties**

Outdoor growers in Oregon should, if possible, select Cannabis strains which will flower in their shorter growing season. Since Cannabis has acclimated to climates from equatorial to Northern and southern, its flowering pattern will follow these genetic tendencies. Thus, an equatorial variety that is accustomed to long slow flowering may not ripen in time if grown outdoors in Oregon. Patients planning to cultivate outdoors should consider surfing the Internet under “Cannabis seeds” and contact other patient networks for information and support about what variety to grow.

### **Basic cultivation issues**

Oregonians registered in the Medical Marijuana Program have few choices when it comes to obtaining an adequate supply of medicine. They must buy Cannabis or seeds in the black market, rely on other patients, caregivers or grow it themselves. The Oregon Medical Marijuana Act was written to allow the cultivation of Cannabis specifically to remove patients from the underground drug markets. Patients and caregivers registered in the Oregon Health Division’s Medical Marijuana Program can legally exchange plants, seeds, clones and medicine among themselves. (Chapter 1 discusses issues surrounding procurement and exchange of seeds and clones as well as application procedures.)

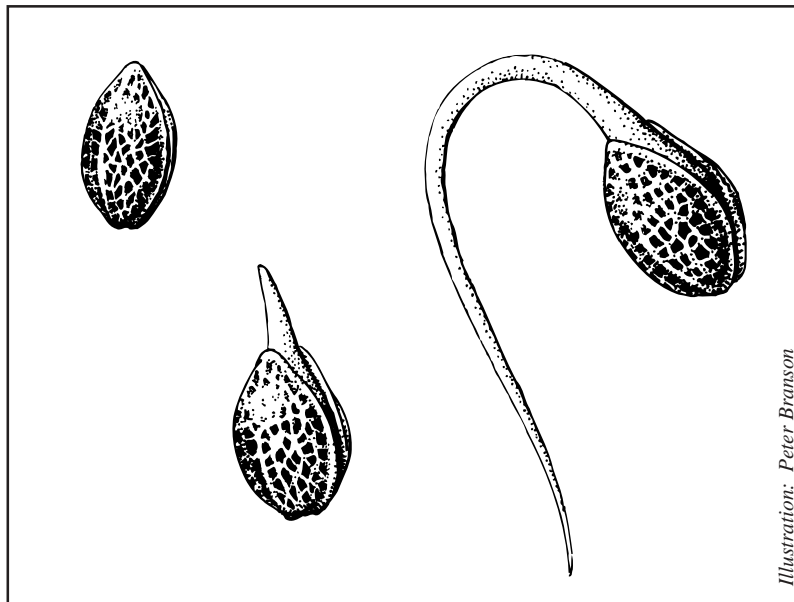
Cultivation of Cannabis is both simple and complex. Growing a consistent supply of medical-grade Cannabis requires patience, trial and error, and careful observation. Outdoor and indoor cultivation also require different (though similar) skills. Throwing a seed into dirt will likely result in a plant, but the quality of medical-grade Cannabis will not be adequate unless the grower has some basic knowledge of horticulture. This knowledge must be coordinated with the flowering limits written into the OMMA.

Cultivation of one’s own medicine flies in the face of the established medical model in the United States. Patients must not only bring energy and commitment to the process of safely growing an adequate supply of Cannabis, but they must often do so with disapproval or

obstruction of the doctor. These considerations must be evaluated along with the physical limitations of the patient and the space available. Patients should carefully consider all these issues before committing to cultivation. Lastly, anyone serious about growing their own Cannabis should buy a copy of *Marijuana Growers Guide*, by Mel Frank, or another guidebook. (The “resources “ section lists several excellent books.)

### Seed germination

Germinating seeds is easy. Start by soaking the seeds for 12 hours in either clean water or dilute “Start up” fertilizer. The seed will expand and begin to sprout quickly if it is viable. If the seeds are old or unhealthy they will sprout poorly if at all. After soaking, plant the seed in potting soil or seed starting mix, which is purchased at the gardening center. Place the seed pointed end up about 1/8-inch deep. Keep it moist, not soaked, by covering the container with plastic wrap. Keep the container warm and don’t dig or move the seed to check it. In 3-6 days most healthy seeds will sprout by sending out a single root. Be careful at this time not to disturb the delicate root, which is going through rapid growth. Fertilize the sprouted seedling with dilute start up fertilizer after the first two round leaves (cotyledons) have emerged. This should be about a week after sprouting. Once serrated leaves have opened and photosynthesis is occurring, place the container under lights. Gradually lengthen the light intensity over a week until the plant is established and growing “true” leaves.



Healthy seeds should sprout in a week. Resist the urge to dig up the seed to check it.

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**Use commercial fertilizers with care. They are very concentrated and “overdosing” can kill the plant.**



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**Cannabis plants typically grow indoors to the height of 2-4 feet before flowering.**

### Plant requirements

All plants need nutrients, carbon dioxide, water and light to grow. (Plants also need small amounts of micronutrients like Magnesium and Zinc.) The basic nutrients are *Nitrogen (N)*, *Phosphorus (P)* and *Potassium (K)*. All fertilizer bottles have an “NPK” rating that represents relative amounts of each. Nitrogen promotes leaf growth. Fertilizers high in “N” are suitable for the initial growing, or vegetative, stage. Flowering or bloom fertilizer formulations have larger percentages of Phosphorus and Potassium as these two nutrients are needed at that stage of growth. There are many fertilizers on the market. Most growers should choose something organic like fish emulsion, bat guano or kelp.

People suffering from immune suppression should consider using a commercial fertilizer like “Peters 20-20-20”. Use commercial fertilizers with care. They are very concentrated and “overdosing” can kill the plant. Organic fertilizers are less concentrated and “easily digestible” by plants. For the planting medium use a general purpose sterilized planting mix.

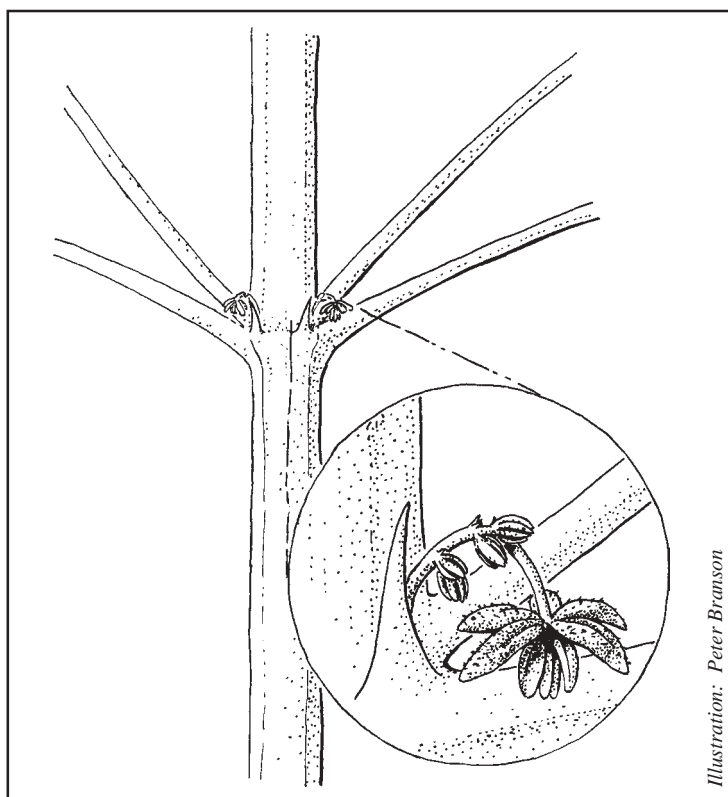
Carbon dioxide (CO<sub>2</sub>), present in small quantities in the air, is the colorless gas which mammals exhale as a by-products of respiration. Carbon dioxide is a fundamental requirement for plant growth driven by the energy of sunlight (or artificial light) through the process of photosynthesis. (This process produces the oxygen (O<sub>2</sub>) which animals breathe, completing this symbiotic relationship.) Increased CO<sub>2</sub> can spur accelerated plant growth. Some growers add supplemental CO<sub>2</sub> to their plants but this is not recommended for beginners because of the complexity and expense. Most plants will grow fine with available air. (Use fans to help bring in fresh air.)

Water is the third essential. Keep plants watered but not soaked. A moisture meter is a simple and inexpensive device to measure soil moisture. Most plants can be planted in 1 or 2 gallon containers and irrigated every 2nd or 3rd day. (There should be holes in the bottom of all containers to allow for drainage.) Large sativas should be planted in larger containers, like 5-gallon buckets. They should also be flushed with large amounts of water to leach out salts and sprayed with lots of water to wash bugs and debris off the leaves about every 2 weeks. The hotter the space the more water the plant will need. Fans should be used to vent excess heat which can be monitored with an inexpensive thermometer placed on the wall. Venting also helps control excess humidity which can lead to mold.

Indoors or out, Cannabis plants require high levels of light for healthy growth. Outdoor growers rely on the sun, which is both inexpensive and powerful. (They also avoid the cost of ventilation.) Indoors, the light timing cycle should be set to 18 hours on and 6 hours off for vegetative growth, the first phase of the plant’s growth. An Intermatic brand timer makes this safe and easy. Cannabis plants typically grow indoors to the height of 2-4 feet before flowering. As discussed above there is much variation in size due to the many

varieties. Each variety has different genetic characteristics that result in unique features. Sativas are generally not adaptable for indoor growing. Many varieties combine qualities from different sources. No single plant will be as useful as those from these carefully bred combinations. The inexperienced grower will need to experiment by procuring seeds or clones and growing them out. New growers should be patient and observe the plant's development to learn what a healthy plant looks like. When receiving new clones ask the provider about the variety and individual needs. Attention to the plant, aided by study of cultivation references, will help in understanding how to care for the plant through all the stages of its life.

Since the number of flowering plants allowed under the OMMA is three, growers may consider growing the plants larger if the space is available.



*Male Cannabis plants should be removed from the garden as soon as the plant is identified as male. This will prevent pollination of the female plants.*

## Flowering

Genetics and environment determine the flowering of Cannabis. Generally Cannabis will attain floral maturity after about 50-70 days. Most hybrid varieties have specific flowering profiles such as number of days to floral maturity and physical appearance. Fertilize the plants on day 1 and day 25 with flowering fertilizer in concentrations recommended by the manufacturer for tomatoes. Keep notes about the process, especially if you are unfamiliar with the variety. You need to be



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able in the future to understand what conditions yielded what results. Notes provide that information.

Cannabis, like many other plants, begins to form flowers in response to decreases of light, which indicate the end of the season. Thus, when flowers are desired the light cycle must be changed. Generally, the light cycle is changed to 12:12 (12 hours of light followed by 12 hours of darkness.) If the grow chamber is light tight or in a dark room the 12 hour cycle can be at any time of day. The critical concern is that the 12 hours of darkness must be *uninterrupted*. Any light (except green) that hits the plants during the 12 hours of darkness will “confuse” the flowering process. Normally, floral characteristics will begin to appear in about a week. At this time males should be removed. Male flowers have segmented “umbrella” flowers with small clusters of pods hanging from them. It is important to be able to differentiate males from females because unfertilized female flowers have the greatest cannabinoid concentration and are the most desirable. Take cuttings from the best female plants to make new plants.

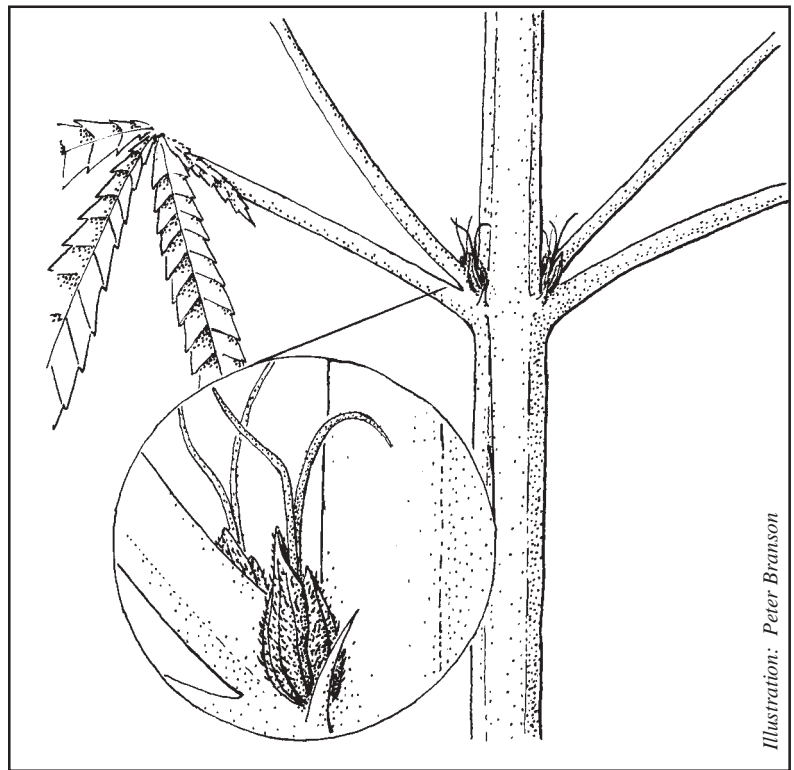


Illustration: Peter Branson

*Female plants are easily identifiable about two weeks after the flowering cycle has begun.*



Flowers can be cut off the plant individually or the entire plant can be uprooted.

The end-point of floral maturity is quite precise and the reader is encouraged to consult a reference for detailed instructions. Generally, when the female flowers (pistils) have mostly turned brown and there are clear crystals, which look like sugar, all over the flowers they are ready to harvest. These crystals are called “trichomes.”

They are highly resinous cellular sacs that concentrate cannabinoids. If left too long flowers will begin to rot and mold, therefore it is important to know when to harvest. The THC level of the flowers increases to the point of floral maturity then begins to decline as THC is oxidized and converted to Cannabidiol (CBD). Successive harvests of the same variety allow the grower to “finely-tune” the flowering process for best results as familiarity with the plant grows.

### Harvesting, drying and curing

Flowers can be cut off the plant individually or the entire plant can be uprooted. For indoor growers the plant can be regenerated.<sup>3</sup>

Cut flower clusters off the plant and carefully trim off leaves. Handle the flowers carefully so the trichomes—resin sacks—aren’t dislodged.

Hang the harvested flowers upside down on a line or string in a dark cool space with lots of air circulation. Observe the clusters for mold or rotting, since they are tightly packed with little air inside. Care must be taken to keep good air circulation. Dry for four days or until the stems snap and break when bent. Then the flowers should be put into a plastic sack or glass jar for another month to *cure*. Curing allows a chemical reaction to take place that makes the plant much less harsh to smoke and increases potency. Remove any flowers that appear soggy and continue to dry. After a month the flowers should be dry, whole, fresh smelling and without any mold or contaminants. Look closely at the individual flowers with a magnifying glass. If any mold or rot is seen destroy the flower cluster.

Preserving the dried flowers is easy. They can be frozen in airtight zip-lock plastic bags. Or they can be canned. To do this wash, mason jars and lids in soapy water, dry and microwave the jars **ONLY** until hot to touch. Pack the dried flower clusters into the jars lightly and microwave jars and flowers for one minute. Carefully screw on lids tightly. Label jar with date and variety. As the jar cools the lid will vacuum seal. Keep unused buds in a dark place to prevent oxidation.

### OMMA harvest limits

Oregon patients and caregivers should clearly understand the limits that are allowed while harvesting. The OMMA stipulates that the grower may grow up to 7 (seven) plants and flower 3 (three). They may possess one ounce of dried (usable) Cannabis for each flowering plant. If there are two flowering plants the caregiver or patient (whoever is growing the plants) may possess up to two ounces of “usable” marijuana. The grower may not possess in excess of three ounces of usable Cannabis. Hopefully, these ridiculously low possession limits will be increased soon.

Dried Cannabis is much lighter than freshly harvested flowers. Therefore, growers may harvest 3 to 4 ounces of fresh flowers knowing that the dry weight of the flowers will be under an ounce. Growers should have and use a scale to measure the harvest weight to ensure legal compliance.



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## Indoor growroom basics

The typical growroom has several basic features that must be adapted to the particular location. Careful planning of the growing area will prevent many problems. The basic requirements for an indoor growroom are: space, light, air circulation and heat.

### Space

Many growers use a closet or enclosed space. It should be around 16 square feet- that is, a 4 foot by 4-foot space. A 16 square foot space is adequate for three moderate-sized flowering plants (the legal flowering limit under OMMA.) Since the law allows for seven plants total, the size of the plants should be matched to the space available. (Although flowering seven plants is a violation of the OMMA, police usually aren't concerned unless the *total number* of plants exceed seven.) The space should be painted bright white or hung with *Mylar*- a reflective foil that reflects light onto the plants. Mylar can also be hung as drapes in a larger room to create the space and hold light.

### The light source

The light source should be a *High Intensity Discharge* (HID) light. They are available in two lighting systems: *Metal Halide* (MH) and *High Pressure Sodium* (HPS). The difference between the two is the spectrum or *wavelength* of emitted light. HPS lights emit warmer, reddish light that is thought to enhance flowering. MH lights emit cooler or bluer light that supports vegetative (leaf) growth. Many people use both, either together, or MH and then HPS matching the different phases of growth. First time growers should probably purchase an HPS light. These are available in many sizes (wattage ratings) but a 400-watt is adequate for most small spaces. The light is probably the most expensive purchase of a growroom. Lights range from \$100 to \$250 and can be purchased from hydroponic/indoor gardening stores in Portland and nationwide. *Fluorescent tube lights* can be used instead of HIDs but aren't recommended because they are too weak and inefficient and will actually cost more to use in the long run.

Lights should be plugged into a timer to regulate on and off light cycles. Timers are inexpensive and easily available at most lighting or hardware stores. The timer should be capable of safely handling the wattage of the light and any other appliances it is controlling. Read the rating of the light and match it with the rating of the timer.

The basic problem with HID lights indoors is the heat they produce. The "*ballast*" is a heavy (10-15 lb.) metal case, which contains the electronic components which run the light. The ballast is connected to the reflector hood and bulb by a heavy gauge cord and should, if possible, be placed outside the growroom to minimize heat production.

### Air circulation

In any case, growers must ventilate the space with enough fans to maintain the temperature below 80° F. For a 16 square foot room at least two fans are recommended: one to blow cool air into the room at



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floor level and a second at ceiling level to blow hot air out of the room. Fans are critically important because plants need moderate temperatures and air circulation to grow. Box type fans are inexpensive and available at most department stores. Oscillating fans keep air circulating around the plants and strengthen the stems.

### Electricity

All these grow room devices, of course, take electricity. If you have outlets nearby then installing them is easy, just plug them in *after making sure that you are not overloading the electrical circuit*. Otherwise, it is imperative to hire an electrician to install lamps and fans along with “ground fault interrupters” to prevent shocks. The key is to safely have the light, fans and timers running 18 hours a day without the temperature getting above 80°F.

*Warning: Correct and safe electrical wiring is extremely important. The total load of all the components of the growroom must not be greater than the capacity of the wiring. Overloading electrical circuits can result in fires. Licensed electricians should be consulted by anyone who is not experienced in electrical wiring.*

### Outdoor cultivation basics

If Cannabis is being grown outside there are several other issues that must be considered. An outdoor garden has the advantage of size, a free light source (the sun), great air circulation, and no need for electrical hookups. Outdoor issues include location, security, weather conditions, and possession limits set by OMMA .

### Sunshine and water

Probably the most basic benefit to outdoor growers is free, powerful sunlight. Sunlight is uniformly intense. This means that the sun’s rays penetrate deeply into the plant increasing photosynthesis and growth. Depending on the variety grown, outdoor Cannabis plants grow much larger and produce more than those grown indoors. Because of this accelerated growing process, outdoor plants require more water and fertilizer. It is practically impossible to give plants too much sun as long as the temperature is not excessive and enough water is provided. In hot weather, Cannabis plants should be watered more frequently, especially if they are large (over five feet.)

### Soil and fertilizer

Since outdoor Cannabis grows large, so do its roots. Careful growers pay attention to this by preparing a large fertile area for the plant to grow. If the location is out in the woods, holes must be dug and filled with rich high-nitrogen soil. In an established garden this is easier since other herbs and vegetables are also growing. In either case, Cannabis likes drained, rich soil. Amend any soil with bat guano, fish



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Growers with maturing plants outside should watch weather reports and be alert for rain or frost.



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fertilizer or tomato food. There are countless soil and fertilizer options. Repeated growing will show what works. Growers should also keep weeds away from the plant to decrease competition. Outdoor plants do not need the repeated flushing with water that is required with indoor plants since salts and chemical residues do not accumulate.

### Weather

Outdoor plants are much more susceptible to climate changes. In Oregon, cloudy, cold and rainy weather systems blow in off the Pacific Ocean beginning in October, or earlier. This can be a problem for any slow-flowering varieties. Colombian and other Southern latitude strains will grow large because they are accustomed to long growing seasons. Worse yet, sustained rain in warm months creates perfect conditions for rot. Entire plants can mold in a few days. Growers with maturing plants outside should watch weather reports and be alert for rain or frost. If these conditions are imminent, plants should be covered with plastic trash bags. Make sure to remove the bags when conditions improve, or every day, to promote air circulation.

### Outdoor harvest issues

Outdoor gardens also present challenges related to harvest and possession limits written into the OMMA. The Initiative was written to accommodate political realities, thus the allowable harvest and possession limits were kept unrealistically small. (The OMMA allows possession of one (1) ounce of dried Cannabis. The person who is acting as a designated primary caregiver is allowed one (1) ounce of dried Cannabis *for each flowering plant, not to exceed three (3) ounces.* (Chapter One details the application and possession issues.) These limits are relatively simple to follow for indoor gardens since the plants are smaller and flowered according to the wishes of the grower. Outdoor growers give up this control. Thus, seven plants planted outdoors in the Spring may result at least in several pounds of flowers which need to be harvested and cured at peak floral maturity to produce medical-grade Cannabis. Since the OMMA differentiates between flowered and unflowered plant limits, this scenario is illegal. Additionally, the possession limits are so small that the grower must harvest only enough fresh Cannabis to remain under the possession limit. Since the grower who is flowering three plants can possess up to three ounces of *dried* Cannabis, they should be safe if they harvest ten ounces of *fresh* flowers at a time. This will dry down to a “legal” amount. The problem occurs because the harvested flowers take weeks to dry and cure. Meanwhile the remaining flowers continue to mature past peak floral maturity.

It is a practical reality that most Oregon patients harvest and dry the entire crop at one time. Although this is a sensible approach it is still illegal. However, using a *cyclic harvest*, in which ten ounces at a time is taken off the plants, dried and given to the patient network or another patient, is an alternative means of harvesting. By sharing excess amounts, the patient can stay safe and help others. Another possible

answer is for the grower to grow different strains with different flowering times. In this scenario, the mature plants are harvested one by one.

Another problem with these scenarios is the three-plant designation. If the patient harvests one of the three plants then his possession limit is reduced since he no longer has three flowering plants! This bizarre situation results from the framers of the OMMA who put political considerations above practical ones.

Patients should be aware that they may be permitted to grow more than seven plants and possess larger quantities of usable Cannabis if they gain the support of their physician. House Bill 3052, the Oregon legislative rewrite of the OMMA, included this provision. (Chapter Two includes information on how patients may legally increase the limits.)

### Security issues

Since the passage of the OMMA, legal Cannabis gardens have sprouted in Oregon. For patients, this has been a great benefit. Patients all over Oregon planted Cannabis in sunny, open locations in back yards and garden plots. Unfortunately, as medical gardens proliferated, so too did the theft of medicine. Oregon patients in 2000 suffered through a blizzard of rip-offs, theft of plants and medicine, and in at least one case, home-invasion armed robbery. Practically every outdoor grower in Oregon was faced with questions of how to protect plants, that sometimes had \$2000 worth of medicine on them, from thieves who cruised through back yards looking for and stealing Cannabis.

This abhorrent situation is an outgrowth of the illegal drug market. Profiteers and thieves see profit in patients' gardens. The fact that patients are suffering for lack of medicine counts for nothing in a world of underground capitalism. Why should it? The American medical system has perfected *profiteering* from disease. (Pharmaceutical stockholders in the United States make billions of dollars in stock profits while Americans can't afford to buy the drugs that keep them alive.) This profit-centered approach fits equally well in the world of illegal drug markets. In any case, patients are the losers. Thus, patients who grow Cannabis outdoors must factor in security issues if they wish to harvest the plants.

### Location, protection and secrecy

Outdoor gardens should be located to make maximum use of natural or vegetative features for visual protection without, hopefully, sacrificing sun exposure. This is a difficult but not impossible balance. For those living in rural areas, planting a hedge of sunflowers around the plants will block the view. Interspersing Cannabis plants with tomato plants will also de-emphasize the distinctive appearance. If the garden is in a city or town, growers should use barriers like fences, trees or shrubs to mask the Cannabis. By planting other plants around the Cannabis, and maintaining south-facing exposure, plants have protection. Cannabis should not be planted within view of roadways. This is



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an invitation for theft or accidental mowing since roadway mowers clear vegetation along many of Oregon’s roads in the summer. East facing hillsides are excellent locations since they have sun exposure. But care must be taken to protect plants from deer and other animals.

Outdoor growers must also consider protecting the plants. There are several ways they can do this. Putting cages around plants can keep animals and people away. This can range from simple chicken-wire cones to chain link fences. Although esthetically ugly, cyclone fencing can be easily installed. Growers should consider adding motion sensors or cameras to the garden. These are inexpensive and can be purchased at Radio Shack.

### **Police protection and patrols**

Patients in Oregon have one big advantage over those in most other states: the protection of law. This legal support may be the most valuable security any Cannabis-growing patient can achieve. Since Cannabis is now a legal medicine (for those registered with the Oregon Health Division), patients should consider calling police to protect their crop. This may seem difficult for patients who have lived in secrecy for years. However, most police in Oregon have no interest in dealing with legal patients. Since police are protectors of society, patients should have nothing to fear by calling police and asking for increased patrols through a neighborhood. If there has been plant theft in a neighborhood, this would be advisable.

Another method for protecting plants could be a “neighborhood patrol.” This would be accomplished in coordination with police, by a Cannabis co-op, whose members take turns going from garden to garden during the weeks preceding harvest. This could work if there are several gardens in a small area, and the group members maintain high levels of trust in each other.

It is an unpleasant reality that the illegal recreational market sets the value of Cannabis. Patients lose in this situation. An ounce of medicine costing \$400 rivals the “organized crime” pharmaceutical market. Patients are faced with hard choices about how to grow and protect their medicine, whether indoors or out. These issues will remain until Cannabis is completely legalized and medicalized—the physician writes the prescription and the patient picks up the medicine at the pharmacy. When the pressure of the “recreational” market has disappeared so too will obscene prices and patient thefts.

Until this time arrives, patients should carefully plan the issues involved in growing Cannabis at their location. They should also maintain secrecy. Talking about the garden invites scrutiny. Patients who maintain secrecy are more likely to harvest their crop.

Many patients find the complexities involved in cultivation an insurmountable obstacle. Patients must have commitment, energy, money and time to cultivate an adequate supply. As time passes and unresolved issues become more apparent improvements to the OMMA will hopefully include larger controlled-growing facilities with security,

increased harvest possession limits and increased patient networking. In the mean time, patients will do what they always have: make do as best they can.

## Footnotes

<sup>1</sup> GW Pharmaceuticals is licensed by the United Kingdom Home Office to conduct a research program to develop prescription Cannabis-based medicines. Detailed bioassays of specific varieties quantify different cannabinoids and their relationships. This knowledge will eventually allow GW to formulate Cannabis-based medicines that help specific conditions. Patients will benefit from these medicines as well as the expanded information about the varying effects of different varieties.

<sup>2</sup> The Investigational New Drug Program (IND) was begun by the federal government in 1976, to facilitate access to *non FDA-approved drugs* on an emergency basis. Federal permits to possess and use Cannabis were obtained by a handful of patients after protracted legal battles. Patients enrolled in the IND received a tin of around 300 U.S. Government grown Cannabis cigarettes each month. This equaled about eight ounces per month. The IND program was closed in 1992 as the numbers of applicants (mostly those suffering from HIV) exploded, leaving only a handful of those few already approved included.

<sup>3</sup> Regeneration recycles the plant through another vegetative and flowering phase. This can be done by leaving five or six nodes on an intact plant after harvesting and returning the plant to a 24-hour light cycle. After a week and some high nitrogen fertilizer the plant will usually begin sprouting new leaves.

