



## Cultivating Cannabis

### Transcript – Growing Indoors

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Welcome back to Cultivating Cannabis. This is module three, all about indoor grow rooms. We're back this time with Brian to pick his brain and learn all we need to know about how to grow cannabis inside.

Stephanie Syson: Alright, we are back with Brian, this time to talk about indoor grow rooms which is great to have him to talk about because I know that you have a lot of experience with this topic.

Brian Gandy: Yes.

Stephanie Syson: So, why would you want to grow indoors?

Brian Gandy: Well primary one back in the day was it was way illegal.

Stephanie Syson: So, hide it?

Brian Gandy: Yeah, so people brought it indoors to conceal it. That's primarily where it came from. Now growing indoors and other things has a lot of other benefits that, you know, for environmental control or pest control or light control, but it used to be to be discrete. Now if you want to grow indoors like if you live in an urban environment, you probably just can't grow some plants on your porch; you might offend somebody. So, it still have value for anybody who wants to grow their own medicine at home and wants to do it either discretely or just grow super high quality. That's another reason that people still do it even though it's legal now in a lot of places is that you can get that, you know, trophy looking flower that is harder to obtain outside.

Stephanie Syson: Just because you can control everything --

Brian Gandy: Absolutely.

Stephanie Syson: -- ultimately.

Brian Gandy: Yeah, yeah. Plants respond to their environment, so if you control the environment, you can grow the exact plants you want.

Stephanie Syson: Okay and what do we need to consider if we want to grow indoors, to know if we can?

Brian Gandy: The primary considerations are temperature, humidity control so you have to have absolute -- not absolute, but the closer you can get to absolute control of those two things, the better. And then your lighting and your water. Watering for the plants and then the water for the plants eventually becomes water in the air which turns to humidity, so you have to again, control that to cycle it to make sure the plants are happy. So, and when it comes to space considerations, I mean you could grow in a fish tank if you really wanted to if you had it dialed, but you know, you can grow anywhere from a closet to a tent, to a garage, up to a warehouse or greenhouse; as big as you want to go.

Stephanie Syson: And if you were just gonna grow your six or seven plants, whatever's legal in your area, how big of a space would you need to do that?

Brian Gandy: I'm a really big fan of the grow tents we'll show later, but you can order them on Amazon now. You used to have to go to a grow shop and get 'em, but literally you can have them delivered or go get it however you want to do it. I mean you can frame up your own space, but by the time you do it, the time and material that it takes to actually get a box built and the impact it has on your existing house, it might just be better to start with something that's pre-fabricated because it has all the ports and the vents and all the room for fans and stuff. It's really well -- it's intuitive, it's years of experience built-in, so it saves you that learning curve and they're super affordable.

Stephanie Syson: And how big?

Brian Gandy: Oh, how big? For just a personal home grow like the one we'll look at later, is five by five and that's really a good flowering space. And then to manage that amount of flower cycle space, I would say you wanna quadruple that. So, you'd want a 10x10 room donated or allocated just for a five by five flower because you're gonna have different cycles, you're gonna have equipment, you're gonna have processing and things that need to go on and work flow around that area. That's one thing a lot of people overshoot, they're like oh, I've got a 10,000 square foot building and I can just go wall to wall flower when realistically only about 50% of a large facility should be a flowering room and then the rest is infrastructure and work flow.

Stephanie Syson: Since you brought up the flowering room and what would the other room be called?

Brian Gandy: Vegetative.

Stephanie Syson: And why do you need those two things?

Brian Gandy: So, vegetative is just the, let's call it the pre-pubescent life cycle stage of the plant and you need that space separate because it has a different light cycle time. So, you have to maintain a certain light cycle and you also, once you really start getting into it, you wanna have slightly different environmental controls; different humidity's and different temperatures at different stages of growth, but primarily it's the light cycle and the light intensity.

Stephanie Syson: And what is the difference between the light for veg state versus flower state?

Brian Gandy: For vegetative, the light cycle has to be more than 18 hours long, so 18-6 is a really good light cycle.

Stephanie Syson: 18 hours of light and six hours of dark?

Brian Gandy: Yeah or you can just run 'em 24 hours a day, but you're burning up 25% of the power consumption you save by running 18-6. So, and then in a flowering situation, it's gonna be 12 on, 12 off and it's gotta be absolute dark in that flowering stage as well.

Stephanie Syson: And so, when you have the 12 to 12, that's what tells the plant it's time to make flowers?

Brian Gandy: Yes. That's the -- what is it? Phytochemical trigger. Phytochrome tells it it's okay to start flowering.

Stephanie Syson: Okay and if you were growing the Ruderalis that we talked about in the previous module, do you need both rooms?

Brian Gandy: No, I mean you could technically -- I think the best way to grow and auto-flower is to stick it in a pot and run 18-6 the whole time. You could run a 24-hour light cycle; there's some varieties that will do that. I personally think plants like to sleep, so give them -- save on the power bill and also save the little plant a little sanity, but --

Stephanie Syson: Mimic nature a little bit?

Brian Gandy: Yeah, more so. But I think if you're gonna do an auto-flower, I would just go straight through 18-6 and you'll see the best results.

Stephanie Syson: And you said there was a slight difference in humidity between the flowering and the veg room. What would that be?

Brian Gandy: So, when you're propagating like the very little baby plants, you want really high humidity because they're really tender. They might have just been a cutting off of another plant and you just want them to respire and breathe kinda slow, so higher humidity helps them control their breathing. And then that humidity gradient will go down over the whole life cycle, so when you get into flower, at the very end of your flowering cycle, you'll be at about 50% humidity; where you started at like 80% at a cutting stage. So, it's gonna go down over time is the general trend.

Stephanie Syson: Okay and with all of this lighting, can you tell us what kind of lights we need?

Brian Gandy: Yeah. So, for propagation which is the very first stage, whether you're doing a seedling or a clone, you'll want really low light levels and really crisp, blue light typically. And you can get that through fluorescents --

Stephanie Syson: Any kind of florescent light bulb?

Brian Gandy: I would -- you know, you suffer on efficiency the older the technology you go. So, there's T5 fluorescents are really good, but the newer generation I'm a big advocate of is LED lighting and they've even got like -- you can get a couple \$20 LED's now that'll do your propagation and they'll last forever and they're really efficient. You never have to change the lamp which is one of the benefits. So then going into veg, you know, again I'm advocating for LED all the way through. It's the current stage we're at, it's the future of lighting, but if you were gonna go traditionally, you would go with a metal halide which is like when you see the street lights when you're driving down the road and you see the blue ones versus the orange ones; that's a metal halide light.

Stephanie Syson: The blue ones?

Brian Gandy: Yeah. So, they're going to give you shorter, more compact growth which is better for vegetative plants and they're slightly less efficient. So when you go into flower, you're gonna want to go into a high pressure sodium traditionally which is more orange, like the orange street lights and they are more efficient and they just put out a ton of light for the amount of power that goes in which is what you need; that kind of horsepower to really finish a plant. Like again, the technology shifted and you can go LED all the way through, but typically you'll have more red spectrum in a flowering LED fixture as well.

Stephanie Syson: And are there some companies that you recommend or some websites where people can easily get kind of home scale lighting?

Brian Gandy: Yeah, I mean for LED I would look at Horticulture Lighting Group, HLG, is a really good resource and they're affordable price point. Don't just buy something off of Amazon and believe the specs. So, I would reach out to me if you have any questions, but start with HLG. If you're gonna spend the money, there's a company out of Texas called Fluence Bioengineering that has really high-quality fixtures and a really strong reputation. If you don't buy their fixtures in particular, there's a hundred knock-offs of their type of light which are all pretty solid. There's kind of a plateau in engineering of technology right now, so there's affordable lights available out there like those two companies.

Stephanie Syson: How do you know how many lights or how much wattage you need for, say we're staying with this small six, seven plant grow room?

Brian Gandy: Yeah. So let's say on a five by five tent, if you were gonna grow with older technology, you would use about 1000 watts of high pressure sodium light in flower and with an LED you can achieve that same kind of yield, in that same five by five footprint with between 500 and 600 watts. So, you're saving 50% on the power draw. That would be the target and then -- I should know my watt per square foot, but basically yeah, in a

flowering situation that's the most critical to get the light level right. You want between five, six, seven, 800 watts in a five by five area.

Stephanie Syson: Now moving onto air. What are some tips and tricks or what do we need to think about when we're thinking about air flow?

Brian Gandy: Yeah. So, like going back to what I said earlier, control over the environment, in particular temperature and relative humidity are critical to a successful indoor grow. That and plants breathe CO<sub>2</sub>, so you have to constantly introduce fresh air from the ambient CO<sub>2</sub> or you could use CO<sub>2</sub> generators. I mean that's kind of burning it at both ends, but for a home grow, I don't think it's necessary. You could use mycelium from a home mushroom grow actually. That puts out a ton of CO<sub>2</sub>, so you could use the spawn bags for CO<sub>2</sub>, but yeah fresh air exchange and controlling your temperature and humidity. And your average temperature is gonna be around 75 degrees ideally. It's a subtropical, temperate plant so it's gonna do very well at 75. With LED's you can run the rooms a little warmer, up to 80 degrees plus.

Stephanie Syson: How much will the containment and the LED's raise the temperature in that room versus like the room temperature on my air conditioning unit?

Brian Gandy: It's really hard to say. With current technology of LED, it should provide actually enough heat to help cycle that environmental, but that's actually one of the downsides to LED is that they don't generate --

Stephanie Syson: They're not that hot.

Brian Gandy: -- enough heat, so your humidity goes up before your temperature goes up. So, you need to make sure that, yeah. If your ambient temperature is good, then you can cycle it to get humidity, but you're gonna be cycling your air environment for temperature and for humidity. And it used to be when you ran a high-pressure sodium in that area, that put out so much heat that it would be the reason that the pressure kept cycling. But now it's the opposite with LED, so you just have to really take care. I mean, I've never had to run a heater in a grow until I ran an LED. It's just kinda counter, but you gotta keep the temperatures up and the humidity down, so just [cross talk].

Stephanie Syson: So, your ideal temperature in flowering versus veg, is it different?

Brian Gandy: Not really, I mean, just stick with 75 degrees straight through for simplicities sake. You can run a little cooler in veg and a little warmer in flower; it really comes down to the genetics and the experience that you have. You'll know when your plants are happy and if you run the same genetics a few times, you kinda get the intuition you need. But let's just stick with 75 degrees Fahrenheit, 50% humidity.

Stephanie Syson: Okay.

Brian Gandy: The general standard.

Stephanie Syson: And on the humidity, how do you create 50% humidity if you live in a dry place like we do and if it's in the winter and it's super dry because heaters are on, the humidity's very low. How do we get more humidity in our grow rooms?

Brian Gandy: Well, the plants will respire. They're actually breathing and they will raise the humidity, so you can watch the humidity controller and it will actually tick up because the plants are breathing moisture into the air. And that's great when you see that happening. That means your plants are growing when you see that. So actually having the dryer air to counter that humidity is a benefit. When you grow in more humid areas like Florida or Washington or places that you traditionally think of being really sticky and humid, you actually have to run dehumidification.

Stephanie Syson: Cause it's too moist?

Brian Gandy: Too moist, yep and if you have spikes of humidity above 60-65%, again this is a generalization, but you start getting issue with powdery mildew, Botrytis and different bugs really like those environmental conditions as well.

Stephanie Syson: Which we are gonna talk about in a later module.

Brian Gandy: Yes.

Stephanie Syson: All that fun stuff. In regards to water, besides the water in the air, besides the humidity, what do we need to think about in regards to watering our plants and how we do that or how much or what we do with the waste or any of those things?

Brian Gandy: Yeah. So, we're leaning more towards a home grow, kind of conservative, really keep it clean and organic method here, so typically the rule of thumb is water in, water out. Even if it goes in through the pot, it's gonna come out through the plant. The best way to know if your plant is ready for water, and this is only really possible on home grows, there's a bunch of different sensors and expensive stuff that are just unreliable. You really just wanna pick up the pot and you want it to be really light. Roots need oxygen just like we do. The roots are breathing and respiring, so they -- the number one way to kill any plant is to overwater it. You can drown a plant. You really want to push the plants to find out where their wilt point is and just water right before that. And it comes with experience, but generally if you're growing in a soil container like one 5 or 7 gallon per flowering plant, you'll probably be watering every other day or every third day.

Stephanie Syson: Okay and on water, while the grow room we're gonna show is in pots and in soil and we're gonna talk about that, what about hydro? How do you feel about hydroponic cultivation of cannabis?

Brian Gandy: It's really fun and it's really a great way to learn especially if you're really into kinda like manipulating plants and if you're a futurist like myself, you probably know that's how we're gonna grow plants between here and the next place. So, from a geeky science perspective it's awesome unless you're really just trying to maximize yield inside. Personally, for growing high quality plants indoors, I wouldn't recommend it especially somebody who's really new to it. Again, it's really a fun way to learn and it can be really efficient and there are some hybrid systems where you can get the best of both worlds, but full hydroponics means that instead of full soil, you just have roots free-hanging in a medium. That's just water with nutrients being cycled through and typically it's non-organic, so if you're using synthetics salts -- and it can be a lot of fun, but it's not the most sustainable.

Stephanie Syson: Okay and what about the soil? We're gonna talk about soils in other modules for outside cultivation, but in regards to your indoor grows and in the pots inside, what are the best soil mediums that you've found or recipes for creating your potting mix?

Brian Gandy: Let's see, so traditionally horticulture medium is what we call it, is been based on peat moss which is mined in Canada and Ireland and it's not sustainable, but it's a great growing medium. It's a little more acidic than most plants like, so you balance it, but now anybody's who's starting now, I would look at coconut core as the bulk of the medium that they're gonna use. It's a renewable resource and peat moss takes hundreds of years to grow back. This grows back in a season and coconut core has a great pH for growing plants, great drainage, great water holding capacity. There's a few things with nutrition. It really likes calcium and magnesium, so you just have to make sure you have plenty of that in the soil mix. But that mixed with perlite, which is expanded volcanic rock. It gives air porosity and drainage and then you know, coconut core and perlite will work great especially if you're doing a hydroponic mix, but then as far as key components, you could use compost with that to provide the humus and the organic matter base, more biological activity and then you'll supplement all those to get your micro/macronutrients from organics inputs like bone meal, blood meal -- there's a ton of different organic amendments --

Stephanie Syson: Okay.

Brian Gandy: -- to look at to mix in that mix.

Stephanie Syson: And if you mix in a good amount of compost, what percentage of compost versus the rest of the mediums would you put in?

Brian Gandy: I go back and forth with this a lot. There's some people who are doing no-till organics where they're just re-using the same soil over and over again and it's really healthy and biologically living and active. So, it's really hard to quantify how much compost is in there because it's a living soil, but if you're making a blend on a tarp to make your own potting soil, I typically won't put more than 20% compost. A lot of purists will tell me to kick rocks, but some of the issues with salt and when it comes to soil chemistry, it's really hard to go higher than that.

Stephanie Syson: Right. I would agree with that for all kinds of plants. That's about the ratio that I would use as well.

Brian Gandy: And I think 15% is really solid; 15 to 30% perlite and then the remainder coconut core will make a very good mix.

Stephanie Syson: And if you've put the good compost in to begin with, do you need to add more compost later on in the life cycle of the plant before harvest?

Brian Gandy: Even when I was growing full hydro, steady nutrients start to finish, I would top dress just like sprinkle earth worm castings on the top of my soil because it's really good to just really -- rather than getting nitrogen, phosphorous, potassium or whatever out of it, you're gonna get a little bit of nitrogen, but mostly you're gonna get a boost in biological activity. And there's lot of other soil stuff chemistry happening there, but yeah, I would top dress it, but conservatively.

Stephanie Syson: Alright, any other tips for indoor growers before we let you go for today?

Brian Gandy: I'm gonna take this time to actually just mention the tools that I would consider essential. So, for hydroponic or for soil cultivation, you've gotta know the pH, the acidity or lack thereof and this is a pH pen; super easy to use. You turn it on, stick it in the water solution and it tells you the pH and the effective range that you want to be in is 5.8 to 6.5. And you'll collect a water sample, especially if you're going with organics. You'll do distilled water, pour it through your soil and then test it. This is money well spent for any gardener and I've had this tool for 11 years now and it tells you basically how salty the water is to make sure you're not overfeeding; absolutely essential in hydroponics, but all very, very important for home growing organics.

Stephanie Syson: Okay, great. Well, thanks for being with us today and we're gonna be back to talk with you about pests and diseases.

Brian Gandy: Alright, so we're just gonna do a quick run-through. This is a little garden, indoor garden setup. It's about as basic as you can get, so for somebody who's just looking to get started indoors, this has got it covered. So, this is the tents that I was talking about. They're reflective material inside so it reflects all the light back on your plants. I think this tent with a filter and a fan was maybe right around \$200 and Amazon will have it to you in a couple of days. This is an LED light fixture; there's a bunch of similar linear ones. I worked in LED for a long time, so this is an old prototype. It's not actually for sale anymore, but it still works great. Let's see, these are all basic humidity and temperature monitors. They're super cheap; it's got a minimum, maximum. You'll get familiar with 'em, but it just says temperature and humidity so you can monitor it. Right now, it's 75 degrees, 50% humidity which is right on for where we want to be. A little more advanced, but super nerdy is this little thing for \$20. It's a Govee, G-O-V-E-E; it's a data logger, so it tells you -- just look at it on your phone and it shows you the trends of temperature and humidity over time. The main benefit of something like this even for a new grower is to see

if you're getting spikes in humidity and like I said earlier, spikes in humidity cause pests and pathogen problems, disease problems.

And I've got a little heater in here just because LED lights don't produce as much heat as traditional light sources. It's good to help balance and get the environmental control right and you know, these are just plastic pots with, you know, we used an Ocean Forest basic medium. All these plants are in vegetative mode, there's no flowering plants in here. These are just for genetic preservation for hemp next season and this little sticky trap, there's yellow ones and blue ones. They are -- each different color attracts different pests, so the yellow ones are good for aphids and white flies. The blue ones are good for drips and fungus gnats. You know, really just having one in there is fine, but if you want better coverage, you can get both. You can see they've got these little squares on them. They've got one, two, three, four, five six, so you can count the number of squares, you count the density and these are just fungus gnats so they're pretty harmless. But it lets you know what's in your garden and then once you get to a different threshold, say you saw 10 on there in a week, you might consider spraying or doing some kind of treatment.

Stephanie Syson: Thanks for watching Module Three: Indoor Grow Rooms.