

AUTOMATIC CLIMATE CONTROL

The amount of control you need to implement over the environmental factors in your room will greatly depend on the scale of your growing area—the number of plants, the number of lights, the size of the room, and whether or not you are supplementing with CO₂. We assume you are looking for the best possible quality fruits/flowers and yield. If this is the case, you need to be aware of the environmental factors that will affect your plants' growth the most.

Air Circulation

The current of air that circulates in a grow room is as important as light, water, heat, and nutrient. Proper ventilation acts as a mediator between light and water, removing excess heat and humidity, while providing plants with a healthy supply of CO₂. Probably the largest problems associated with growing indoors are ventilation, or are carbon dioxide related. Plants need CO₂ to grow and thrive. They absorb it and use light to break it down into carbon and oxygen. Carbon is used to create new plant material and oxygen is released as a byproduct. A lack of CO₂, found in musty grow rooms, encourages mold, invites algae, and can turn plant leaves a hideous shade of yellow. This unhealthy environment eventually leads to stunted growth, withering, and general plant malaise.

To provide ample CO₂ to plants, fresh air must be brought in continually, or it can be supplied via a CO₂ emitter or generator. Getting fresh air into your grow room can be as simple as an open hole with a screen, or a vent fan. (With CO₂ enrichment, a fresh air intake is not necessary.) The circulation within the room should be constant and breezy. Plants breathe through their stomata which reside on the undersides of their leaves. Air must ruffle these leaves, providing fresh CO₂ to their stomata. No stagnant air should be present.

In a closet or other small space, a small circulating fan should do the trick. For larger applications, an industrial fan should be positioned in such a manner as to facilitate a current of air which sweeps around the room in a circle. In a 10' x 10' space, one industrial fan combined with a wall mounted circulating fan should be sufficient. Larger spaces may need double or triple the amount of fans.

Temperature and Humidity Control

Growing plants produce humidity. Hot lights produce heat. You will need to control these factors. The easiest method of climate control is to install a vent fan on a timer. Proper venting takes at least one exhaust fan. Purchase a fan that will replace the volume (cubic feet) of air in your grow area in at least 2.5 minutes. (The shorter the time, the better. It is best to replace the air in less than 1 minute.) The stale air is replaced by fresh air drawn from another area or window. Keep in mind that humid air is heavier and more difficult to move; the BIGGER the fan the BETTER.

To calculate the room size, multiply width by height to get the total cubic feet of your room. Here's an example: a 10' x 10' x 8' room is equal to 800 cubic feet. A vent fan should exchange the air within five minutes, so for an 800 cubic foot room you'll need at minimum a fan size which is capable of moving 160 cubic feet per minute. (We suggest a 465 cfm for reasons explained above). The timer will regularly turn the vent fan on and exhaust hot and humid air. While this will help considerably it is still a very rough method of control.

To dial in both your temperature and humidity control, we suggest you use a controller that keeps both the humidity and temperature within a set parameter through the use of a vent fan. It can also be coupled together with a CO₂ generator to create a dynamic combination. When using this combination, if either temperature or humidity get too high, the CO₂ generator turns off and the vent fan turns on until the appropriate environmental levels are returned. Then the CO₂ generator turns back on and the vent fan goes off.

AUTOMATIC CLIMATE CONTROL

Let's discuss what a high-tech automated environmental control can do for you. Using high-tech equipment in a growing environment will boost plant growth exponentially and ensure the health of your plants. Light is the limiting factor in any indoor growing system. For this reason, all other variables (nutrients, carbon dioxide, pH, temperature, humidity, etc.) should be raised to optimum levels to compensate for any light deficiency. In an optimal environment, plants are able to absorb what they need, when they need it, resulting in accelerated growth and vibrant health. This translates into larger yields of fruit or flowers at harvest time. The average hand-watering home gardener realizes about a 150% increase in productivity after switching to a controlled hydroponic system. As your sophistication grows, you can experience a 250% or more increase from these beginning base harvest levels.

An automated system controls not only light and watering cycles, but maintains optimal nutrient, pH, and CO2 levels at all times as well. The difference this makes for plant growth is like the difference between sitting in bumper to bumper rush hour traffic versus driving an open highway when every song on the radio is one your favorites. Plants grow a lot faster with every important environmental factor tuned in.

Automated controllers ARE expensive, but they do make a big difference. They keep conditions at the perfect level for your plants and they will reward you with gorgeous and beautiful produce. With each environmental factor that gets tuned into the correct range, the plant growth becomes that much more healthy and robust. By its very nature, hydroponics works well with technology. And in order for nature to thrive in an indoor environment, or in an environment that was up to now severely limiting—like a desert or a rooftop—a slew of problematic factors must be solved. High-tech tools and methods are a dependable and essential solution.

You can achieve excellent results by using timers and innovation, however, most commercial nurseries have automated controllers in their greenhouses. If you are growing plants for profit and want to compete on a commercial base, chances are you would benefit from some automated controls as well. We believe that you will want to start small, with a pH and nutrient meter, and then work your way up to humidity and temperature control using vent fans. After upgrading your air control, you will probably be most interested in either a nutrient/pH water flow management system or CO2. We have other info sheets detailing both of these categories.

Is putting carbon dioxide in my garden worth it?

Well, we deal with this on another info sheet in detail. But, in general we always say that you should dial all other variables in first before you try and deal with CO2. It throws everything a little out of whack. You want your temperature to raise to around 84-86°F (since this higher temperature is needed in order for your plants to metabolize all of this extra CO2 and form it into sugars for the rest of the tissue it will generate) and because the plants are working much harder (and transpiring more water out of their leaves) humidity will rise as well. This opens a whole can of worms.

All this said, CO2 greatly enhances performance. Carbon Dioxide is a much needed resource for your plants' development and overall growth. Plants use CO2 in their respiratory cycle, much like we depend on oxygen. Plants can absorb much more CO2 than that which is available at natural atmospheric pressure levels. In most outdoor environments, CO2 is available at 450 parts per million (ppm). Most plants can use anywhere from 1300 to 1600 ppm. This is roughly up to 4X the amount that is available outside. If you give your plants these elevated levels of CO2, you will immediately notice a vast increase in plant growth, development, and fruit/flower production. Plants with elevated CO2 levels will produce on average 30% more fruit/flowers when compared to plants at normal atmospheric CO2 levels. That's a "true," easily attained 30% (as long as all the other environmental co-factors are dialed in as well.)