GROWERTALKS

Corr on Cannabis

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# Which Way is Right?

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There may be more than one way to skin a cat. The Army tells us there's the right way, the wrong way and the Army way. The song says there are 50 ways to leave your lover. From my observations, there are as many ways to grow cannabis as there are cannabis growers.

In general, cannabis is grown in the field, in a greenhouse or indoors in a warehouse, although lines between the categories can blur. Which method is best? The correct answer, like always, is it depends.

Field production is an old, yet rejuvenated, method of cannabis production. The first cultivation of cannabis thousands of years ago was in fields. Cannabis production in the United States for hemp fiber during World War II was entirely in fields and descendants of that cannabis continue to self-sow in ditches ("ditch weed").

The earliest underground cannabis cultivators producing for medical and recreational use grew in forest clearings, in the middle of corn fields or wherever the crop could be grown without detection.

Now, as local regulations allow, growers are finding production of cannabis in the field can be practical. The Farm Bill, passed in December 2018, allowed for field production of hemp (cannabis with a THC content less than 0.3%). Many states that allow medical or recreational production have provisions allowing field production.

Field production of cannabis can be done similarly to any row crop—with direct seeding, and no or minimal irrigation. This is the typical method for production of hemp for fiber or seed. However, production of cannabis for extraction of cannabinoids is valuable enough that additional inputs pay off with increased yields. Field production of cannabis for extraction may be low-tech, but it's not no-tech. This type of production often has drip irrigation under plastic mulch, much like a strawberry or tomato crop. There are very few energy inputs—just cultivation of the soil and energy for irrigation pumps if needed. Field production is typically the least-expensive way to grow cannabis.

Greenhouse production is more technologically intense, although not necessarily dramatically so. Cannabis production in parts of the world with mild climates can be done in greenhouses that are little more than polyethylene film supported by bent pipes. If the climate allows, the greenhouses can be without heat or fans. This sort of production is similar to the way cut flowers are produced in Kenya, Colombia or Ecuador.

By necessity, greenhouses in most of North America or Europe require more environmental control because the

climate is less favorable. The more environmental control required, the greater the cost per unit area.

Anyone who's ever worked in a greenhouse would be familiar with most cannabis greenhouses in North America. Most have hot water heating and fan-forced ventilation, usually with evaporative cooling. Since cannabis grows best with as much light as possible, cannabis greenhouses typically are built with glazing material to maximize sunlight and with supplemental lighting. While precise temperature and humidity control is practical when outdoor temperatures are lower than the desired temperature in the greenhouse, during summer, excessive humidity and temperatures can be a problem in cannabis greenhouses. Regardless, one report shows greenhouse cannabis production to use 26% less energy than indoor warehouse production.

Warehouse indoor production has the potential to have the greatest climate control, but uses a lot of equipment and energy to achieve that control. Since all of the light must be provided by lamps, electrical energy use can be significant—not only for the lights, but to remove excess heat. Dehumidification and air filtration in indoor production are more practical than in a greenhouse, allowing reproducible conditions all year. This all leads to increased energy and equipment costs, however.

The pros and cons of these methods of production have led to the development of hybrid production methods with a blend of characteristics from different categories. Greenhouses are being modified to be more like warehouse indoor production. A hybrid greenhouse still uses the sun as the primary source of light and still needs supplemental light for when natural light is limited. However, rather than relying primarily on natural ventilation and evaporative cooling to reduce temperatures, hybrid greenhouses are partially or nearly completely sealed from outside air. Reduced air exchange allows desiccant to be used for dehumidification, carbon dioxide concentration can be reliably elevated and air can be filtered to remove disease spores.

All of this comes with a cost. Removing heat without air exchange is the biggest challenge. Radiant energy from the sun heats a closed greenhouse very quickly. Removing this heat requires chillers or other forms of cooling. These have a higher installation cost and operating cost than evaporative cooling with air exchange.

The philosophers Jagger and Richards pointed out you can't always get what you want, but if you try sometimes, you just might find you get what you need. Knowing what you need, not just what you want, is critical to profitable cannabis production. **GT**

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