

Industrial Hemp Farming & Common Questions for Texas—Part 4. What can I learn from prospective hemp grower meetings?

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(Texas A&M AgriLife resources for hemp in Texas will be posted initially at <https://lubbock.tamu.edu/programs/crops/hemp> then transferred to an AgriLife systemwide hemp webpage once it is established.)

There is an increasing number of meetings around Texas regarding hemp for CBD oil, fiber and grain. To date Texas A&M AgriLife has not conducted any meetings specific to hemp. Also, we have not spoken much on hemp issues, though that will be changing with the newly formed Industrial Hemp Educational Initiative Team (see <https://today.agrilife.org/2019/07/09/texas-am-agrilife-creates-team-to-answer-hemp-questions/>).

Here are some tips if you attend a listening meeting or conference on hemp production for CBD oil, fiber or grain.

- Understand who is sponsoring the meeting and their role. Are they established industrial hemp people with a track record of involvement with hemp for some time?
- Look for conflicts of interest. This could be an entity promoting hemp and making suggestions on how to grow, but then in turn being the source of seed, transplants or other hemp production inputs.
- Are the goals and plans being shared realistic? Or does it seem like there are possibly inflated numbers for yields, crop value, profits, etc.?
- If you are evaluating growing hemp as a farmer (and likely under some form of contract), will there be company support staff to advise you on growing the crop?
- Ask program organizers all the questions you can think of while there when it is the easiest. Don't leave until your questions have been answered. Hemp industry businesses should have indications they are going to be around for a while. Are they investing their own capital for hemp along with you as a potential grower?
- Ask about what sort of contracting arrangements businesses and buyers will have with growers. Will any contract be a legally enforceable document?
- If the meeting is more about the opportunities for hemp, but is short on how to grow the crop, you need to raise those questions about production. This becomes more important once you decide you are interested in hemp and would consider growing.

An example: [Hemp Information Meeting, June 24, 2019, Lubbock, TX](#)

I attended a general hemp information meeting. I will share comments here that may help you understand about hemp, how the meeting was conducted, and what could have also been

helpful if it was discussed. Know that much of this information was likely opinion and not based on research.

The meeting was invitation only, primarily to about 30 farmers and some selected hemp industry individuals. Among the attendees were about 12 farmers, but there were at least another 32 attendees. Most were interested in hemp business, products for hemp production, etc. The sponsor noted later that several other hemp businesses wanted to speak and share their vision and plan, but they were not among the originally invited attendees and were thus not permitted to do so.

The organizer's goals were mainly a focus on hemp for fiber and grain, with minimal interest in CBD oil. The organizer felt that fiber and grain represent a more viable long-term, stable production opportunity that would involve the acreage for meaningful crop rotation.

The organizer's stated outcome for the meeting was the motto: "Inform, Warn, Enable."

Some conference attendees, considering the time regulatory procedures and the application process will require, were unsure there would be significant hemp farming in Texas in 2020.

Hemp is viewed as a versatile crop. Though CBD oil to date has been the most profitable, the CBD industry is leveling out quickly. The means of extracting CBD using either ethanol or carbon dioxide extraction were discussed.

For hemp as fiber, though "fiber" is used generally, there are two portions of the plant that have economic value. *Bast* is the outside part of the stalk. This appears to be the larger market. *Hurd* is the inner part of the stalk (the pith), which is often viewed as a waste product. Each requires different procedures to isolate the desired material.

There is a lack of uniformity in means of hemp production. This should improve with time. Attendees reported from a recent hemp conference in Kentucky that some farmers there are making money, some are breaking even, and some are losing money (it was not discussed why).

Unfortunately, the meeting started with three different sponsor speakers who mainly discussed products that could be used for hemp production. But the information did not address much on how hemp grows, how it should be farmed, etc.

One speaker suggested that sprinkler and flood irrigation is not recommended for hemp. He listed hemp as using 2.8" of water per week (somewhat higher than other estimates I have heard). Like others, though, the speaker noted that if hemp is overstressed, THC levels increase thus risking potentially having to destroy the crop. It was not discussed whether LEPA drag socks might be a viable alternative to drip irrigation.

Other irrigation comments included concerns that pivot sprinkler irrigation could increase disease conditions. (In reality, though, for West Texas this is not normally a concern in other

crops because humid conditions are still lower than in Central Texas. It was stated that pivots could damage the tops of the plants (floral structure). Some hemp varieties might reach up to 15' tall. Typical Kentucky farmers report (for CBD?) about 8-9" of rain during the growing season supplemented with 10-13" irrigation. Some Colorado farmers are irrigating about 12" (but it was not clear on the duration of irrigation, e.g. 2-month crop vs. 4-5 months).

Speakers knew of one farmer in Colorado in 2019 who planned to plant as many as 4,000 acres for CBD. It was wondered if this scale of production might bode poorly for those thinking of trying to grow 1-2 acres for CBD oil.

A South Texas farmer who has a medical exemption to grow hemp for CBD oil offered a few comments.

An attorney who actively lobbied in the Texas legislature attended. She also collaborated with state Sen. Charles Perry, who was instrumental in the hemp bill passage. She noted it took a lot of time with legislators (not Perry) to explain hemp vs. marijuana; patents and plant variety protection act (PVP) rules, varieties, many of which do not have documented background due to marijuana.

Speakers mentioned CBD fields must be all female, because males and pollen lower/degrade production of CBD. (Later, Texas A&M AgriLife needs to learn more about this, especially if a few male flowers are tolerable in large scale farming because the sheer production volume may overcome the effect of a few male flowers in CBD oil production.) Will all CBD production have to be in a greenhouse? (No.) But pollen from a regular hemp field a few miles away from a CBD field will probably damage it. Pueblo County, Colorado, has set up zones for CBD vs. other IH production to protect CBD growers from this potential issue.

Comments from a hemp clone and genetics supplier

A company owner spoke about his methods for producing and supplying genetic clones for CBD oil production. Hemp production for grain and fiber is largely from planted seed, which is (or should be) certified by AOSCA (Association of Official Seed Certifying Agencies). Where hemp is approved, growers should check their state's approved variety list.

For high CBD oil production, farming can start with regular seed (not common), feminized seed (produces only female flowers), plantlets (meaning transplants?), and clones. There may be little certification yet, though some states have lists of approved varieties. Approximate seed cost for grain and fiber, <\$0.10 per seed; high CBD regular seed, \$0.10-0.25/seed, possibly \$0.50/seed; high CBD/feminized seed, \$0.50-1.00/seed.

Rooted clones/plantlets were discussed. Their higher up-front cost ranges from \$2 to 10/each. They do not develop a tap root but have a good adventitious root system. Clones are made from cuttings off a mother plant and they are an exact genetic copy of the mother plant, which gives higher consistency in the field.

Clones are transplanted in the field at 6-12" tall which gives a head start on the growing season. Clones require acclimation/hardening off in a greenhouse before going to field.

For CBD, you want only female flowers to produce oil. If pollination occurs, then it produces seed and the CBD yield is much lower. Female plants can be sprayed with colloidal silver, but it was not clear how this amplifies female floral structure or suppresses male flowers. Genetic program goals target as little as 1 male or less among 5,000 plants.

Hemp that develops from seed (vs. clones; not sure if it also meant feminized seed) develops a taproot, which is better.

Because cross-pollination can seriously reduce CBD oil content, Oregon is considering banning non-CBD hemp. California has CBD & non-CBD counties. Bees can travel a couple miles, birds even further, and carry pollen.

Hemp planting seed is very small (size of alfalfa, winter canola, sesame, hybrid pearl millet?) and some farmers have trouble planting it especially since the target plant population is quite low. (This does not bode well for planting any hemp in drier areas where rain is infrequent. Small seed may be limited to 1/2" and at most 1" deep planting.)

Planting from seeds has less upfront cost but with current varieties there is substantial impurity hence multiple phenotypes in the field. A lot of seed producers advertise seed stability using F1 seed, but it is not backcrossed enough, so there remains wide variation among plants in the field. With many phenotypes it is hard to determine yields and percentage of CBD.

There is a high risk of males pollinating your CBD field. Even feminized seeds can yield a handful of males in the field. One male can severely affect your yield and potency. A speaker offers that an unpollinated field could be 12-15% CBD vs. 6-7% CBD if pollinated. (However, it remains to be seen if large-acre farmers with some pollination might be more economical than high-percentage CBD production due to significantly lower costs. This may depend on the processor, if they are willing to accept raw material with lower CBD content.)

Notes from a Colorado hemp CBD oil farmer

He said there will be a significant learning curve for the next five to 10 years for hemp farmers. He sees a need for farmers to work together.

For his and most other Colorado farmers' hemp fields: For grain and fiber, 30" rows, 6" plant spacing (this is, ~35,000 plants/A; it was not stated what the seed rate drop would be in seeds per acre). For high CBD production, 60" rows, 48" spacing, or about 2,000 plants per acre maximum. There is use of plastic mulch culture with drip irrigation (he would not farm CBD hemp without it, and the mulch helps suppress weeds). The planting rig for CBD uses a three-row transplanter and can plant up to 75 acres in one day (I think that was two or more

machines). There was no mention of cost per acre for this mulching practice. He uses fertilizer injection in the irrigation water, primarily for P. Wide plants are desirable for CBD production.

There are no uniform guidelines or formulae for production of hemp.

His hemp water use per acre: 12" per season (this was not specified as irrigation or rainfall, but I assume it was irrigation only). The farmer compared this to corn in the area at 24-30" acre-inches of water per season. (My thought is most Colorado corn grain farmers might not be quite that high.) It is best to have clean (low salts or low TDS) irrigation water, but no information was offered on what salinity levels should be in ppm, etc., to not restrict hemp growth.

The farmer stated there is an effect of environment on CBD, THC, but did not specify.

Harvest: For CBD, the whole plant is harvested, hung to dry to preserve trichomes; leaves and flowers shucked from stalks or ground in biomass. He uses an old modified tobacco harvester (Marco Hemp Harvester 6031?). Handle the hemp material gently. If not storing in a climate-controlled environment, then you could have mold (this is for CBD?). (Trostle note: it was not explained how a farmer with many acres for CBD oil would do this. The farmer discussion here may be only for limited-acreage high-yield CBD oil.)

The farmer offered his own assessment of the hemp industry in the U.S., particularly for CBD. He predicts the U.S. will "blow up" (crash?) in three to five years. He touts that he can make \$15,000 per acre after the bubble bursts (caveat emptor; this would seem highly speculative and seems infeasible). Equipment for hemp is already here. This includes a grain wagon ("Hemp Wagon"), harvesters from tobacco, etc. Processing is already done in many variations.

CBD oil extraction: CO₂ extraction, higher upfront cost, higher quality full-spectrum extract (60-70% CBD; throughput is 100 to 2,000 lbs./day of dried floral parts.) The ethanol extraction has lower up-front cost.

The farmer's caution on contracts and buyers. Be careful. Some buyers may not be reputable. Several oversell as if hemp has an amazing ability to make money, several promising pie-in-the-sky results. Don't try growing and hold out for better price; you won't get anything better.

If farming for CBD from clones for 10-100 acres, do the clone production yourself. The more acres you have then establish your own greenhouse and grow your own stock. He personally uses only clones, never seed.

He tests his own CBD crops weekly for possible THC with an in-field kit. There are likely regional labs that can run the test as well.

In his first years of Colorado hemp production he has had no disease issues. Due to federal regulation of cannabis, anticipate that pesticide law (Texas law and other states) will state any eventual labeled pesticide must be registered federally, not a state-approved (only) label.

Hemp is hardy, grows on a wide variety of soils, grows on marginal soils. The farmer has little to no concern that hemp is not regionally adapted, we just need to know which varieties are better.

Many other countries are already growing hemp for fiber, but the U.S. is leading CBD production (though we may be in a three-year bubble as acreage increases).

Hail damage on hemp is a concern. It is susceptible. Farmers must manage the risk with insurance if possible.

Hemp flowering can occur in as little as 52 days, but it also could be up to 95-100 days (variety and/or environmental differences?).

Is there a minimum soil temperature for planting? The producer didn't know. He plants in late May/early June in eastern Colorado.

There is a lot of biomass after CBD extraction. "There is nothing there." But there is possibly some use such as pelletizing and using to feed his boiler for CBD extraction.

The grower declined to speak publicly about his financials. He would share that information only with prospective farmers.

The farmer said Chase Bank is willing to finance hemp. He could not borrow from John Deere to purchase equipment to grow hemp, but if it was stated as generally for his farm, no concerns.

I asked the farmer: "If Texas A&M AgriLife were to conduct research on hemp, what did you think would be one or two high priorities for the crop?" He did not have a suggestion.

Comments from a Canadian hemp industry investor/processor

His company works on other products but has begun working with hemp. Canada regulations make CBD basically prohibited. Building products from hemp are a primary interest. Potential large-scale users of hemp fibers (bast or hurd) have not piled into industrial hemp because there is not enough supply. Thus, a company like his is interested in a state like Texas. Once there are enough farmers and supply, then numerous companies may become interested in using hemp. Fiber/hurd is economical based on basic economics. Fiber markets and processing need to be near the farmers. His company's goal is to have all production within 120 miles of processing.

His projections (without stating the actual per-acre yields) were hemp straw \$500/A, seed \$450/A and fiber \$350/A. He commented about CBD oil being perhaps \$4,000/A, but you could get paid as well for these other materials if growing for CBD. Company goals include getting farmers more involved in the commodity supply chain. Not just get paid for the material, but perhaps a co-op that gets more value.

Other estimates were provided: industrial hemp fiber is about \$300/acre, but if high quality, \$1,000/A for fine fiber. They estimate \$1,250/A net at 5 tons per acre (stalk, not leaves or flowers). Canadian estimate was \$800/A production costs, gross was \$2,000/A.

Patagonia is offering to develop a hemp clothing line using hemp fiber. (Production conditions and management are likely different.)

Comments were made about industrial hemp reducing the need for forest products.

A software developer comments about software management and required record keeping for production, processing and transportation of hemp products

Software has been developed to handle all logistics of the hemp supply chain. Documentation can be prepared to show someone is not laundering money. The software will provide ready reporting of the history of the hemp from production to final product. It will also provide needed manifest documentation for haulers.

Comments from Texas state Sen. Charles Perry

Because there remain public issues regarding hemp as cannabis/marijuana, he recommends and speaks in terms of hemp (not cannabis). Hemp industry partners should find a way to band together. Don't jump into hemp production too fast. "I don't think you want to get engaged in the hemp industry before the economics and markets are established and known," he added. Pharmaceuticals is a potential market.

For hemp $\leq 0.3\%$ THC is federal law. There will be no push from Texas to go higher than that. Perry encouraged attendees to recognize false claims, unscientific statements, excessive statements about financials, etc. when you see it. There will be a lot of it out there. Don't make rash decisions. Seek advice. Compare information with others.

Audience questions about growing hemp

A member of the audience submitted numerous questions to the program organizer about how to grow hemp. There was much discussion about hemp and what it can do, but the meeting overall was low on agronomic information. A few of the questions were read to the speakers. These included best planting date, if hemp was susceptible to nematodes or dicamba drift, freeze injury, etc. There were few if any answers offered. The organizer noted afterwards that there was probably no one there who knew the answers. This prompted my writing an additional document "Industrial Hemp Farming & Common Questions for Texas—Part 3. Critical Questions about Farming the Hemp Plant" (see <https://lubbock.tamu.edu/programs/crops/hemp>). The document is not a complete list, but it reflects over 100 questions Texas A&M AgriLife staff will seek to learn about to help producer clientele have more information if they decide to try growing hemp.

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We gratefully acknowledge Tillery and Doug Sims, Sims Land Services, Lubbock, Texas for the invitation to attend the hemp meeting described in this document.

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