**Project CBD update: the tango of supply and demand**

By O’Shaughnessy’s News Service

Cannabidiol (CBD) is well on its way to becoming a household word. Increasing numbers of medical marijuana users know that the non-psychoactive cannabinoi
dol dominant in hemp strains has important medical effects. CBD-rich plants have been crossed with one another and new strains of interest have been identified by labs. And, most significantly, extracts with measurable doses of THC and CBD are available.

Several offspring of the “Cannatonic” seeds originally provided to Project CBD by European allies were found to have a CBD-to-THC ratio slightly greater than 20-to-1. Similar CBD-THC ratios have turned up in plants identified by the grow
ers as “AC/DC” and “Oracle.”

**Same strain, different names? The Werc Shop’s Analysis**

“Project CBD played a big role in carrying the message,” says director Martin A. Lee. “What we could not achieve was a balance of supply and demand.”

**CBD Strains From Europe**

Grown out in California

**Allies in Europe provided Project CBD with seeds from nine CBD-rich strains. Four seeds from each variety were grown out by a trusted friend in a small garden in northern California. He reports:**

*The seeds were started on April 20, 2012. The seeds were transplanted to pots on April 22nd with 100% germination. On June 20th, the survivors were transplanted into amended soil mix of garden soil and forest purple humus. Soil tests showed that they only needed supplemental nitrogen, which was provided by aged feather meal and bat guano. The soil warmed, approximately on July 1, the plants exploded into growth and only needed water and sunlight until finishing. Flowering revealed that all plants were females. CBD Shark and Mango Haze seemed vulnerable to cold as they were both slow to start. Two CBD Shark and three CBD Mango Haze plants died while growing out in small pots. Day time temperatures were 55F to 65F and down to 40F at night.**

**Observations:**

CBD Shark: Not a big plant, no problems with bugs or molds. Set flower first around August 5, and finished first on October 1. Heavy producer for such a small plant.

CBD Mango Haze: Strong sativa, no problems with bugs or molds. Late to set flower, never got real chunky and a late finisher. It wanted more time on the 21st of October.

CBD Nordle: Strong and vigorous plant, no problems with bugs or molds. A good producer with a strong piney smell. Anecdotal evidence suggests it is good for pain relief, trimmers loved it.

CBD Critical Mass: Only plant to show any sign of powdery mildew and on one branch only, was next to a plant that had lots of mildew, not a CBD variety. Was free of any other problems and was the heaviest producer. Anecdotal evidence is of strong, stoney smoke.

CBD Outdoor Mix: A fairly good producer but seemed the weakest of these varieties. One plant had a few spider mites, and the dreaded bud moth caterpillars were only interesting to a few of the all the plants in the garden.

CBD Yummy: Strong plant and good producer, late finisher that wanted more time on October 20th.

CBD Medi-Haze: Strong beautiful sativa that finished with fluorescent purple hairs on the flowers. Very nice smoke with heavy buds.

All plants were in a garden that received approximately eight hours of direct full sunlight per day. Elevation of the garden is appox 3,000 feet with southern exposure and the water is free of chlorine and all other chemicals. Ph of the water is 6.0.

**Strain-specific oils**

My next step is to work with a chemist who uses hexane to extract the oils and the same as the commercial food industry uses to extract soy for veggie burgers. Our plan is to make mostly “ground CBD-rich oil” and a few strain-specific oils.

In our first collaboration, approximately 600 grams of “Nordle” flowers were made into 130 grams of oil. I liked the yield but it was productive, and it was first harvested.

Chemist Bernard Hopkins of Dabbers Delight adds: “A gram of oil extracted with hexane has significantly higher levels than a dried flower of not just cannabinoids but also the terpenes and flavonoids, which are known to have medicinal effect.”

“With each new strain comes the possibility of making a new extract with potentially unique medical properties. By making strain-specific CBD concentrates, we are able to document and test the different entourage effects of compounds that act differentially together than they do as individual constituents.”

“By comparing oils with similar CBD-to-THC ratios but different terpene levels, we can finally begin to identify which of these compounds are exerting which effects on the body and mind.”

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**Maximum Available**

Nine strains from Spain grown from seed by a Project CBD ally were tested by Pure Analyt
cs lab in late October. Darkened cells indicate highest quantities of THC, CBD, and CBG detected among the samples.
Avidelk!

In a video that aired June 27, Reuters' Tara Cleary reported on the availability of cannabis plants in California. Cleary said, "where you have a locally established grower, you have a very good product that people want. But it's not very easy to get."

Cleary also noted that "the spread of marijuana in the United States has been quite rapid. But the amounts per gram are about six times greater in the United States than what's found in CBD-rich marijuana strains. The kind of CBD-rich plants being grown for the medical market in the U.S. produce much more cannabinoid than fiber hemp plants. Medical Marijuana, Inc. says it circumvents the federal prohibition by extracting CBD from industrial hemp—no matter the source—because it is grown outside the United States in five different countries. MLNA won't disclose which countries. The initial extraction is performed by another subsidiary, Phytophore, which provides raw hemp oil that eventually goes into three Dixie X products: Dixie X Dew Drops (a tincture), Dixie X Elixirs (a full spectrum CBD oil that eventually goes into three Dixie X products) and a topical "pain relief salve." Keber told The Daily Beast.

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CBD-rich samples tested by Halent
Cannabis (21% CBD, 0.7% THC)
ThcO2 (0.7% CBD, 21% THC)
Dixie Dew Drops 1.2% THCV A (16% THCA)
Blueberry (0.9% CBG, 9% THC)
Himalayan (1.5% CBD, 21% THC)
Train Wreck (16% CBD, 4% THC)
Terpeo Queen (14% CBD, 3% THC)
Harlequin (14% CBD, 15% THC)
CRC Harlepin (13% CBD, 5.5% THC)
Blueberry (0.9% CBG, 9% THC)
Wizard (3% CBD, 4.6% THC)
Omerta (3% CBD, 8.5% THC)
Superg 8 (12.5% CBD, 7% THC)
Harlequin (12.5% CBD, 3.5% THC)
Blueberry (0.9% CBG, 9% THC)
Blueberry 0G (12% CBD, 4.8% THC)

CBH's high THC phenotype
This phenotype contains terpenes that contain relatively high amounts of the so-called “mi- noe” cannabinoids, whose medical potential has been mostly under-the-radar. When such plants are identified, the clients are notified that they have something out of the ordinary that they might want to use in a breeding program.

Three strains were found to be relatively high in Cannabigerolic (CBG) acid.

- Vaiven Kush 5% CBGA (21% THC)
- Doobie 12% CBGA (12% THC)
- SSDH 2.6% CBGA (16% THC)

The following contained relatively high levels of THC:

- Varin: Dixie Dew Drops (12% THC)
- THCVA (14-16% THCV)
- Bubba 420 XXX: 1.5-5.2% THCVA (5.8% THCV)
- Time/Wreck: 2-4% THCVA (1% THC)
- Sour Diesel TCV (3% THC)
- Harlequin B (10-14% THC)
- Durban Poison 1% THC A (16% THC)
- Durban Poison 1% THC B (16% THC)

These were highest in cannabinoidsome (containing all 0.5-1.0% of the following: CBG, CBGA, and THCV).

M123
Casey Jones
Mr. Nice
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Green Ribbon
Green Crack
Mr. Nice
continued on next page

The test results from Wec Shop indicated that the Dixie Scrip capsules were nearly devoid of terpenes, which were lost during processing.

CBD and raw THC-Acid becomes neutral when other cannabinoids in the two-ounce bottle of the Dixie X Dew Drops tincture, as advertised containing 500 mgs of CBD and other cannabinoids.

Halen identified the contents of a 241 CBD-rich sample tested by Halent Labs noted that many plants being grown from supposedly stabilized seeds or clones were, in fact, disappointingly different from the grower thought. For example, Halent —using HPLC technology that measures the cannabinoid content of specific strains— had identified “Cannatonic” flowers with CBD-to-THCA ratios of 21-to-0.7 and 22-to-1. In addition to this CBD-rich phenotype, Halent also tested “Cannatonic” with ratios of 4.0 to 22, and 1.0-to-14—in other words, a

Toning down the medicinal claims for CBD products seems appropriate given that their therapeutic value is limited by the paucity of biologically active terpenes and THC, which may result in diminished medicinal impact for the consumer. For more pronounced results. Others may benefit to some degree from these so-called weak medicine, but for many people, the Dixie X CBD products might be the only way they can access cannabinoids, especially if Medical Marijuanica, Inc. is able to market its products nationwide.

Whether Dixie’s CBD products are ultimately successful in the marketplace may come down to a matter of cost-effective- ness. Dixie X Dew Drops tincture on a dose-per-dollar basis to justify Dixie’s asking price when more concentrated CBD extracts, infused with a synergistic bouquet of cannabinoids and terpenoids, are becoming available in states where medical marijuana is legal.

In conclusion, we find this message from Dixie Botanicals on its website: “We have revised our labels for our small container products to indicate that we do not have enough room for the Supplemental Facts box.” Thus there is no indication of how much CBD may be contained in small containers, but consumers can allegedly learn “the approximate amount of CBD received by serving” by visiting Dixie’s website.
The grower of the strain that Halent affiliated with Halent has developed a chromatographic method that separates THCV from the mixture of cannabinoids without leaving about half of the associated entourage intact with the CBD-containing component, deCesare claims. This method allows for a CBD:THCV ratio of between 30:1 and 1,000:1 — even starting from Harlequin, which typically produces a 5:2 ratio.

Another way to get CBD? "When properly constructed, the column yields a 10-to-20 fold improvement in the ratio of CBD to THC, more or less, for each pair. For Cannatonic C-6, only one pass is necessary to achieve at least a 1:501 ratio. With Harlequin, the two passes were required to achieve a 1:201 ratio."

Some advocate using a portable mass spectrometer detector and a mass spectrometer to get CBD directly. "It adds a couple of steps to the preparation of samples," says Linker, "but it's more accurate." The reflectivity of the inert sorbent is exposed to infra-red light at the client's request, and volume. Since this was being done for longterm storage. "The added advantage in fractional collecting," deCesare points out, "is the ability to selectively remix the ratios desired, the inclusion of other meaningful cannabinoids like CBG, CBC and CBDN, and the stability of the terpenoids concentrated in thc, for longterm storage."

The separation method has not been employed on large batches — runs have involved less than five grams, done pro bono for family patients. "Scaled-up technology is being developed by a couple of manufacturers to produce larger amounts and serve more customers," deCesare said as this issue went to press in February 2013.

The new study in Cancer Research, entitled "Similar Effect for Brain Cancer Cell Lines," shows that the Id-1 gene has the same key role in regulating aggressive brain cancer as it does in controlling metastatic breast cancer cells: when the gene is "turned off," the spread of the brain cancer cells is slowed down. And more importantly, CBD was effective in turning off the gene in both culture and animal models using biopsies and animal subjects, validates their earlier breast cancer studies. Efforts are now underway to begin clinical trials with cancer patients to confirm efficacy and toxicity treatments such as Tamoxifen or Herceptin.

Efforts are currently underway to begin clinical trials with cancer patients to confirm efficacy and toxicity treatments such as Tamoxifen or Herceptin. What's so thrilling about this discovery is that it offers a new window of hope," said Dave Fryer, SutterHealth.org CEO. "This is a key component of the technology that Steep Hill provides to dispensaries, growers, and others seeking to assess the contents of cannabis samples without bringing them into the lab. The original Quantacann system involved direct measurement of flowers and trichomes, and has leased a headspace sampler to press in February 2013.

Nine clients are leasing Quantacanns for separating cannabis compounds similar to THC, the primary psychoactive compound in the plant. We were excited to realize that CBD, this lesser known compound in cannabis, could halt breast cancer metastasis through the inhibition of Id-1, said Dr. McAllister, senior author of the new study.

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CBD-V As a Treatment for Epilepsy?

Researchers led by Ben Whalley at the University of Reading reported in the September British Journal of Pharmacology that cannabidivarin —CBDV— suppressed seizures in animal models of epilepsy. Whalley et al were testing a CBDV-rich extract developed by G.W. Pharmaceuticals. CBDV also proved effective in combination with currently used anti-seizure drugs.

Whalley told the university’s news service: “There is a pressing need for better treatments for epilepsy. It’s a chronic condition with no cure and currently in around one third of cases, the currently available treatments do not work, cause serious side-effects and increase fatalities. Currently prescribed drugs to prevent fits can cause significant side-effects to individuals’ motion and cognitive abilities that can adversely affect the quality of life for people who have to take them every day.”

“Our work has highlighted the potential for a solution based on cannabinoid science... Cannabidivarin is the most effective and best tolerated anticonvulsant plant cannabinoid investigated to date.”

Whalley and colleagues are now trying to figure out the mechanism of action by which cannabidivarin works to reduce seizures. GW hopes “to advance CBDV into human clinical trials” in 2013, according to R&D director Dr. Stephen Wright.

Labs Declare War on Dirt

The Association of California Cannabis Laboratories (ACCL) recently conducted its first round of validation testing. According to CEO Robert Martin of CW Analytics, nine member labs received identical liquid samples containing known quantities of THC, CBD, and CBN. When the labs’ measurements were compared, says Martin, “the values clustered together, except for one lab that had machine issues that week. We’re working with them to help resolve their problem.”

The labs taking part were The Werc Shop, Halent, Delta 9 Technologies, Excelsior, Halent, Green Style, Sequoia, Steep Hill and CW Analytical. “We’re working together in the interests of accuracy,” says Martin. “We all want to know that the numbers we’re coming up with are correct.”

Safety is another ACCL goal. Labs occasionally encounter Cannabis samples containing microorganisms that are associated with filth and can cause disease. The level can become concerning, Martin says, if bubble hash isn’t properly processed, handled and stored. “If you concentrate a product of the earth, you can concentrate dirt,” he observes.

“We don’t see this problem in oils that are made with alcohol or waxes made with butane —they’re microbiologically cleaner.”

The ACCL works with California hash makers “to help them clean up the way they handle their shake and the way they process and store their product. We work with vendors, go back through the process, and determine where it was contaminated. Ninety-nine percent of the time we find the smoking gun and they mobilize and do whatever it takes to fix the problem.”

“In 30 years working in the food industry,” Martin adds, “I never saw that. When notified of a problem, people would usually respond with denial or blame. In this industry, everybody wants to find out why it’s dirty and how to clean it up.”

Martin is frankly proud of the trade association, which he helped launch in 2009 with David Lampach of Steep Hill (who is the ACCL president) and Jeffrey Raber of the Werc Shop (now the CFO). “When it first started the labs wouldn’t talk to each other,” Martin reflected. “Now we have a forum where we can air our grievances. It’s really wonderful, a mature way of dealing with things. We hope we can provide an example for the rest of the industry: collaboration is the way to win.”

CBD in Colorado

New therapeutic opportunities are possible in the Rocky Mountains now that marijuana has been legalized for adult use. The Colorado “Free for All” program has announced plans to give away CBD-rich plants to anyone 21 years old in Colorado “who wants to try using CBD to prevent disease and increase their long term quality of life.” Participants will be given plants with the expectation that they will clone them and gift them on to others. “People no longer have to wait to get sick before they can use CBD legally,” Cannatech volunteer Bill Althouse explained.

Scheduled for launch in Denver in mid-February, the CBD-rich “Free for All” will be accompanied by educational events about the potential benefits of CBD. Those who receive a free plant will be encouraged to participate in a long-term study of the use of CBD as a preventative medicine. For more information, contact info@cannatech.coop. And for updates and announcements about the CBD-rich Free For All, follow Project CBD on Facebook.

Project CBD from previous page