

Hemp closer to *indica*

Sativa / Indica Genetics Gap Quantified

It has long been assumed that the difference between plants considered by cultivators to be *Cannabis sativa* and plants considered *C. indica* was the result of differences in the genes determining cannabinoid content. But the differences are spread throughout the genome, according to a new study by Canadian plant geneticists.

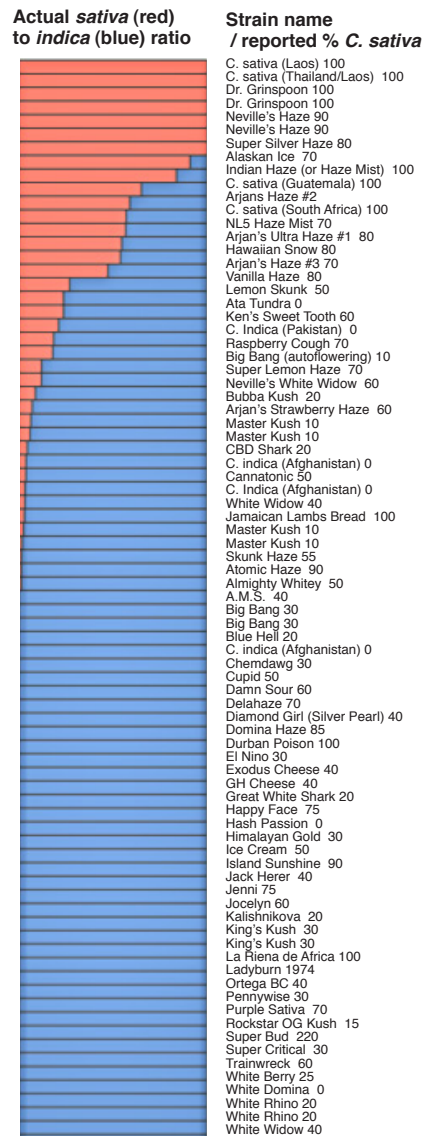
The researchers analyzed 81 marijuana and 43 hemp samples and found that “marijuana and hemp are significantly differentiated at a genome-wide level, demonstrating that the distinction between these populations is not limited to genes underlying THC production.”

The study, published August 26 on PLOS1, developed “evidence that hemp is genetically more similar to *C. indica* type marijuana than to *C. sativa* strains.”

The authors concluded that there is a “moderate correlation between the genetic structure of marijuana strains and their reported *C. sativa* and *C. indica* ancestry.” They also found that “marijuana strain names often do not reflect a meaningful genetic identity” —confirming what Dr. Jeffrey Raber and other chemists have concluded.

The reported ancestry of the 124 plants analyzed was determined via online database searches, seed companies and licensed cultivators. Co-author Darryl Hudson (DOC Solutions in Ontario) estimated the identity of 26 strains for which no online information was available. Only three strains were found to actually be 100% Sativa: Dr. Grinspoon, Neville’s Haze, and Super Silver Haze.

The graphic at right lists the strains tested and the ratio of Sativa (left hand part of each horizontal bar, in red) to Indica genetics (right hand part, blue). How inaccurate the commonly used names can be is illustrated by the total absence of Sativa genetics in Durban Poison, Jamaican



Lamb's Bread and La Riena de Africa —all reputed to be 100% Sativas.

Lead author Jason Sawler is with Anandia Labs in Vancouver and Dalhousie University's Agriculture Faculty. The study was planned by Sean Myles, also of Dalhousie, and Jonathan Page of Anandia Labs and the University of British Columbia Botany Department.

2015 harvest

Thousands of acres of hemp grown in Kentucky, Colorado and Tennessee

In 2015 the Tennessee Department of Agriculture licensed 47 farmers to plant hemp on 1,595 acres, and allowed importation of 38,180 pounds of seed for them (almost all from Canada). But, as reported by Clay Duda in the *Knoxville Mercury*, “One shipment that arrived in Memphis was sent back to Canada after the carrier, FedEx, discovered the package contained hemp seed, which the company considered a narcotic... Other delays were attributed to the DEA slow-walking necessary paperwork to import the seeds.”

So instead of planting in April and May —when fast-growing hemp would have shaded out weeds— Tennessee farmers were planting in June and July and their *Cannabis* had to compete with weeds. (The University of Tennessee had a one-acre hemp plot on which 15 herbicides and pesticides were tested.)

FedEx —but not the DEA— was also responsible for blocking hemp seed deliveries from Canada to Kentucky farmers. The Kentucky Agriculture Department licensed some 1,700 acres but only about 800 were planted, according to Eric Steenstra of the Hemp Industry Association. Heavy sprintime rains also impeded planting.

In Colorado 166 farmers were licensed to plant 3,657 acres of hemp in 2015. Some 2,300 acres were planted, availability of seeds being the main limiting factor. Colorado's Agriculture Department also licensed 571,000 square feet of space for indoor hemp cultivation.

Most of the crops are going towards CBD production. “Colorado tested 52% of the acres this year and only 8% were above 0.3% THC,” Steenstra says. Plants in only one field were found to contain more than 1% THC. “Given the lack of certified seed,

that level of compliance is really quite good,” Steenstra observes

Bill Polyniak is a Kentucky farmer who considers the hemp program “an absolute success.” Originally involved because he has a son with epilepsy, Polyniak now sees hemp as a way to “revitalize” individuals’ lives and the overall economy.

In 2015, Polyniak grew hemp in three Bluegrass Country locations —two dedicated to CBD oil production, one to seeds for planting in the future. “I’m thinking about 2025,” he says. “These children are going to need oil all their lives.”

After a CO2 extraction process in Kentucky, a portion of Polyniak’s CBD-rich oil is trucked to South Carolina, where it is further refined, bottled and sold by a company called Palmetto Harmony —“created after a collection of parents with special children ran out of options using modern medicine,” the website says. Palmetto Harmony CBD products are sold at healthfood stores in South Carolina.

Polyniak and his wife have developed their own brand of CBD-rich oil, “Genesis Blend,” available through their Kentucky Cannabis Company & Bluegrass Hemp Oil websites. The 2014 harvest enabled Polyniak to get the price per milligram of CBD below a dime. The 30 ml bottle holds 300 milligrams of CBD oil and provides 10 milligrams per full dropper. (The dropper holds 30 milliliters.)A stronger extract of 1500 mg per bottle provides 50 mg of CBD per dropper-full. Both strengths are available in larger 4 ounce bottles.

Polyniak has applied for licenses to cultivate 20 acres of hemp in 2016. The goal of the breeding program is to maximize CBD content, seed production and fiber quality and quantity.



CBD-RICH PLANTS BEING GROWN FOR THE KENTUCKY CANNABIS COMPANY BY BILL POLYNIK.