

INDUSTRIAL HEMP (*CANNABIS SATIVA*) RESEARCH TRIALS IN HAWAII

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- Definition. Industrial hemp is *cannabis sativa* with THC levels $<0.3\%$. THC is the psychoactive component

QUESTIONS

- Main question, can industrial hemp be grown in Hawaii?
- Secondary questions are details on yields, water use, fertilizer use, cultivation ease, phytoremediation.

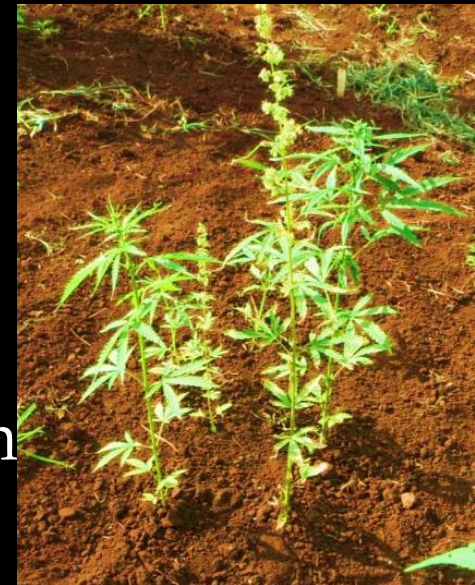
WILL INDUSTRIAL HEMP GROWN IN HAWAII? ANSWER, YES SUBTROPICALS

- On the model's left back is subtropical fiber hemp at full growth cycle.
- At her feet is temperate zone hemp
- At the left front is subtropical seed hemp
- Subtropical fiber and seed hems grow very well.



CONCEPT “ACCLIMATIZED” IS NOT SCIENTIFICALLY CORRECT

- Successful acclimatization implies that plants have the genetic and genetic control resources ready to react to environments with <14 hr daylengths.
- Our experiences with temperate zone strains show that they have premature flowering and senescence.
- Plant on bottom a temperate zone hemp growth cycle. It weighs 13 g or less than tablespoon.
- Our results say there is no acclimitization



EXPERIMENTAL DESIGN

- Planted in small squares and proved or disproved hypotheses by use of statistics.

	temperate	seed	fiber
mean height	58.5d	95.7c	193a
mean weight	20.3d	158c	627a

- Different alphabetical suffixes indicate significant differences.
- Heights in cm, weights in g
- Plants on the insides of squares used for measurements



YIELDS

- Should be determined by farmers. We did too many special things such as watering more often than a farmer would. (We avoided using drip irrigation.)
- **Fiber hemp stalks.** Per acre, 27-38 tons, 3 seasons/year. For building materials. Grow at high density.
- **Fiber hemp leaves.** Get 31-35 tons/acre/year and 3 seasons/year.
- **Seed hemp.** Can only grow 2 Seasons per year. About 1.7 tons/acre/year. About 20,000 candy bars for omiyagi.
- Other uses possible. Farmers are very creative. Capacitors, anti-cancer chemicals.

ODDS AND ENDS

- Repeating. Now is the time for farmers to try hemp out after suitable seed is obtained.
- We have some preliminary information.
- If you try to sprout hemp seeds, you will fail and blame the birds. We have reported a way to successfully sprout.



ODDS AND ENDS

- We did not use pesticides. Hemp cultivation is pesticide free.
- Hemp was self-weeding in our trials.
- Increasing fertilization to 100 kg nitrogen/hectare did not increase growth.
- Water use was 1/6 that of sugar cane and increased irrigation did not increase growth.



ODDS AND ENDS (CONTINUED)

- In 49 days, hemp absorbed and metabolized 80% of the model pesticide atrazine we applied. Hemp phytoremediates.
- Have to carefully read cannabinoid profiles. New strains are being bred/found. The high CBD strain at right is still marijuana. I have not seen high CBD (ca. 10%) and low THC (<0.3%).

Mold	Pass
pesticides	Pass
Terpene	Pending
CBD-A	9.71
THC-A	11.4
CBD	0.10
CBG	0.12
CBN	0.09
d9-THC	0.31
d8-TH	0.24
CBC	0.13

ODDS AND ENDS (CONTINUED)

- My agricultural background makes me want to get results right away. This is why I have looked into hempcrete as a building material. It reminds me of the stands of trees or hemp plants in Italy. They no longer have forests for houses.
- Below is the hurd (stalk) and the bast (“skin”). The hurd is used for hempcrete.



ODDS AND ENDS (CONTINUED)

- Forage for cattle has always been lacking in Hawaii. Hemp leaves can be forage.
- Hemp seeds are delicious and much of the hemp crop in Canada is sold via Amazon as Hemp Heart candy bars.
- We have shared DEA and other agency problems with everyone who wanted to know. We needed a U.S. Senator, an HIA lawyer as well as an Assistant Secretary of the U.S.D.A to intervene on our behalf to get seeds.
- Contacts for seeds have been shared with the HDOA.
- Industrial hemp needs to move forward. The seeds have been sown.

MAHALO

- Hawaii Department of Agriculture and CTAHR.
- Hawaii Legislature.

