2019 GRAIN & FIBER HEMP VARIETY TRIAL - Chatham

J. DeDecker, K. Thelen, C. DiFonzo, M. Chilvers, C. Kapp, A. Stawara

Researchers at Michigan State University received funding from MSU Extension and AgBioResearch to conduct a grain and fiber hemp variety trial at two locations in 2019. Nine varieties of grain and fiber hemp were planted in East Lansing and Chatham, MI. Here we report only information regarding the trial conducted in Chatham at the MSU Upper Peninsula Research and Extension Center (UPREC) – North Farm. Hemp varieties 103-125 days to maturity were sourced from Canada and the Northern US (X-59 only) under the assumption that conditions there would be similar to the U.P., particularly in terms of day length and temperature.

1,500 lbs. per acre of 10-0-4 poultry litter and 321 lbs. per acre of 0-0-22 Kmag were incorporated pre-plant based on soil test results. The trial was planted June 14th at 45 lbs. per acre. The experimental design was a RCBD with four replications. Plots were 4 ft. X 16 ft. with 7 inch row spacing. The trial was hand hoed once for weed control on July 1st. Observations of stand establishment, flowering date and height at flowering were recorded (Table 1). To help mitigate the risk of pollination for our neighbors growing cannabis, we took the unusual step of removing most male plants/flowers from our plots. Our plants were eventually pollinated by male escapes in the trial, but this likely influenced the timing of pollination and also yield. Flower samples were collected on August 25th and submitted to MDARD for THC analysis (Table 2).

Plots were harvested on Sept. 5th (dioicous) and Sept. 12th (monoicous) based on maturity. We hand cut and separated flowers and stems from two 1 m2 quadrats per plot. Flowers were oven dried at 140 degrees F and threshed using an Almaco small bundle thresher. Seed was cleaned using a Clipper seed cleaner, weighed and tested for moisture. Grain yields reported here are adjusted to the industry standard of 9% moisture (Fig. 1). Stems were bundled and left in the field for four weeks to "ret". Stems were

Variety	Use	Habit	Maturity	Stand Est.	Stand Density (plants/m^2)	Flowering Date	Height at Flowering (cm)
CFX-2	Grain	Dioicous	103 days	10.28%	47.48	7/12/19	81.48
CFX-1	Grain	Dioicous	105 days	8.64%	39.53	7/12/19	81.92
Grandi	Grain	Dioicous	110 days	13.95%	64.59	7/12/19	81.74
Katani	Grain	Dioicous	110 days	13.68%	62.24	7/11/19	81.99
Picolo	Grain	Dioicous	110 days	7.65%	35.32	7/11/19	71.32
X-59	Grain & Fiber	Dioicous	110 days	2.79%	12.83	7/14/19	93.27
Anka	Grain & Fiber	Monoicous	110 days	11.71%	53.24	7/20/19	139.90
USO 31	Grain	Monoicous	125 days	10.81%	49.83	7/23/19	137.92
Fermion	Grain	Monoicous	125 days	8.68%	39.95	7/30/19	164.34

Table 1. Hemp varieties and early observations.

TRIAL DETAILS

PURPOSE:

Compare performance of available grain and fiber industrial hemp varieties, under Northern Michigan conditions

TRIAL LOCATIONS:

MSU UPREC-Chatham

MSU Campus-East Lansing

EXPERIMENTAL DESIGN:

Randomized complete block design with four replications.

TRIAL MANAGEMENT:

- Planted June 14, 2019 at 45 lbs/acre
- Plots 4' X 16' with 7 in. row spacing
- Borders and alleys planted to minimize edge effect
- 1,500 lbs/acre of 10-0-4 poultry litter applied at planting
- Hoed once for weed control
- Male plants/flowers clipped, or rogued through July

TAKE AWAYS:

- Dioicous varieties from Hemp Genetics International produced the highest grain yields.
- Monoicous varieties produced the highest fiber yields.

then oven dried at 140 degrees F and weighed. Fiber yields reported here are adjusted to the industry standard of 10% moisture (Fig. 2).

Results and Discussion

Stand establishment was a significant challenge in this study, based on a combination of poor seed quality (low germ) and challenging seedbed conditions. We learned that seeding rates adjusted for germination, a fine, firm seedbed and shallow planting depth are critical for hemp establishment. Seedbed conditions should be similar to alfalfa, which is best achieved with primary tillage in the fall and secondary tillage in the spring.

Variety	Total THC	CBD	Variety	Total THC	CBD
CFX-2	0.10%	1.30%	X-59	0.04%	0.90%
CFX-1	0.10%	1.50%	Anka	0.10%	1.20%
Grandi	0.10%	1.50%	USO 31	n.d.	0.40%
Katani	0.20%	0.50%	Fermion	0.09%	2.00%
Picolo	0.10%	1.70%			

Table 2. THC and CBD concentration of hemp varieties.

Our biggest surprise this year was plants flowering 3-4 weeks after emergence. Cannabis is photoperiod sensitive, and was not expected to flower until day length declined to approximately 14 hours, which would occur in late August at Chatham. However, it appears that the varieties we studied are either less photoperiod sensitive as an adaptation to northern latitudes, or perhaps our late planting date caused extra early flowering. Regardless, early planting will be critical for grain and fiber hemp in Michigan to allow for as much vegetative growth as possible prior to flowering.

We observed that hemp is very competitive against weeds. Where stands were good, the crop did an amazing job competing with our very high weed pressure after only one hoeing. It is quite impressive in that regard, and will therefore make a good crop for organic growers, or could perhaps be used as a cover crop for weed control. Yet, where stands were thin, weeds quickly overtook the crop.

Grain and fiber yields were within the expected range for our location. Grain yield averaged 980.64 lbs/a with the highest yielding variety, Grandi, producing 1,440.68 lbs/a and the lowest yielding variety, USO-31, producing 498.90 lbs/a. Fiber yield averaged 3,000.26 lbs/a with the highest yielding variety, Anka, producing 6,736.30 lbs/a and the lowest yielding variety, X-59, producing 955.72 lbs/a. Monoicous varieties were much taller than dioicous varieties and produced significantly more fiber. All varieties tested below the regulatory THC threshold of 0.3%.

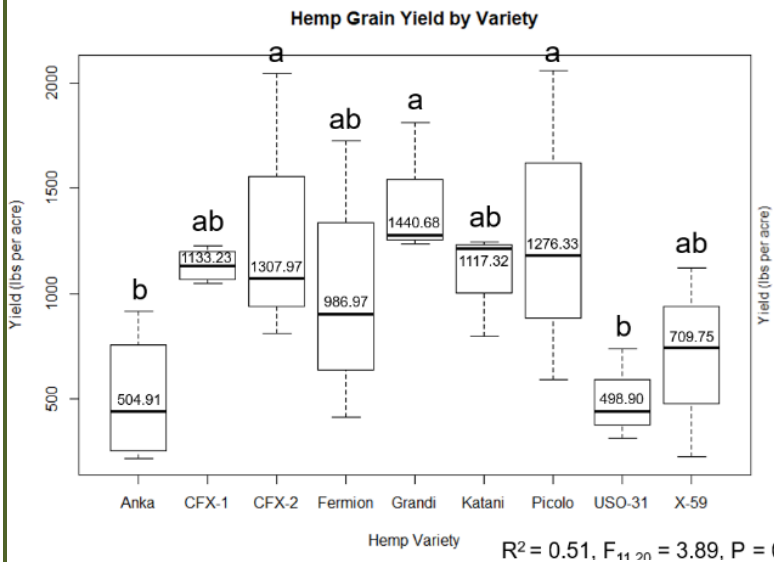

Figure 1. Hemp grain yields by variety. Varieties with the same letter are not significantly different. Numbers on bars are mean variety yields.

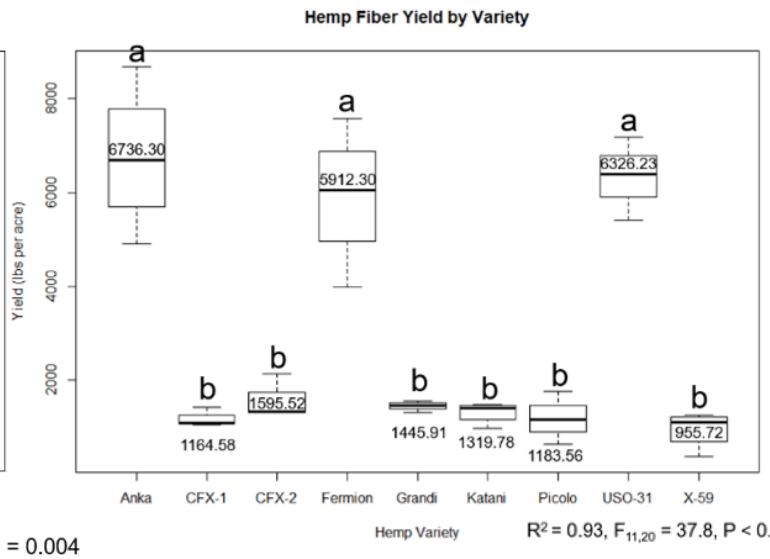

Figure 2. Hemp fiber yields by variety. Varieties with the same letter are not significantly different. Numbers on bars are mean variety yields.