

# Hemp Tribal Research Initiative for Michigan (TRIM) 2021 CBD Hemp Cultivar Trial



**Authors: James DeDecker<sup>a</sup>, Andy Bahrman<sup>a</sup>, Thurman Bear<sup>c</sup>, Rosebud Bear-Schneider<sup>c</sup>, Chris Bundy<sup>e</sup>, Joe Charlebois<sup>a</sup>, Joseph Fisher<sup>e</sup>, Guadalupe Gonzalez<sup>e</sup>, Elisa Grossman<sup>e</sup>, Kathy Hart<sup>e</sup>, Christian Kapp<sup>a</sup>, Ben Southwell<sup>d</sup>, Steve Yanni<sup>b</sup>**

<sup>a</sup>Michigan State University - Upper Peninsula Research and Extension Center

<sup>b</sup>Bay Mills Community College

<sup>c</sup>Ziibimijwang Farm

<sup>d</sup>Lake Superior State University

<sup>e</sup>Saginaw Chippewa Tribal College

## Introduction

The recently rebirthed hemp industry is seeing a dramatic increase in investment, but there is still substantial uncertainty regarding agronomic practices and potential markets, including such basic information as what cultivars should be grown. To address this lack of information, a replicated cannabinoid hemp cultivar trial was conducted in the summer of 2021 at the University of Wisconsin-Madison Arlington Research Station, Michael Fields Agricultural Institute (MFAI), Michigan State University – Upper Peninsula Research and Extension Center (UPREC), Saginaw Chippewa Tribal College (SCTC), and Ziibimijwang Farm (ZF, Little Traverse Bay Bands of Odawa Indians). The main objective of the cultivar trial was to obtain data on how currently available hemp cultivars perform in different Upper Midwestern locations. Farmers can use this data to help choose the best cultivars to plant, and breeders to decide on key traits in need of improvement. Cooperators in Michigan together evaluated twenty-five different hemp cultivars for plant height, uniformity, flowering time, biomass yield, and cannabinoid content, the results of which are reported here. Michigan locations were supported by a grant from the USDA-NIFA Tribal Colleges Research Grant Program. The information synthesized from these trials will help refine and expand the knowledge base and increase the successful adaptation of hemp as a viable option for farmers and Native communities in the Midwest region.

Hemp producers and processors are required to follow tribal/state and federal regulations regarding hemp production and registration. Growers must register within their intended state/tribe for production and must adhere to most current or active rules and regulations. Regulations are subject to change from year to year with the development and approval of proposed program rules. It is important to note that these regulations may vary across state/tribal lines and may be impacted by pending federal regulations. Please refer to the [Michigan](#)



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[Department of Agriculture and Rural Development hemp webpage](#) for rules and regulations regarding producing hemp in the state of Michigan.

## 2021 Growing Season and Soil

Temperatures were above normal and precipitation below normal at UPREC in Chatham, Michigan (46.353274, -86.930878) during the 2021 growing season (Table 1a). Temperatures and precipitation were both slightly above normal at ZF in Carp Lake, Michigan (45.695322, -84.813714) (Table 1b). Temperatures and precipitation were slightly above normal at SCTC in Mount Pleasant, Michigan (43.596437, -84.710299) (Table 1c). The trial at Chatham was planted on Eben very cobbly sandy loam soil following onions. The soil type at Carp Lake was Emmet sandy loam, which was previously fallow. The trial at Mount Pleasant was planted on Thetford loamy sand, which was previously fallow.

**Table 1a. Average monthly weather data for UPREC at Chatham, Michigan in 2021.**

	Jun.	Jul.	Aug.	Sept.	Oct.
Average Temp (°F)	65.21	66.22	68.29	58.63	53.26
Total Precipitation (in)	4.22	2.03	1.25	2.82	2.03

**Table 1b. Average monthly weather data for ZF at Carp Lake, Michigan in 2021.**

	Jun.	Jul.	Aug.	Sept.	Oct.
Average Temp (°F)	66.11	66.49	69.96	60.05	55.09
Total Precipitation (in)	3.01	5.74	5.01	2.31	2.17

**Table 1c. Average monthly weather data for SCTC at Mount Pleasant, Michigan in 2021.**

	Jun.	Jul.	Aug.	Sept.	Oct.
Average Temp (°F)	70.02	71.21	73.34	63.03	56.44
Total Precipitation (in)	4.12	2.62	3.88	3.56	3.85

Data retrieved from Enviro-weather formerly Michigan Automated Network (MAWN)

## Experimental Location and Design

A total of twenty-five cultivars were evaluated between the three Michigan locations including three day-neutral (a.k.a. auto-flowering) cultivars and twenty-two photoperiod sensitive cultivars. The UPREC trial included all twenty-five cultivars, while ZF included fourteen and SCTC twelve cultivars. All trials were established as randomized complete block designs with four replications at UPREC and three replications each at ZF and SCTC. Plots consisted of five plants with 4 ft in-row and between-row spacing. Feminized seeds were sown in greenhouses at each location on May 10<sup>th</sup> (UPREC photo-sensitive), 10<sup>th</sup> (SCTC), XXXX (ZF), and 24<sup>th</sup> (UPREC day-neutral). After hardening-off, seedlings were transplanted on June 10<sup>th</sup> (UPREC photo-sensitive), 16<sup>th</sup> (UPREC day-neutral), 17<sup>th</sup> (SCTC) and XXXX (ZF). 1000 lbs/a 10-0-4 feather meal fertilizer (Morgan's Safe Green Lawn) was incorporated with rotary tillage prior to transplanting at UPREC and ZF. 1,400 lbs/a 7-6-5 organic fertilizer (Morgan's Healthy Garden) was incorporated with rotary tillage prior to transplanting at SCTC. Weeds were controlled using black plastic mulch laid over raised beds at UPREC and ZF. Weeds were controlled using landscape fabric laid over flat ground at SCTC. Drip irrigation supplied water to the plants as needed, and fertility was supplemented with AgroThrive LF 2.5-2.5-1.5 fish emulsion applied in the irrigation water at a rate of 2 oz. per gallon, 3-4 times during the peak season.



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## Trait Evaluation

### *Plant Height*

Plant height was measured from the base of the plant to the tip of the tallest inflorescence. Plants were measured at harvest. The data was collected in inches and is reported in inches using the average of three plants per plot.

### *Flowering Time*

Flowering data was recorded weekly after planting. A plant was considered to be flowering when clusters of female flowers were observed at the shoot apices (terminal flowering, Fig. 1). All five plants in a plot were rated for flowering. Flowering data is presented as both the average number of days after transplanting and actual date that terminal flowering occurred. Significant flowering intervals were observed for some cultivars, while others flowered consistently across individual plants/plots within a cultivar.



Figure 1. “Terminal flowering” showing female flower cluster and extruding stigmas at the shoot apices

### *Disease Score*

Disease incidence and severity was scored on three plants per plot at harvest in Chatham and Carp Lakes using a visual 0-9 scale to capture the approximate percentage of each plant infected with foliar diseases. White mold (*Sclerotinia sclerotiorum*) was by far the predominant disease observed in 2021, followed by Gray mold (*Botrytis cinerea*).

### *Cannabinoid Composition*

Approximately 3 inches of floral tissue was collected from the top third of each plant and aggregated at the plot level. Floral material was sent to Lake Superior State University (Sault Ste. Marie, MI) for analysis of cannabinoid potency using high-performance liquid chromatography (HPLC). Flower samples were collected 3, 5 and 7 weeks after a cultivar initiated flowering. The latest flowering cultivars only flowered 3-4 weeks prior to harvest, which was necessitated by freezing temperatures.

### *Whole Plant Weight and Biomass Yield*

The three center plants from each plot were selected for drying and yield data, for a total of nine/twelve plants per cultivar at each location. Hemp plants were harvested after 7 weeks of flowering (except the latest cultivars) by hand-cutting plants at the base, weighing, and hanging whole plants in a dairy barn (UPREC and ZF), high tunnel (1/2 SCTC) or pole barn (1/2 SCTC) for approximately 6-8 weeks. At UPREC, dried whole plants were weighed again prior to processing. Each plant was stripped to remove flower/bud and leaf matter from the stem using a rotary bucking machine from Capital Creations, LLC. Flower bud and leaf material was weighed; a grab sample was collected and oven dried to determine plant moisture. Stripped biomass yield data reported here is adjusted to a consistent 12% moisture. Whole plant weights are reported as dry weight at UPREC and wet weight at ZF and SCTC.

### *Statistical Analysis of Data*

The tables on the following pages have been prepared with the entries listed in alphabetical order. Height, flowering, and yield data were analyzed in R with the program agricolae, with mean separation performed using the Tukey’s Honest Significant Difference (HSD) method. All analyses used a mixed model with treatment as a fixed effect and replicates as a random effect with an alpha level of 0.05 to determine significance. Cultivars that



are within the range of the value listed for LSD are not significantly different from each other at the five percent level of probability.

## Results

Significant differences in flowering date, plant height, disease score, whole plant weight, stripped biomass yield and cannabinoid concentrations were observed in our trials (Tables 2-9). Some heterogeneity was observed within cultivars on most of the parameters we evaluated, but it was much less pronounced than in our 2020 trials. Crop performance was negatively affected by cannabis aphid, European corn borer damage, white mold (*Sclerotinia sclerotiorum*) injury and lodging at all locations. Differences existed between locations, and between cultivars to some extent, in transplant production practices, timing of sampling and harvest, and in post-harvest handling/processing. These confounding factors were important limitations in this research.

Cultivars clustered into three groups based on flowering date and maturity (Fig. 2). The latest flowering photo-sensitive cultivars may not be appropriate for our high latitude environment. Some cultivars flowered consistently across plants/plots within a short number of days, while others flowered unevenly across a long period upwards of 50 days. A few cultivars were similarly heterogeneous in stature and architecture, making their agronomic performance highly unpredictable.

Overall, cannabinoid concentrations were higher than expected in our 2021 trials. This may be partly due to our sampling protocol collecting samples at 3, 5 and 7 weeks after flowering. Many cultivars were THC compliant at 3 weeks post flowering, few were at 5 weeks, and virtually none were compliant at 7 weeks after flowering. In the future, sampling should begin earlier in the flowering period and occur more frequently than every two weeks to best capture the period of rapid cannabinoid biosynthesis 2-5 weeks after flowering. In addition to the timing of our sample collection, low temperature drying (100 °F) was used to prepare our samples for analysis in 2021. This resulted in high concentrations of un-decarboxylated THC acid (THCA) relative to Delta 9 THC in our analysis results. We used the equation below to calculate total THC in our samples. Beyond the absolute CBD/G and THC concentrations reported here, growers are encouraged to focus on the CBD/G:THC ratios of various cultivars, which are known to be relatively stable within cultivars across years, locations and sample timing.

$$\text{Total THC} = \Delta 9 \text{ THC} + (\text{THCA} * 0.877)$$

The Midwest Hemp Database project uses the following criteria to identify CBD hemp cultivars with “good potential” in our region:

- Flowering initiated prior to August 30th
- Average stripped floral yield above 1 lb/plant
- Average CBD/G:THC ratio above 20:1

**We encourage everyone to access the [Midwestern Hemp Database](#) for the best information available on CBD hemp cultivar performance in the Midwest.**



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**Table 2.** Planting date, average days to flowering, 50% flowering and harvest date for day-neutral cultivars at UPREC in Chatham, MI. Cultivars followed by the same letter are not significantly different.

Cultivar	Source	Planting Date	Avg. Flowering (days)	Avg. Flowering Date	Harvest Date
Auto Blunami	Beacon Hemp	6/16/2021	16.00 a	7/2/2021	8/18/2021
Dr. Chunk	Kayagene	6/16/2021	12.33 c	6/28/2021	8/18/2021
118 Early Harvest	7-Mile Farms	6/16/2021	15.00 b	7/1/2021	8/18/2021
Mean		6/16/2021	14.44	6/30/2021	8/18/2021
LSD (p=0.05)			0.84		

**Table 3.** Planting date, average days to flowering, 50% flowering and harvest date for photoperiod-sensitive cultivars at UPREC in Chatham, MI. Cultivars followed by the same letter are not significantly different.

Cultivar	Source	Planting Date	Avg. Flowering (days)	Avg. Flowering Date	Harvest Date
Bubbatonic	Kayagene	6/10/2021	72.00 e	8/21/2021	10/7/2021
Early Cherry	Beacon Hemp	6/10/2021	77.00 de	8/26/2021	10/19/2021
Early Nueve	Beacon Hemp	6/10/2021	59.25 f	8/8/2021	9/23/2021
Early Remedy	Beacon Hemp	6/10/2021	75.50 de	8/24/2021	10/7/2021
Forbidden V	Oregon CBD	6/10/2021	95.75 a	9/13/2021	10/26/2021
Hot Blonde	Blue Forest Farms	6/10/2021	98.50 a	9/16/2021	10/26/2021
IHG 065	Industrial Hemp Genetics, LLC	6/10/2021	93.25 ab	9/11/2021	10/26/2021
IHG 095	Industrial Hemp Genetics, LLC	6/10/2021	94.25 ab	9/12/2021	10/26/2021
Lifter	Oregon CBD	6/10/2021	73.00 e	8/22/2021	10/7/2021
Lifter Seedless	Oregon CBD	6/10/2021	86.25 bc	9/4/2021	10/26/2021
Panakeia (CBG)	Tesoro Genetics	6/10/2021	59.75 f	8/8/2021	10/7/2021
Pine Walker	Oregon CBD	6/10/2021	97.25 a	9/15/2021	10/26/2021



Queen Dream	Blue Forest Farms	6/10/2021	97.25 a	9/15/2021	10/26/2021
Rogue	Arcadia	6/10/2021	91.75 ab	9/9/2021	10/26/2021
Santiam	Arcadia	6/10/2021	92.75 ab	9/10/2021	10/26/2021
Variety A	Trilogene	6/10/2021	95.67 a	9/13/2021	10/26/2021
Suver Haze	Oregon CBD	6/10/2021	72.50 e	8/21/2021	10/19/2021
Suver Haze Seedless	Oregon CBD	6/10/2021	83.25 cd	9/1/2021	10/19/2021
Variety B	Trilogene	6/10/2021	94.00 ab	9/12/2021	10/26/2021
Umpqua	Arcadia	6/10/2021	60.50 f	8/9/2021	9/23/2021
White CBG	Oregon CBD	6/10/2021	62.75 f	8/11/2021	10/7/2021
White CBG Seedless	Oregon CBD	6/10/2021	78.25 cde	8/27/2021	10/19/2021
Mean		6/10/2021	82.29	8/31/2021	10/17/2021
LSD (p=0.05)			8.48		

**Table 4.** Plant height, dry whole plant weight, stripped biomass weight and cannabinoid composition at five weeks post flowering for day-neutral cultivars at UPREC in Chatham, MI. Green indicates cultivars with more than 8% CBD and red indicates cultivars with more than 0.36% THC (MI threshold with uncertainty).

Cultivar	Source	Plant Height (in)	Dry Whole Plant Weight (lb)	Stripped Biomass (lb)	CBD (%)	THC (%)	CBD:THC Ratio
Auto Blunami	Beacon Hemp	18.96	0.23	0.15	13.09	0.87	15.10 a
Dr. Chunk	Kayagene	15.78	0.26	0.17	13.68	1.09	12.56 b
118 Early Harvest	7-Mile Farms	21.06	0.27	0.17	13.63	0.96	14.32 ab
Mean		25.38	0.25	0.16	13.47	0.97	13.99
LSD (p=0.05)		ns	ns	ns	ns	ns	2.16



**Table 5.** Plant height, disease score, dry whole plant weight, striped biomass and cannabinoid composition at five weeks post flowering for photo-sensitive cultivars at UPREC in Chatham, MI. Cultivars followed by the same letter are not significantly different. Green indicates cultivars with more than 10% CBD/G and red indicates cultivars with more than 0.36% THC (MI threshold with uncertainty).

Cultivar	Source	Plant Height (in)	Disease Score (0-9)	Dry Whole Plant Weight (lb)	Stripped Biomass (lb)	CBD/G (%)	THC (%)	CBD/G: THC Ratio
Bubbatonic	Kayagene	82.08 ab	0.17 b	7.57 a-d	3.38 abc	16.97 a	0.75 abc	22.87 fgh
Early Cherry	Beacon Hemp	67.83 c-f	1.67 ab	5.87 b-h	3.06 a-d	18.80 a	0.91 a	20.95 hi
Early Nueve	Beacon Hemp	62.50 f	0.00 b	3.90 gh	2.11 def	8.85 ab	0.49 b-e	19.16 hi
Early Remedy	Beacon Hemp	66.67 def	0.08 b	5.66 c-h	2.82 a-d	16.32 ab	0.73 abc	22.61 fgh
Forbidden V	Oregon CBD	92.33 a	1.25 ab	8.38 ab	3.10 a-d	14.77 ab	0.35 c-f	42.11 c
Hot Blonde	Blue Forest Farms	74.67 b-f	1.08 ab	5.90 b-h	2.23 c-f	NA	NA	NA
IHG 065	Industrial Hemp Genetics, LLC	75.33 b-f	2.50 ab	4.16 fgh	1.61 ef	17.88 a	0.55 a-e	33.82 cde
IHG 095	Industrial Hemp Genetics, LLC	70.58 b-f	1.92 ab	3.53 h	1.40 f	16.00 ab	0.41 c-f	40.25 cd
Lifter	Oregon CBD	70.50 b-f	0.00 b	5.08 d-h	2.48 a-f	12.84 ab	0.61 a-d	17.22 hi
Lifter Seedless*	Oregon CBD	78.67 bcd	4.08 a	7.87 abc	2.60 a-e	19.51 a	0.88 ab	22.62 fgh
Panakeia (CBG)	Tesoro Genetics	64.58 ef	2.00 ab	4.12gh	2.12 def	15.97 ab	0.03 f	258.94 a
Pine Walker	Oregon CBD	79.92 abc	2.00 ab	5.54 c-h	2.32 b-f	12.30 ab	0.23 def	58.23 b
Queen Dream	Blue Forest Farms	78.33 bcd	3.67 ab	6.39 b-g	2.52 a-f	15.73 ab	0.41 c-f	39.41 cd
Rogue Santiam*	Arcadia	82.08 ab	1.42 ab	9.06 a	3.48 ab	17.97 a	0.57 a-d	32.18 c-f
Variety A	Arcadia	71.25 b-f	2.58 ab	6.16 b-g	2.05 def	10.44 ab	0.39 c-f	25.47e-h
Suver Haze	Trilogene	79.75 a-d	2.00 ab	8.06 abc	2.68 a-e	18.65 a	0.59 a-d	31.68 d-g
Suver Haze Seedless	Oregon CBD	77.25 b-e	3.50 ab	7.19 a-e	3.51 a	14.92 ab	0.70 abc	21.45 gh
	Oregon CBD	77.09 b-e	4.42 a	6.73 a-f	2.78 a-e	17.93 a	0.71 abc	25.52 e-h



Variety B	Trilogene	75.00 b-f	3.17 ab	6.32 b-g	2.12 def	17.27 a	0.48 b-e	36.22 cd
Umpqua	Arcadia	80.33 abc	1.09 ab	4.61 e-h	2.37 a-f	5.54 b	0.49 b-e	10.77 i
White CBG	Oregon CBD	64.42 ef	1.50 ab	5.25 d-h	2.43 a-f	19.17 a	0.14 ef	166.05a
White CBG Seedless	Oregon CBD	70.67 b-f	4.17 a	5.64 c-h	2.78 a-e	10.60 ab	0.38 c-f	59.49a
<b>Mean</b>		74.63	2.01	6.04	2.54	15.16	0.51	29.03†
<b>LSD (p=0.05)</b>		13.23	3.75	2.61	1.18	10.95	0.42	10.34†
*CBD and THC values are estimated from samples collected at 3 weeks post flowering. † Mean and LSD values for CDB/G:THC ratio exclude CBG dominant cultivars.								

**Table 6.** Planting date, average days to flowering, 50% flowering and harvest date for photoperiod-sensitive cultivars at ZF in Carp Lake, MI. Cultivars followed by the same letter are not significantly different.

Cultivar	Source	Planting Date	Avg. Flowering (days)	Avg. Flowering Date	Harvest Date
Forbidden V	Oregon CBD	6/10/2021	79.00 a	8/28/2021	10/19/2021
Lifter	Oregon CBD	6/10/2021	65.33 bcd	8/14/2021	10/19/2021
Lifter Seedless	Oregon CBD	6/10/2021	74.00 abc	8/23/2021	10/19/2021
Panakeia (CBG)	Tesoro Genetics	6/10/2021	60.00 d	8/9/2021	10/19/2021
Pine Walker	Oregon CBD	6/10/2021	77.67 ab	8/26/2021	10/19/2021
Rogue	Arcadia	6/10/2021	70.00 a-d	8/19/2021	10/19/2021
Santiam	Arcadia	6/10/2021	74.00 abc	8/23/2021	10/19/2021
Variety A	Trilogene	6/10/2021	77.67 ab	8/26/2021	10/19/2021
Suver Haze	Oregon CBD	6/10/2021	68.00 a-d	8/17/2021	10/19/2021
Suver Haze Seedless	Oregon CBD	6/10/2021	67.67 a-d	8/16/2021	10/19/2021
Variety B	Trilogene	6/10/2021	79.00 a	8/28/2021	10/19/2021
Umpqua	Arcadia	6/10/2021	62.00 cd	8/11/2021	10/19/2021
White CBG	Oregon CBD	6/10/2021	60.00 d	8/9/2021	10/19/2021
White CBG Seedless	Oregon CBD	6/10/2021	72.67 a-d	8/21/2021	10/19/2021
Mean		6/10/2021	70.50	8/19/2021	10/19/2021
LSD (p=0.05)			12.72		





**Table 7.** Plant height, disease score, wet whole plant weight, striped biomass and cannabinoid composition at five weeks post flowering for photo-sensitive cultivars at ZF in Carp Lake, MI. Cultivars followed by the same letter are not significantly different. Green indicates cultivars with more than 10% CBD/G and red indicates cultivars with more than 0.36% THC (MI threshold with uncertainty).

Cultivar	Source	Plant Height (in)	Disease Score (0-9)	Wet Whole Plant Weight (lb)	Stripped Biomass (lb)	CBD/G (%)	THC (%)	CBD/G: THC Ratio
Forbidden V	Oregon CBD	60.89 ab	NA	4.14	0.89 ab	11.46 de	0.40 cde	29.10 bc
Lifter	Oregon CBD	49.11 abc	5.22 ab	4.97	1.07 ab	18.29 a	1.18 ab	16.86 cd
Lifter Seedless	Oregon CBD	61.11 ab	4.00 ab	5.73	1.26 a	16.16 abc	1.04 a-d	16.52 cd
Panakeia (CBG)	Tesoro Genetics	48.11 bc	6.22 a	4.16	0.74 ab	15.54 a-d	0.00 e	NA
Pine Walker	Oregon CBD	61.33 a	NA	3.97	0.73 ab	8.97 e	0.28 e	34.39 b
Rogue	Arcadia	59.11 abc	3.00 ab	6.32	1.06 ab	12.89 cde	0.72 a-e	18.26 cd
Santiam	Arcadia	53.22 abc	1.56 b	5.56	0.94 ab	12.33 cde	0.59 b-e	21.15 bcd
Variety A	Trilogene	49.67 abc	2.00 ab	5.04	0.73 ab	13.05 cde	0.64 a-e	22.17 bcd
Suver Haze	Oregon CBD	54.33 abc	4.33 ab	4.78	1.01 ab	17.91 a	1.11 abc	16.18 cd
Suver Haze Seedless	Oregon CBD	53.67 abc	3.50 ab	4.92	1.00 ab	18.37 a	1.37 a	14.48 d
Variety B	Trilogene	53.56 abc	NA	4.03	0.79 ab	13.21 b-e	0.60 b-e	22.04 bcd
Umpqua	Arcadia	56.78 abc	4.00 ab	4.04	0.91 ab	16.00 a-d	1.23 ab	13.08 d
White CBG	Oregon CBD	46.89 c	5.44 ab	2.95	0.69 b	17.82 ab	0.29 de	76.04 a
White CBG Seedless	Oregon CBD	53.78 abc	3.00 ab	4.16	0.74 ab	18.44 a	0.29 de	65.03 a
<b>Mean</b>		54.40	3.84	4.63	0.90	15.03	0.70	20.38†
<b>LSD (p=0.05)</b>		13.01	4.45	ns	0.61	4.69	0.75	8.15†

† Mean and LSD Values for CDB/G:THC ratio exclude CBG dominant cultivars.



**Table 8.** Planting date, average days to flowering, 50% flowering and harvest date for photoperiod-sensitive cultivars at SCTC in Mount Pleasant, MI. Cultivars followed by the same letter are not significantly different.

Cultivar	Source	Planting Date	Avg. Flowering (days)	Avg. Flowering Date	Harvest Date
Early Cherry	Beacon Hemp	6/17/2021	70.00 a-d	8/26/2021	10/20/2021
Early Nueve	Beacon Hemp	6/17/2021	66.33 cd	8/22/2021	10/20/2021
Early Remedy	Beacon Hemp	6/17/2021	68.00 bcd	8/24/2021	10/20/2021
Lifter	Oregon CBD	6/17/2021	67.33 bcd	8/23/2021	10/20/2021
Lifter Seedless	Oregon CBD	6/17/2021	80.00 ab	9/5/2021	10/20/2021
Rogue	Arcadia	6/17/2021	78.67 abc	9/3/2021	10/20/2021
Santiam	Arcadia	6/17/2021	82.00 a	9/7/2021	10/20/2021
Suver Haze	Oregon CBD	6/17/2021	69.67 a-d	8/25/2021	10/20/2021
Suver Haze Seedless	Oregon CBD	6/17/2021	82.00 a	9/7/2021	10/20/2021
Umpqua	Arcadia	6/17/2021	57.67 d	8/13/2021	10/20/2021
White CBG	Oregon CBD	6/17/2021	66.33 cd	8/22/2021	10/20/2021
White CBG Seedless	Oregon CBD	6/17/2021	73.00 abc	8/29/2021	10/20/2021
Mean		6/17/2021	71.75	8/29/2021	10/20/2021
LSD (p=0.05)			13.08		



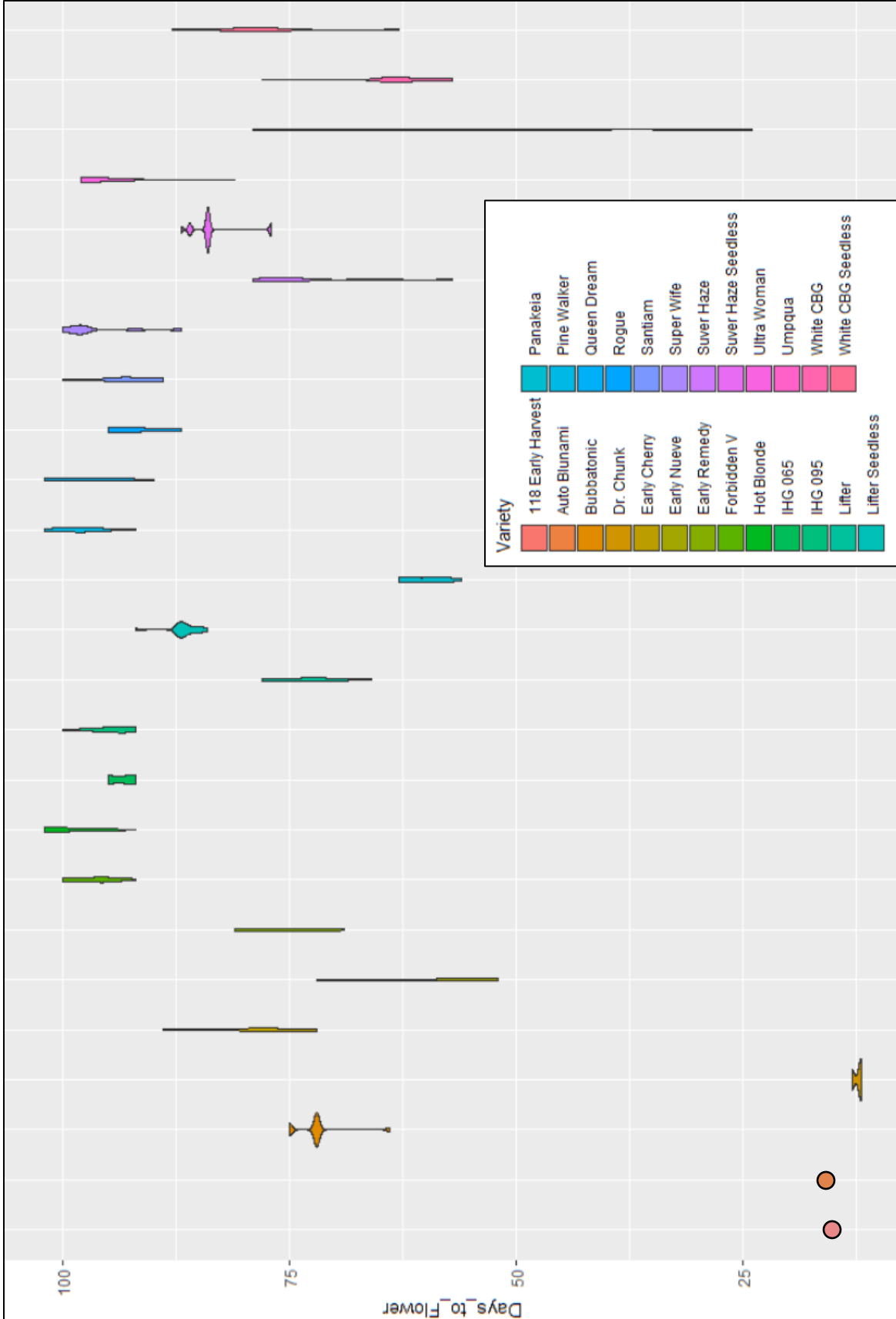
**Table 9.** Plant height, wet whole plant weight, striped biomass and cannabinoid composition at five weeks post flowering for photo-sensitive cultivars at SCTC in Mount Pleasant, MI. Cultivars followed by the same letter are not significantly different. Green indicates cultivars with more than 10% CBD/G and red indicates cultivars with more than 0.36% THC (MI threshold with uncertainty).

Cultivar	Source	Plant Height (in)	Wet Whole Plant Weight (lb)	Stripped Biomass (lb)	CBD/G (%)	THC (%)	CBD/G: THC Ratio
Early Cherry	Beacon Hemp	39.34 e	5.82	1.35 ab	12.79 abc	0.53 ab	26.75 ab
Early Nueve	Beacon Hemp	42.11 cde	6.77	1.33 ab	14.66 ab	0.45 ab	32.44 ab
Early Remedy	Beacon Hemp	41.39 de	6.44	1.08 ab	15.83 a	0.52 ab	30.65 ab
Lifter	Oregon CBD	48.78 a-e	5.99	1.02 b	16.69 a	0.57 ab	29.14 ab
Lifter Seedless	Oregon CBD	59.44 a	10.68	1.80 ab	10.21 abc	0.69 a	15.04 b
Rogue	Arcadia	53.78 a-d	11.34	1.85 ab	9.64 abc	0.51 ab	23.53 ab
Santiam	Arcadia	47.89 a-e	9.86	1.53 ab	5.07 c	0.33 bc	15.07 b
Suver Haze	Oregon CBD	57.66 ab	9.36	1.60 ab	14.36 ab	0.65 a	22.81 ab
Suver Haze Seedless	Oregon CBD	59.00 ab	12.05	2.07 a	9.64 abc	0.67 a	14.60 b
Umpqua	Arcadia	55.67 abc	9.56	1.63 ab	14.81 ab	0.46 ab	33.09 ab
White CBG	Oregon CBD	45.11 b-e	5.81	1.27 ab	10.15 abc	0.26 bc	64.07 a
White CBG Seedless	Oregon CBD	50.50 a-e	8.84	1.59 ab	6.51 bc	0.13 c	57.65 ab
<b>Mean</b>		50.06	8.54	1.51	11.70	0.48	24.31†
<b>LSD (p=0.05)</b>		14.06	ns	1.11	8.32	0.32	21.33†

† Mean and LSD Values for CDB/G:THC ratio exclude CBG dominant cultivars.



Figure 2. Days to Flowering by Cultivar



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## Additional Information

Dr. Shelby Ellison, University of Wisconsin Madison– Cultivar Trial Results

(<https://fyi.extension.wisc.edu/hemp/>)

Dr. Esther Shekinah, Michael Fields Agricultural Institute – Cultivar Trial Results

(<https://michaelfields.org/hemp-information-exchange/>)

Phillip Alberti, University of Illinois Extension – Midwestern Hemp Database Research Report

([Go.illinois.edu/HempDatabase](http://Go.illinois.edu/HempDatabase))

Dr. Ben Southwell, Lake Superior State University – Cannabis Chemistry Program

(<https://www.lssu.edu/college-science-environment/school-science-medicine/cannabis-chemistry/>)

Bay Mills Community College (<https://www.bmcc.edu/>)

Saginaw Chippewa Tribal College (<https://www.sagchip.edu/>)

Ziibimijwang Farm (<https://www.ziibimijwang.com/>)

## Contact Information

Dr. James DeDecker

Michigan State University

Upper Peninsula Research and Extension Center

E3774 University Drive

Chatham, MI 49816

[dedecke5@msu.edu](mailto:dedecke5@msu.edu)

Website: <https://www.canr.msu.edu/uprc/>



Upper Peninsula Research  
and Extension Center  
MICHIGAN STATE UNIVERSITY

