2020 Dual Purpose Industrial Hemp Trials

University of Maryland

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December 16, 2020

Background

Through participation in the multi-state project S1084 (Industrial Hemp Production, Processing, and Marketing in the U.S.), we volunteered to participate in a national dual purpose industrial hemp variety trial at University of Maryland. The test was coordinated by Dr. Bob Pearce at University of Kentucky in 2020 and his responsibilities included organizing seed from sources and shipping all seed to collaborators across the country. Our goal for participation was to identify dual purpose hemp varieties that will perform well in Maryland and the mid-Atlantic region.

Test Procedures

Thirteen varieties from six companies were tested in Maryland in 2020 (Table 1). The test took place at Wye Research and Education Center in Queenstown, MD on a field with Mattapex-Butlertown silt loam soil, which is moderately well drained with nearly zero slope. The field was conventionally tilled prior to planting and 144 lb ac^{-1} nitrogen applied as 30% UAN applied on June 2, 2020 prior to planting. Plots were planted with a modified cone planter set to plant seed <0.5" deep on June 4, 2020. We utilized a randomized complete block design with each variety replicated four times. Plots were 7 feet wide by 20 feet long with clean alleys around each small plot. To manage weeds in season, we applied Medal II at 1.5 pt ac^{-1} on June 18. After a heavy rain storm with large wind gusts in early August, our plots were left nearly horizontal but were able to recover turgor as the season continued. At the end of August, some plots had not established a good stand and we determined that we could not harvest substantial material to determine appropriate yield. Therefore, we decided to mow these plots to minimize costs associated with phytochemical testing. On the remaining plots, we collected leaf samples for analysis of Δ9-tetrahydracannabinol (THC) concentration by SunX Laboratory on August 27 and performed a stand count (counted the number of male and female plants in a 0.40645 m^2 area of each plot) on September 1, 2020. We were unable to harvest seed from the plots, as the plots were subject to bird feeding. However, whole plants were harvested on October 21, 2020 from a 0.40645 m^2 area of each plot, bundled by plot, and weighed in the field. Average stalk height and diameter were determined at this time. Bundles were left to ret in the field for approximately four weeks, then oven dried and weighed again to determine retted dry mass.

Test Results

Average population, fresh mass, dried mass, stalk diameter, stalk height, THC concentration, and THC potency (approximately the sum of THC and tetrahydracannabinolic acid) are presented in Table 2. A least significant difference (LSD) value is reported for each test where statistical significant differences ($P \leq 0.1$) for a variable were observed among varieties. The mean separation value has been calculated at the 10% probability level ($LSD_{0.1}$). The LSD can be used to compare two varieties within the same test. For example, when the yield difference between two varieties is greater than the LSD value, there is a 90% certainty that the difference in yield is due to variety performance rather than due to random variability.

Acknowledgments

This work would not be possible without the assistance and oversight of equipment maintenance and in-season plot management by Louis Thorne and Joseph Crank. Thank you for fabrication skills to adapt the planter to work for this study. Thank you to the crew at Wye Research and Education Center for your

patience as we learn how to cultivate this new crop. This trial was partially funded with grant support from the Atlantic Seed Association.

Table 1. Varieties and source of seed evaluated in Maryland in 2020. Varieties that remained through harvest are identified, including number of reps that remained.

Variety	Source	Mowed or Remained (reps harvested)
Anka	Cerela/Uniseeds	3 reps
Altair	Cerela/Uniseeds	3 reps
Bialobrzeskie	Bija Hemp	Mowed
Henola	Bija Hemp	3 reps
Hlesia (Glesia)	Fiacre Enterprises	3 reps
Hliana (Giliana)	Fiacre Enterprises	Mowed
Hlukhovskii 51	Fiacre Enterprises	3 reps
CFX-1	Hemp Genetics International	Mowed
CRS-1	Hemp Genetics International	Mowed
Katani	Hemp Genetics International	Mowed
X-59	Legacy Hemp	Mowed
NWG-2730	New West Genetics	3 reps
NWG-452	New West Genetics	3 reps

Table 2. Performance of varieties in 2020.

Variety	Population plants ac^{-1}	Fresh weight kg ha^{1}	Dry weight kg ha^{-1}	Stalk diameter mm	Stalk height cm	THC ccn %	THC potency %
Anka	199,132 ± 25,057	5536 ± 615	2160 ± 184	5.4 ± 0.1	118.1 ± 1.3	0.02	0.16
Altair	195,813 ± 14,467	3690 ± 0	1806 ± 182	5.8 ± 0.1	104.1 ± 7.6	0.01	0.09
Bialobrzeskie	-	-	-	-	-		
Henola	292,060 ± 48,890	-	-	-	-	0.00	0.04
Hlesia (Glesia)	248,915 ± 37,695	3690 ± 0	1800 ± 104	5.1 ± 0	108.0 ± 6.3	0.00	0.01
Hliana (Giliana)	-	-	-	-	-		
Hlukhovskii 51	202,451 ± 6,638	7381 ± 2460	2987 ± 787	6.3 ± 1.0	119.4 ± 4.4	0.00	0.02
CFX-1	-	-	-	-	-	-	-
CRS-1	-	-	-	-	-	-	-
Katani	-	-	-	-	-	-	-
X-59	-	-	-	-	-	-	-
NWG-2730	195,813 ± 77,195	13532 ± 1879*	5568 ± 775*	7.7 ± 0.7	140.0 ± 2.9*	0.05	0.17
NWG-452	192,494 ± 20,188	9841 ± 1879*	4575 ± 444*	7.7 ± 0.8	134.6 ± 2.5*	0.02	0.10
Mean	**218,097**	**7536**	**3183**	**6.5**	**121**	-	-
Probability > F	**0.4300**	**0.0246**	**0.0139**	**0.1890**	**0.0002**	-	-
$LSD_{0.1}$	**NS****	**4986**	**1888**	**NS**	**7.7**	-	-

*Varieties with an asterisk next to values are not statistically different (Probability > F ≤ 0.1) compared to the top yielding variety (highlighted in blue).

**NS indicates that no statistically significant difference was observed for this variable.