2023 Hemp Flower Variety Trial

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Hemp is a non-psychoactive variety of *Cannabis sativa* L. The crop is one of historical importance in the U.S. and re-

Irrigation was applied through drip irrigation and the rate modified weekly based on rainfall. Each plot was monitored on a weekly basis for flowering date and variation amongst seedlings within each plot were recorded. High variation in growth rates, and plant structure amongst seedlings generally also meant a range amongst flowering dates. Additionally, plants were harvested as they appeared ready using visual clues including trichome formation/maturity, pistil senescence, and swelling of bracts.

buds were collected. Wet bud and leaf material was then run through the Centurion Pro Gladiator Trimmer (Maple Ridge, BC, Canada) (Image 2). Wet bud weight and unmarketable bud weight were recorded. The flower buds were then dried at 80 F or ambient temperature with airflow until dry enough for storage without molding. A subsample of flower bud from each plot was dried in a small dehydrator and wet weights and dry weights were recorded in order to calculate the percent moisture of the flower buds. The percent moisture at harvest was used to calculate dry matter yields.

Yield data and stand characteristics were analyzed using mixed model analysis using the mixed procedure of SAS (SAS Institute, 1999). Replications within the trial were treated as random effects, and treatments wG[Ve treated as fixed. Treatment mean comparisons were made using the Least Significant Difference (LSD) procedure when the F-test was considered significant ($p<0.10$). Variations in yield and quality can occur because of variations in genetics, soil, weather, and other growing conditions. Statistical analysis makes it possible to determine whether a difference among treatments is real or whether it might have occurred due to other variations in the field. At the bottom of each table a p-value is presented for each variable that showed statistical significance (p-value ≤ 0.10). In this case, the difference between two treatments within a column is equal to or greater than the least significant diffe[Vence (LSD) value and you can be sure that for 9 out of 10 times, there is a real difference between the two treatments. In this example, variety 3 is significantly different from variety 1 but not from variety 2. Varieties with an asterisk a[Ve statistically similar to the top performer in bold. The difference between variety 3 and variety 2 is equal to 1.5, which is less than the LSD value of 2.0. This means that these varietie

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Table 4. Seasonal weather data collected in Alburgh, VT, 2023.

Alburgh, VT	June	July	August	Sept	Oct
Average temperature (°F)	65.7	72.2	67	63.7	54.4
Departure from normal	-1.76	-0.24	-3.73	1.03	4.11
Precipitation (inches)	4.4	10.75	6.27	2.4	5.38
Departure from normal	0.14	6.69	2.73	-1.27	1.55
Growing Degree Days (50-86°F)	483	712	540	449	225
Departure from normal	-41	17	-101	62	87

Historical averages are for 30 years of data provided by the NOAA (1991-2020) for Burlington, VT.

Within the variety trial, Pinewalker Seedless was the tallest at 175

Table 6. As harvested, hemp plant harvest growth metrics, Alburgh, VT, 2023.

Variety	Whole plant weight	Stem weight	Stem weight	Flower weight	Flower weight	Leaf weight	Leaf weight	Flower:Stem	Leaf:Stem
	lbs plant^{-1}	lbs plant^{-1}	%	lbs plant^{-1}	%	lbs plant^{-1}	%		
Forbidden V	19.2* ‡	7.55*							

Table 7. Hemp flower yield, Alburgh, VT, 2023.

Variety	Flower dry matter†	Unmarketable flower	Dry matter flower yield†	Yield at 8% moisture
	%	lbs plant^{-1}	lbs ac^{-1}	lbs ac^{-1}
Forbidden V	21.1	0.023*‡	2148*	2335*
Forbidden V Seedless	24.2	**0.006**	2339*	2543*

Figure 2. Flower total potential dominant cannabinoids and total potential THC, Alburgh, VT 2023.

The cannabis plant contains a wide array of non-cannabinoids that contribute to aromatic profiles and may potentially have similar health benefits to some cannabinoids. Terpenes make up one group of many types of compounds found in hemp. Terpene profiles were determined in one replicate for each variety (Table 9

DISCUSSION

Various growth characteristics, such as sprawling versus upright growth habits, can be especially important when looking at the potential for high disease pressure. Some disease issues could potentially be mitigated by cultural practices such as adequate plant spacing and selecting varieties with disease tolerance or resistance. While not trialed in 2023, autoflower varieties may also be good options for early harvest and diversification. In past years, autoflower varieties matured over a month ahead of full season varieties and could be worked into a production system to spread out harvest labor requirements while bringing in a marketable crop at an earlier date.

In the past four years of variety trial evaluation, insect damage has been largely non-impactful in the weeks leading up to harvest. While aphids appear to be present on plants, damage in our area is not noticeable though higher populations may have the potential to impact flower quality, especially in the smokable flower market. During severe years with high populations of leaf hoppers, greater damage to leaves in the form of hopper burn may also be noticed in crops, however, other preferred crops may draw insects away from hemp. With continued growth of the hemp industry and often lack of crop rotation in fields, disease impacts may prove to be more detrimental moving forward. In the past three years of our studies under various weather conditions, Septoria leaf spot, Bipolaris leaf spot, hemp leaf spot, Cercospora leaf spot, and powdery mildew have become more noticeable in our trials. From the2.024 6224 6224 62-4(et)5(y)22-4(on)TQ0.000

as new markets are developed for the crops. While many of these compounds contribute to the vast array of aromatics and can exhibit distinct aroma profiles across cultivars, many of these compounds may also be important for their purported health benefits and synergistic effects with other compounds when consumed in hemp and hemp related products. The fourteen varieties within our research trial, and building on past year's variety trials, only begins to scratch the surface of the multitude of hemp cultivars that are now commercially available. With such wide scale variations in growth habits, yield, and quality of various cultivars, it will be increasingly important to continue research and evaluation of those available cultivars to provide region specific information to optimize farmer yields within the Northeast.

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