2021 Industrial Hemp

2021 INDUSTRIAL HEMP FERTILITY 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 reemerging in worldwide importance as manufacturers seek hemp as a renewable and sustainable resource for a wide variety of consumer and industrial products. The crop produces a valuable oilseed and oilseed meal. The fiber has hi

5 stems per plot were harvested and decorticated to determine the percent of bast and hurd fractions. Oil

considered typical for the summer months. There were 12.36 inches of precipitation during the growing season.

Impacts of nitrogen rate

There were no significant differences in grain yields across fertility treatments within the trial with an average yield of 1669 lbs ac^{-1} at 10% grain moisture (Table 3). Grain hemp is generally harvested at a moisture of 10-20% and the average from the trial was 19.4%. Similarly test weights remained consistent across all fertility treatments. Grain moisture appeared to be impacted in some manner by fertility applications with the highest observed moisture seen in the 100 lbs N ac^{-1} treatment at 20.9% and was statistically similar to the control, 150, and 200 lbs N ac^{-1} treatments. Between the two varieties, it appeared as if they responded similarly to fertility treatments regarding hemp grain metrics, with no fertility x variety interactions occurring.

Table 3. The impact of nitrogen fertility rates on grain hemp yields, Alburgh, VT, 2021.

Treatment	**Test weight**	**Grain Moisture at harvest**	**Dry matter grain yield**	**Grain yield @10% moisture**
lbs N ac^{-1}	lbs bu-1	%	**lbs ac^{-1}**	**lbs ac^{-1}**
0	39.8	20.0 ab†	1500	1666
50	40.0	18.4 b	1581	1757
100	39.5	**20.9 a**	1435	1594
150	40.0	18.8 ab	1467	1630
200	39.5	19.1 ab	1527	1697
LSD (0.10)	NS‡	2.42	NS	NS
Trial Mean	39.8	19.4	1502	1669

Treatments within a column with the same letter are statistically similar. Top performers are in **bold.**

There was no statistical difference between treatments in a particular column (p=0.10).CID 59>BDC q0.00000912 0 6124(n)-6( )-2(a)4( )-2(p)-6(

Table 4. Oil yields of hemp grain by nitrogen fertility rate, Alburgh, VT, 2021.

Treatment	Oil Content		
lbs N ac^{-1}	**%**	**lbs ac^{-1}**	**gal ac^{-1}**
0	16.8 ab †	278	36.4
50	15.3 b	271	35.5
100	17.0 a	271	

DISCUSSION

Grain and fiber yields did not increase consistently with increasing nitrogen rate, and not all of the nitrogen treatments resulted in higher yields than the untreated control. As a whole, results were more nuanced and less predictable than linear and plateauing responses to increased nitrogen application rates observed in many other crops. While yields did not show clear increases for grain, significantly higher straw yields were observed in the 200 lbs N ac^{-1} in addition to highest observed oil content at the same application rate. Two varieties were evaluated in this trial to determine if there were response differences between hemp varieties to nitrogen rates. There were no significant variety x nitrogen rate interactions indicating the varieties responded similarly to increasing rates of nitrogen. Both selected varieties (Felina 32 and Canda) have the potential to be grown as either grain or fiber crops, however some differences were observed. When looking solely at varietal differences within the trial, higher grain yields were observed in Canda which also impacted the total oil production on a per acre basis. Conversely, higher straw yields and plant heights were observed in Felina 32.