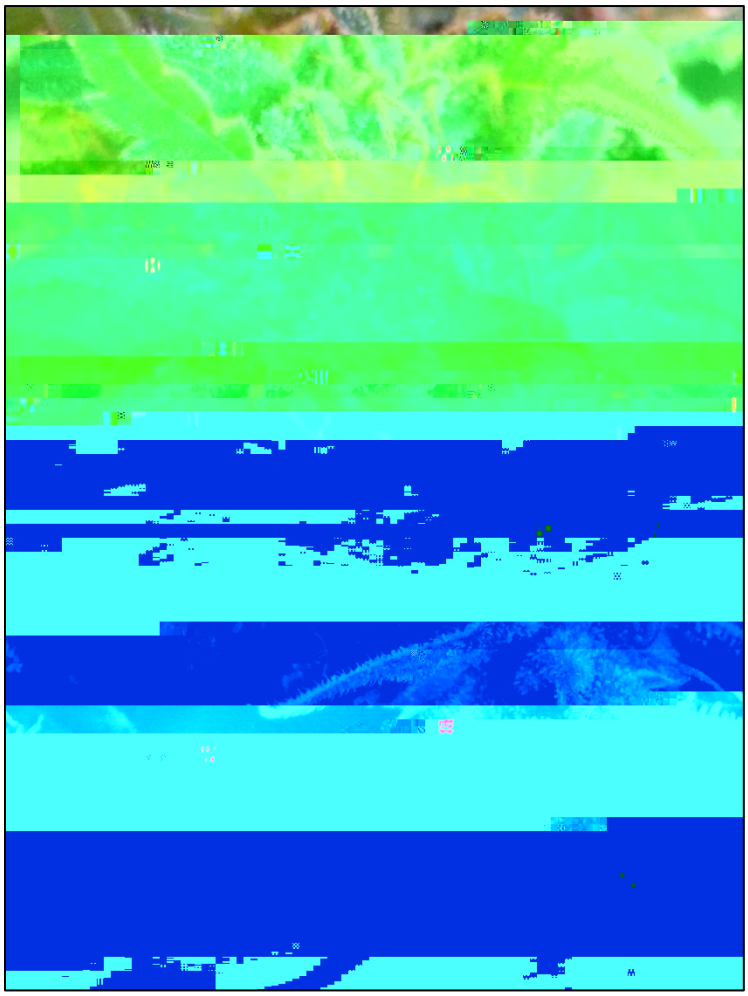
2018 Cannabidiol Cold Tolerance Trial



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THE UNIVERSITY OF VERMONT

2018 CANNABIDIOL COLD TOLERANCE TRIAL

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Hemp is a non-psychoactive variety of *cannabis sativa L.* Hemp is a crop of historical importance in the U.S. and re-emerging worldwide as a popular crop as it is sought out as a renewable and sustainable resource for a wide variety of consumer and industrial products. Hemp that is grown for fiber, grain oil, or as an intended health supplement contains less than 0.3% tetrahydrocannabinol (THC). When hemp is grown to produce cannabidiol (CBD) as an intended health supplement, CBD concentrations are relatively high, with concentrations ranging between 8-15%. As demand for hemp across the country increases, industrial hemp may be a new cash crop and market for Vermont farms, as hemp can be worked into rotation with other grasses like cereal grains or grown as a specialty crop. Hemp for CBD production is grown more intensively, similar to vegetable production, and can be grown indoors or in the field. Hemp is cultivated in many diverse climates worldwide and is fairly cold tolerant, though there is a lack of agronomic research specific to the effect of cold temperature on CBD found in industrial hemp plants. In 2018, the Northwest Crops and Soils (NWCS) Program conducted a trial to determine the effects of cold temperature on total potential CBD and the ability for fabric row cover to protect the plant during cold temperatures.

MATERIALS AND METHODS

Female hemp plants grown from clonal propagation of the industrial hemp variety Boax were planted on CBD 27-

i-buttons recorded temperatures once per hour until 24-Oct at 3pm EST. Approximately 3-4 flower bud clippings from each plant were randomly sampled on 18-Oct, 19-Oct, 21-Oct, 22-Oct, and 24-Oct. Samples from each plant were then combined by plot to yield one combined sample per replicate for each treatment. Samples were sent to the Nutraceutical Science Laboratories (Waterbury, VT) for analysis in order to determine the total potential cannabidiol (CBD). Analysis was performed by supercritical fluid chromatography, which does not heat the sample. Total potential cannabidiol is the maximum amount of CBD that can be contained in a sample, and takes into account both cannabidiol concentrations at the time of analysis and cannabidiolic acid (CBDA) concentrations. Cannabidiolic acid is converted to CBD during decarboxylation (the removal of a carboxyl group). Decarboxylation occurs when the hemp is exposed to heat, such as through combustion, or sunlight.

Data were analyzed using a general linear model procedure of SAS (SAS Institute, 1999). Replications were treated as random effects, and treatments were treated as fixed. Mean comparisons were made using

Table 2. Seasonal weather data collected in Alburgh, VT for June-October 2018.

Alburgh, VT	June	July	August	September	October
Average temperature (°F)	64.4	74.1	72.8	63.4	45.8
Departure from normal	-1.38	3.51	3.96	2.76	-2.36
Precipitation (inches)	3.70	2.40	3.00	3.50	3.50
Departure from normal	0.05	-1.72	-0.95	-0.16	-0.07

dates, total potential CBD concentrations were higher in the uncovered plants, but there were no statistically significant differences between the treatments. The average temperatures at the base of the