

Research Overview

Industrial hemp, (*cannabis sativa*, L.) production in the United States has a long history dating back into the 1600's where early settlers used this plant to produce rope, clothing, and other textile material. Produced predominately for fiber in the 19th and early 20th century this plant was an important material in the lives of our early settlers. In the early 1900's marijuana was identified as a recreational drug and several states along with the U.S. government increased restrictions on hemp and marijuana and eventually all forms of marijuana and hemp were made illegal by 1970 with the passage of the Controlled Substances Act (CSA).

In 2017 industrial hemp was legalized by the federal government. By 2019 there were forty-six states who enacted laws related to the production of hemp, including West Virginia. The number of acres being planted has grown, increasing between 250-300⁺ each year since 2017. Nationally, in 2018 there were just over 100,000-acres approved for production; in 2019 that number jumped to 511,442-acres approved for production across the country. West Virginia follows a similar story with 17-acres planted in 2017, 155-acres in 2018 and 640-acres were grown in 2019.

The focus of hemp production has changed over the last few years. The emergence of cannabidiol (CBD) oil as additive for products in the health and medical arena has shifted producers focus to varieties with high CBD yields. These varieties are grown for their oil production with many varieties promising biomass with 10-14% oil on a dry matter basis. These varieties are more closely related to the cannabis varieties grown for Tetrahydrocannabinol (THC) production than the fiber varieties that were grown in the past. The varieties grown for CBD production look, smell, and grow just like their illegal cousin but lack the THC concentrations to be considered illegal.

Cultural Practices

Field Preparation and bed laying Plants were put in various types of media including plastic and bare ground



Goal Statement:

During the 2019 growing season approximately 180-acres were planted in Pocahontas, Greenbrier, and Monroe Counties (south eastern West Virginia), of which WVU Extension Agents were able to collect data on 80-acres and worked closely with three other producers representing an additional 11-acres. WVU Extension Agents, as well as producers had a drastic upward learning curve during the 2019 growing season. Including cultural practices, nutrient management, pest management and more. With such a new and emerging industry it was imperative for agents to begin collecting data immediately to improve their knowledge of the crop and the recommendations they are able to provide to new and existing growers.

Twelve different varieties were grown in the area; of the twelve, we were able to collect production data on six of those varieties. The data collected included plant variety, hemp yields, CBD concentration, THC concentration, nutrient applications, and soil type. The goal of this research project was to gather applicable data to relay to growers in order to improve cost/input data, variety selection, nutrient management recommendations, cultural practices, IPM and site selection.



Hemp plants with various cultural issues, nutrient deficiencies and disease problems encountered in the 2019 season.

RESULTS

- 6 different varieties were sampled at multiple locations-
 - Suverhaze & Elektra were the best yielding varieties from a CBD perspective
 - Boax was the only variety that tested under the regulated 0.3% THC limit at harvest
 - Post-harvest many producers are having difficulty marketing their hemp product do to increased production throughout the country (Less than 30% of grown hemp has been successfully marketed (3/1/20)
- Elevation Effect on THC
- 2019 data has been distributed through five educational programs to 174 participants in West Virginia
 - With the publication of this data multiple producers have suspended their permits for the 2020 season.

Table 1. Industrial hemp variety data.

Variety	Dry Matter Per Plan Libs.	% Stem	% Bud	% Leaf	Total Cann.	% CBD	Total %THC
Mid West	2.13	25.8	39.7	21.01	11.64	9.37	0.5
00 Cheery	1.89	33.5	28.6	16.61	11.7	8.58	1.19
T1	1.05	48.22	38.3	14.12	7.76	6.12	0.37
Suverhaze	1.08	9.18	54.64	27.66	16.81	13.72	0.71
Elektra	1.53	18.9	57.8	14.94	15.47	12.69	0.65
Boax	2.76	36.79	58 Leaf included		5.07	4.21	0.2

Plant Weights Being Collected



Plants were broken down to evaluate yield



Large industrial hemp grow in Pocahontas County, WV



CONCLUSIONS

In any Extension program, it is essential that producer needs are considered and the program is adjusted as needed. Hemp producers have been met with a variety of issues from growing to regulation to marketing. What does 2020 hold in store for WV hemp production? The West Virginia Department of Agriculture has received close to 500 applications for the 2020 season. The USDA currently has proposed rules, that if approved, would make each variety sampled considered noncompliant with the exception of Boax. A survey conducted across growers at the end of 2019 showed that 62% of those respondents were still in possession of 75% percent of their product, showing many growers are having difficulty moving product in the saturated market. In 2019 growers faced new diseases and insects while having to contend with a drought that effected much of the growing season. Despite all of this growers showed that yields of 2-3,000lbs of biomass per acre could be achieved in the Greenbrier Valley. Going into 2020 the question isn't can we grow this crop, the question is can we grow it under stricter guidelines and is there a profitable market? For the upcoming year two items will be critical for success: 1. Producers must have viable marketing contracts in place prior to planting with established credible businesses. 2. Producer testing of CBD and THC levels must be very aggressive and start prior to flowering to stay abreast of CBD and THC levels.