Gen3-2011 - Industrial Hemp Grain Yield Optimization

CROP ADVANCES

Field Crop Reports

Volume 8 — February 2, 2012

Field Crops Team, Agriculture Development Branch
Ministry of Agriculture, Food and Rural Affairs
In partnership with
Ontario Soil and Crop Improvement Association
And other Agricultural Organizations and Businesses

http://www.ontariosoilcrop.org/cropadvances.htm

Industrial Hemp Grain Yield Optimization

Purpose:

Identify optimum nitrogen rates for yield and plant characteristics and to evaluate hemp variety performance characteristics in Renfrew County.

Methods:

Valley Bio in cooperation with Stone Farms, OSCIA and OMAFRA conducted nitrogen rate and variety trials in summer 2011.

Nitrogen Trials

For the nitrogen trials a parcel of land that was cropped with soybeans in 2010 and hemp in 2009 was selected. The soy stubble was worked the previous fall after bean harvest. Soil is a sandy loam with good drainage, and good fertility; a soil analysis was done prior to starting field work. Nitrogen was applied using 46-0-0 Urea through a 10 foot Gandy (volumetric meter) to make 30 foot treatment strips. Treatments were arranged in a randomized pattern with 2 replicates from 0 to 200kg/hc in 50kg increments for a total of 10 treatments. The ground was then worked to 3 inches depth using a high speed Lemken tillage implement to prepare the seedbed and incorporate the Urea. Seeding was done using a Great Plains 1510P grain drill in 7.5 inch rows at 38lbs/acre, considered a heavy rate for hemp. As of the 28th of May the plots did not receive any further treatments for fertility, weed or pest control.

The harvest of the nitrogen treatments was conducted the 21st September with a John Deere 8820 and a 21 ft MacDon draper, harvesting the centers of the treatments for measurement in a weigh wagon. Representative grain samples were pulled to measure moisture, dockage and clean bushel weights.

Variety trial

We were unable to attain a Health Canada research license to conduct a variety trial for this project.

Results:

OMAFRA Emerging crop specialist, Scott Banks, collected data and tabulated results for the nitrogen trials (Table 1). The summarized data shows a clear response to increasing nitrogen application rates. Historically the recommended rate for nitrogen in hemp was considered to be 60-80 lbs/acre. The result of this trial indicate the potential for higher yield returns with increase nitrogen use. During harvest a clear visual (Figure 1) distinctions in the colour and density of canopy was observed, and a small advantage in crop height was measured which was proportional to nitrogen application.

Table 1: Hemp Grain Yield Response to Nitrogen Rates 2011

Nitrogen Rate (lbs/ac)	Grain Moisture at Harvest (%)	Test Weight (lbs/bu)	Yield (bu/ac)
0	10.7	41.8	32.4
50	11.2	40.5	31.2
100	10.7	43.1	37.6
150	11.7	37.7	40.9
200	11.6	39.9	39.1

Note: Although yields increased with nitrogen rate, the yields are not statistically significantly different.

Figure 1: Visual Distinctions In The Colour, Density Of Canopy, And Crop Height Proportional To Nitrogen Application.

Summary:

This trial has shown a response to higher rates of nitrogen use in a hemp grain crop. The protocol for the trial is sound and the data collected has confidence. Given stressors in the spring and limited space to conduct the trials, only 2 reps were conducted, giving a limited data pool. For better reliability in results further trials and data are required. It would be recommended that if this trial be replicated in future years, and the plot replication should be increased to four.

Next Steps:

Hemp production is increasing across Canada and is forecast by the Canadian Hemp Trade Alliance to reach 100,000 acres for grain production by 2014. Ontario has significant potential to participate in this new crop that fits well with current Ontario crop rotations. Hemp should be considered for further funding in Ontario the help gain a better understanding of hemp agronomics and growth potential for the province.
To further validate and confirm this trial, the protocol should be repeated in 2012 at a suitable location with 4 plot replicates.

Acknowledgements:

Renfrew County Soil and Crop Improvement Association
Ontario Ministry of Agriculture, Food and Rural Affairs – Scott Banks, Emerging Crops Specialist and Paul Nopper, Field Crop Technician
Reuben Stone – Valley Bio Ltd.
Dalton Stone – Stone Farms

Project Contacts:

Scott Banks, OMAFRA, scott.banks@ontario.ca

Glen Smith, Secretary - Renfrew County Soil and Crop Improvement Association

Location of Project Final Report:

This report will be available as part of the 2011 Crop Advances Reports and available on the Ontario Soil & Crop Improvement Association website.