

2015 Dual-Purpose Industrial Hemp Trial

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Materials and Methods

A trial was conducted on the UK Agricultural Experiment Station Spindletop Farm in Fayette County, KY evaluating 6 varieties of industrial hemp grown for dual-purpose, i.e., harvesting grain initially and then subsequently harvesting the stems for fiber. The 6 varieties evaluated and their country of origin were: Futura 75 (France), Fibrol, Tisza and Lipko (Hungary), Canda (Canada), and Bialobrzieskie (Poland). All varieties were monoecious.

The experimental design was a randomized complete block with four replications. Plot size was 8' x 20'. The soil at the site is a Maury silt loam. The seeding rate was 60#/A. Plots were seeded with a modified research plot drill at an average planting depth of 0.25 inch. Conventional tillage was used to prepare the site, and 50 units of N/A were applied during pre-plant cultivation in the form of urea (46-0-0). The trial was seeded on 25 Jun. No additional fertility or inputs of any kind were applied (herbicides, insecticides, irrigation, etc.).

Three response variables were measured. Plots were harvested first for grain and then fiber on 15 Sep; 84 days after seeding (DAS). Both grain and fiber were harvested manually from the same randomly selected 1 m² area from within each plot avoiding plot edges. Grain was thrashed and cleaned by hand, dried by heated forced air to 9% moisture, then weighed. Grain data is expressed as pounds of dry grain/A. Stems for fiber yield determination were first counted to determine plant densities. This data was transformed and expressed as the number of plants/A. The stems were subsequently dried by heated forced air for 48h then weighed. Fiber yields are expressed as pound of dry matter (DM)/A.

The data was analyzed using PROC ANOVA of SAS (SAS Institute, Cary, NC). Means were separated by F-protected LSD at $\alpha=0.10$.

Results

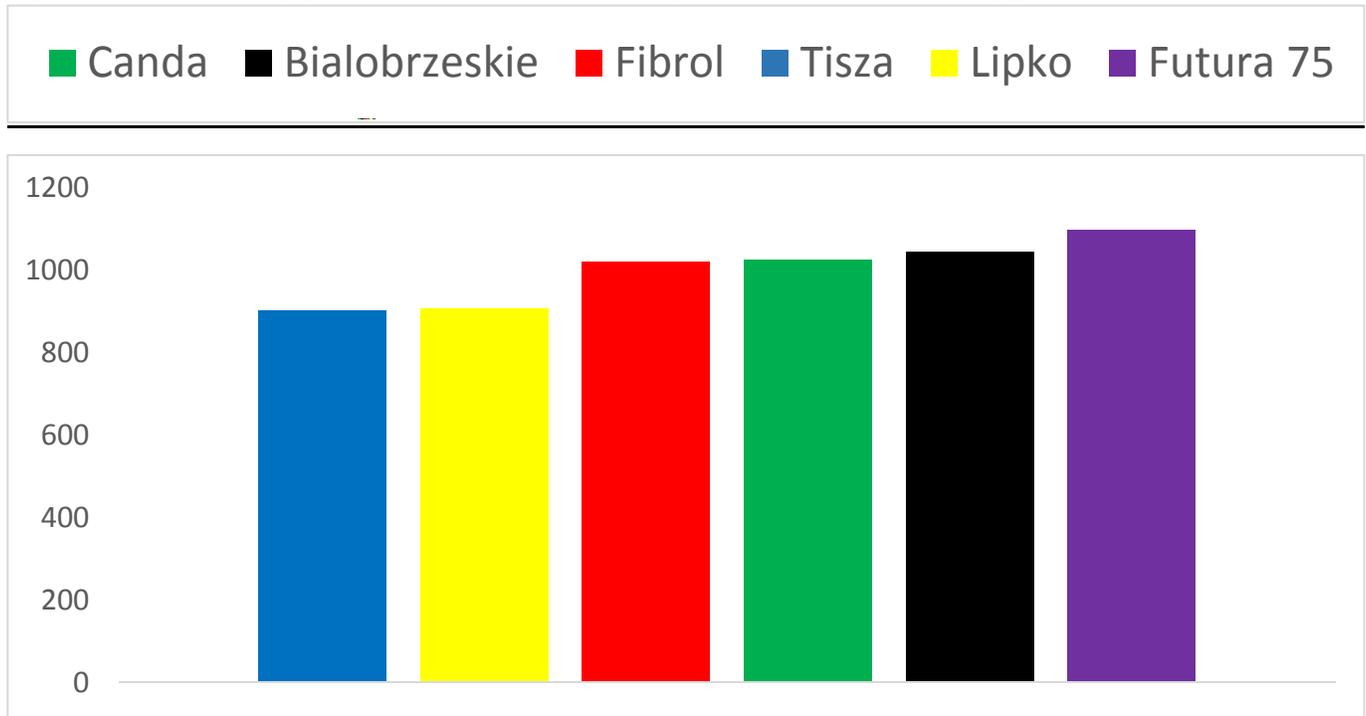
Plot establishment was excellent without additional inputs. Table 1 provides the analysis of variance statistics for this trial.

Table 1. Analysis of variance statistics for 2015 dual-purpose trial.

ANOVA Statistic	Grain Yield (#dry grain/A)	Fiber Yield (#DM/A)	Plant Density (plants/A)
P-Value Model	0.0842	0.0020	0.0067
P-Value Replication	0.0514	0.0427	0.9463
P-Value Variety	0.2101	0.0015	0.0015
CV	12.23	20.02	17.12

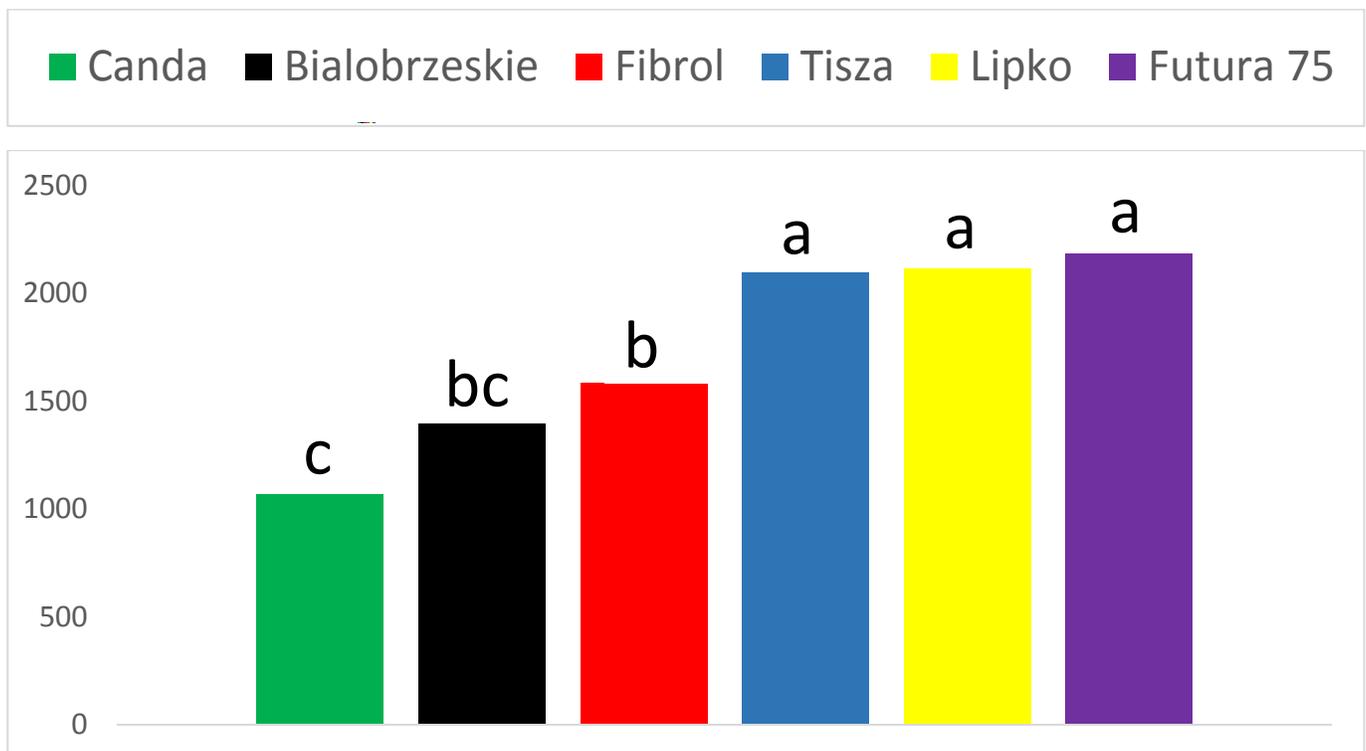
As indicated in Table 1 and illustrated in Figure 1, there were no significant effects ($P>0.10$) of variety on dry grain yields. Mean dry grain yields ranged from 902-1099 pounds/A

Figure 1. Yields of dry grain from 6 varieties of hemp harvested 84 DAS (#dry grain/A).



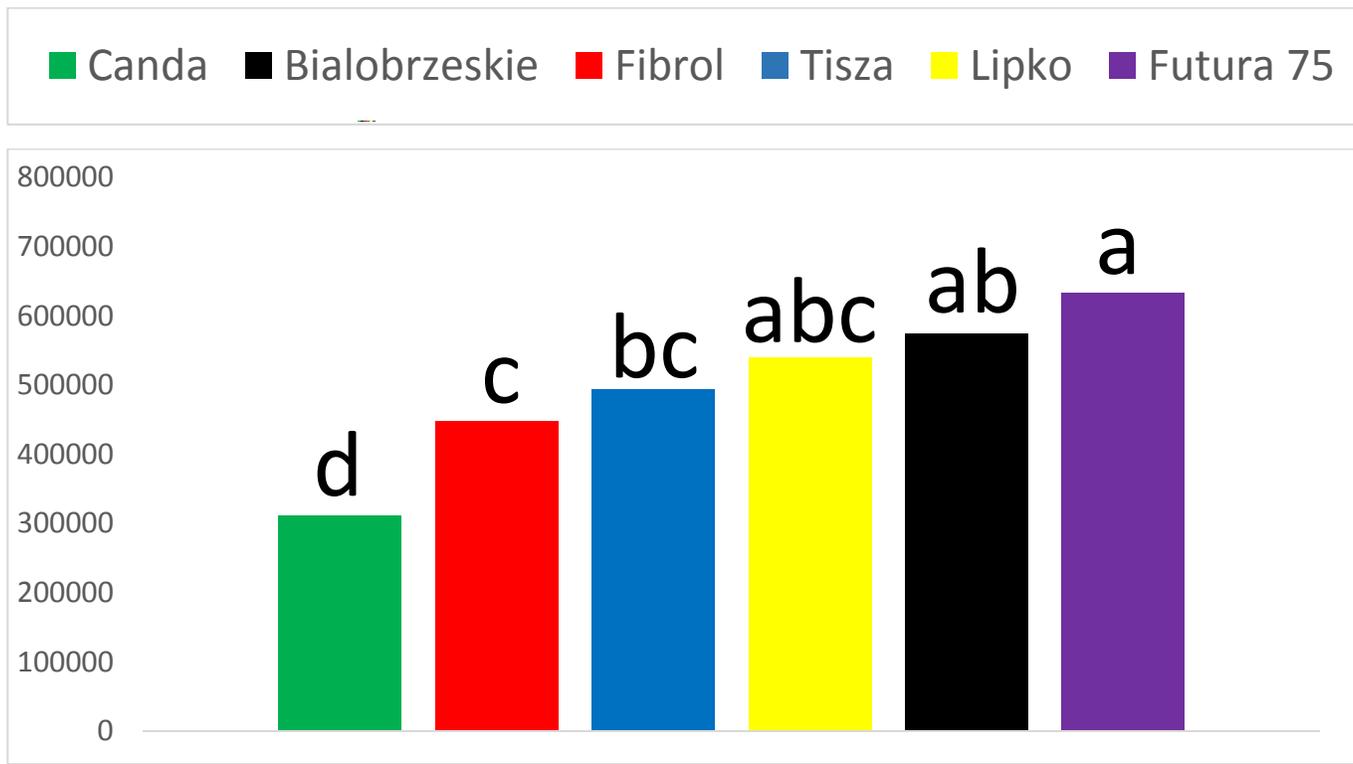
There were significant differences ($P < 0.0015$) among fiber dry matter yields due to varieties (Table 1). Yields of DM ranged from 1068-2184 pounds DM/A (Fig 2).

Figure 2. The effects of variety on fiber DM yields (#DM/A) harvested 84 DAS.



There were also significant effects ($P < 0.0015$) on plant density due to varieties (Fig. 3). Plant densities ranged from 310,597-633,334 plants/A.

Figure 3. The effects of variety on plant density (plants/A) harvested 84 DAS.



Conclusions

This trial was planted very late in the growing season relative to what would be considered optimal; somewhere in the range of 7-8 weeks later than desired. Because hemp is very sensitive to photo period, late planting almost certainly had significant effects on yields dry grain and fiber as well as plant densities. Dry grain yields were not impacted by varieties, but fiber DM yields and plant densities were significantly different ($P < 0.10$) among varieties. Interestingly, even with the late planting the grain yields for all varieties were at or above historical grain yield averages. We highly anticipate that we will be evaluating these and many more varieties in the future as more processors and producers move into Kentucky. Moreover, trials must be conducted comparing varieties originating from different latitudes to determine appropriate planting dates for optimal yields of both grain and fiber over the course of an entire growing season. Of equal importance will be evaluations of efficient harvesting of both grain and fiber components of dual-purpose crops utilizing standard equipment already common on Kentucky farms.

We gratefully acknowledge the in-kind support of this trial by Mr. Tom Hutchens, president of the Kentucky Hemp Seed Research and Development Company, LLC (KHSRD). Mr. Hutchens and the KHSRD provided the seed for the varieties Fibrol, Tisza, Lipko, and Canda.