INSIGHTS OF THE FRENCH HEMP PROGRAM

by Patrick Girouard

Ever since its' prohibition in 1938, possible legalization of hemp in Canada has always led to passionate debates. Lots has been said about the plant; its effects, potential commercial uses, etc... But in fact, too much has been said. The diversity of the participants involved in the debate, and the variety of reasons supporting their respective positions, has produced an incredible amount of incomplete literature. From an agricultural stand point alone, it has become increasingly difficult to make an accurate assessment of the potential of hemp as a new crop opportunity in North America. In order to improve the understanding of the issues surrounding hemp production, REAP-Canada visited organizations involved in hemp production in France this last October.

History

Up until the mid 1800's, more than 100,000 hectares of hemp was grown throughout France to produce linen, fabric, twine, rope, cordage, and natural oil (seed). However, hemp acreage declined steadily over the years to hit a rock bottom of 700 hectares in 1960. Several reasons can explain the drastic decline in hemp production: the end of the era of sail boats; the entry of synthetic fibre; the availability of other natural fibres and oil produced overseas (cotton, sisal, jute, peanuts, etc.); and the high labour requirement involved in hemp production (mainly fibre separation).

At present, approximately 6,000 hectares of hemp are grown each year in France. Most of the production is grown for high quality paper markets (currency and cigarette paper), and is produced under a contract-type arrangement. The crop qualifies for generous subsidies available through the European Community Land Set-Aside Program.

Hemp is found mainly in La Sarthe and La Loire, west central regions of France.

Planting occurs during the month of May, and the crop is harvested from mid-August to mid-September. Hemp is a low maintenance crop, since no field operations are required between planting and harvest. Fertilizers are applied at planting and weed control is

performed by the crop itself; hemp competes with weeds early in the season and then eliminates them through its' faster growth.

The hemp varieties used in France yield on average eight tonnes of straw per hectare (15% moisture) with a long fibre content of between 34-39%. On a dry matter basis per hectare, long fibre yields 2.3 to 2.9 tonnes. The long fibre content is of interest to papermills because it represents the part of the plant used for high quality paper production.

Economics

Under French conditions, one tonne of hemp straw sells for $113. When long (bast) and core (inner part of the stem) fibres are separated by an intermediary, bast fibre sells to papermills for between $450 - $750 per tonne. The price varies depending on the fibre quality and general market conditions. Nevertheless, it is argued that if the markets were truly balanced, that is if farmers didn't have an annual EEC subsidy of $1,267 per hectare, hemp bast fibre would have to sell for $1,000 per tonne.

A typical production budget for a hemp crop yielding 8 t/ha in France is as follows:

Total revenues (value of the straw and EEC subsidy) are $2,167 /ha; total variable costs are $900 /ha, for a gross margin of $1,267 /ha ($158 /tonne). From a Canadian perspective, such a gross margin makes any cash crop farmer envious.

However, if the EEC subsidy is taken out of the budget, the gross margin turns to zero. Without the subsidy, French hemp growers are not able to cover variable costs for yields below 8 t/ha. But with subsidies, hemp is an attractive venture in France.

Based on the French experience, the ability of hemp to be a competitive fibre source for papermaking in the Canadian economy rests on three key points: economies of scale, market development and value added co- or by-products.

In France, hemp is grown on a relatively small area (6,000 ha) and in small fields compared to the scale of agriculture in North America. This means that economies of scale at both the production and processing levels could be possible under our conditions.

One problem associated with hemp is its' low, long fibre content compared to softwood such as spruce. For instance, in one tonne of hemp, 34-39% is long fibre. If the pulping process converts only 45% of the long fibre, that means only about 15% of the original hemp straw has been used. With hemp straw selling for $113 per tonne, a 15% final use translates into a fibre cost of $753 per tonne of pulp (this does not include any credit for the sale of residues). In contrast, softwood is selling for about $100 per dry tonne, and with a pulp yield of 45%, fibre cost is $222 per tonne of pulp. This example demonstrates the fact that hemp bast fibre must be used to produce higher value papers, or used in mixture with other fibre sources to produce existing or new paper grades that command a premium on the market.

The core fibre of hemp, approximately 60% of the plant material, is usually not used for papermaking due to the short fiber length. In France, this material is used in the

particle board industry, or as bedding for animals. Development of valuable markets for this by-product is an opportunity that needs to be investigated further.

Insulating Material

Recently, one interesting use for the core fiber has been developed. Chenevotte Habitat, a company near Le Mans (France), is producing an insulating material made of hemp core fibre available from a nearby papermill. The product, called Isochanvre, is available in two forms: bulk, and as a conglomerate with lime. In both cases, the product provides sound insulation due to its absorptive qualities and thermal insulation through its capacity to retain and store heat.

In order to be used for insulation, the company had to develop a process whereby hemp core, an organic material, is transformed into a mineral form. In the mineral form the material becomes waterproof, rot-proof, fire-proof and has fungicidal properties. This mineral transformation technique was first invented by the Egyptians about 4,000 years ago. At that time, the product was used for bridge decks and ship gangways. Isochanvre is now used in France, and in nearby countries, and is an industry with sales growing by 50% a year. One hectare of hemp is said to be sufficient to build a house with 100 m2 of floor.

Overall, if the economics of hemp is to become positive, without the aid of subsidies, in the North American context, it is obvious that valuable markets must be found for each type of fibre in the plant, not just for the bast fibre. The French hemp program is a resource of practical information to establish a similar industry in Canada, but their experiences will likely only be used to set bench marks for our industry, since the production scale in Canada will be much larger.

Characteristics of Hemp Varieties Grown in France

1) Growing Season Requirement (from seedling emergence to full heading): 70-72 to 88-91 days

2) Total Straw Yield: 6-8 metric tonnes of dry matter per ha

3) Long (bast) Fibre Yield: 2.3-2.9 metric tonnes of dry matter per ha

4) THC Content (Psychoactive ingredient): 0.05-0.145%

Source: FNPC, France

Typical Production Budget in France

Average Hemp Yield: 8 tonnes/ha (@ 15% moisture)

Revenues($/ha): Straw 900

EEC Land Set Aside Subsidy 1,267

TOTAL 2,167

Variable Costs($/ha): Fertilizers 238

Seed 236

Harvest 330

Miscellaneous 96

TOTAL 900

Gross Margin ($/ha) 1,267

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