



Hemp



Cannabaceae

In the past three years, there has been a renewed interest in the production of fibre hemp (*Cannabis sativa L.*) in Alberta. This effort has sparked a great deal of interest and speculation regarding the crop's potential. The concept of crop diversification has captured the attention of Alberta producers and processors; the expansion beyond our traditional crop commodities makes good sense in the global marketplace. Since 1995 fibre hemp research plots have been grown in various parts of Alberta to evaluate the potential of this crop for both seed and fibre production. Research licenses were granted by the Health Protection Branch of Health Canada, the branch of the federal government charged with enforcing legislation concerning this species.

Fibre hemp is an annual herbaceous plant which flourishes in temperate regions. All cultivars tested in Alberta have been low-THC (delta-9 tetrahydrocannabinol) cultivars. Canada has adopted the 0.3% THC standard established by the European Union as the concentration which separates non-psychoactive strains suitable for legal fibre production from those which are illegally grown for their properties of intoxication. The 0.3% THC designation is very conservative. Most narcotic strains range from 3-5% THC, with cleaned, high potency material reaching as high as 15% THC. It is postulated that THC was useful to the plant by providing protection from UV-B exposure. The cannabinoid complex (which includes THC) of compounds is secreted by epidermal resin glands which are most numerous on and around the reproductive structures. This makes sense, since the reproductive structures require the highest level of protection. Low-THC varieties secrete resin, but it is composed of non-intoxicating substances.

Plant growth is very vigorous. Fibre hemp can reach heights of up to nine meters, but the usual average under commercial production is 2-4 meters. The crop has been subject to intensive breeding programs in Poland, Rumania, Hungary, France, the Ukraine and several other European countries. Breeders have attempted to increase bast fiber yield and quality. One method has been to select monoecious strains (male and female reproductive organs located on the same plant) which eliminates the problem of different maturities between male and female plants. Due to the fact that flowering is dictated by day length, most land races have been selected to mature in early autumn, to take full advantage of the temperate growing season. Breeders also prefer to select for long internodes and a hollow stem, which increase the quality of the fiber.

The plant consists of a single main stalk, with an external sheath of bast fibre and an interior core of white, fibrous hurd. The plant has been used for a wide variety of purposes including rope-making, textiles, paper production and construction materials; the seed has been used as a source of high quality oils (both for industrial and edible uses) and protein (22% which compares favorably to several legumes). In 1997 a \$60,000 Ontario research grant was given to The Natural Order Ltd. to study which strain of hemp will provide the most seed and highest quality oil, and how this oil can be used by industry. In Britain, a commercial company (which grew 4000 ha of industrial hemp in 1996) uses the hurd as an animal litter product, and processes the bast fibre into mats which are used for bedding horses. Recent research programs have dedicated over US\$9 million to determine whether fibre hemp could be used to develop a pulp and paper industry in the Netherlands.

The plant is cited to have a wide range of advantages. Fibre hemp suppressed populations of destructive nematodes and *Verticillium* in the Netherlands. However, many claims are made regarding the superior light use efficiency of the crop, the crop's ability to produce huge amounts of biomass on poor soil, unsurpassed competitiveness and its unparalleled cellulose production. Dr. Hayo van der Werf states that many of these claims are inaccurate; some of the overestimation of hemp's benefits may be due to the emotional commitment many individuals have in making this a viable crop.





Seeding



Hemp seed



Hemp leaves



Grasshopper sunning itself



CDC North's hemp plot



Female flower



Hurd (core) and blast



Hemp root





Harvesting



Stubble



Hemp bales



Hurd panels

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This document is maintained by [Stacey Tames](#).
This information published to the web on June 10, 2001.
Last Reviewed/Revised on May 27, 2004.

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