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Basic information on FINOLA Agronomy for 2012

Plant Economy

The FINOLA variety of industrial hemp (non-drug *Cannabis sativa*) is a versatile, dioecious, oilseed crop that was developed in Finland in 1995. It is primarily grown for grain and also produces fiber/biomass. The typical seed weight for FINOLA is between 11.5- 12.5 g /1000 seeds.

Field Selection

For best results, sow FINOLA in well-drained sandy soils that are rich in organic matter with high nutrient availability. High microbiological activity in the soil will support vigorous growth through mychorrhizal symbiosis under organic cultivation. A light to medium textured soil is preferable, with a pH between 6.0 to 7.5. The seedbed should be fine, uniform, moist, warm (+10 °C min) and weed free before sowing. Hemp is best preceded by perennial alfalfa/grass breaking crops, green manure plow downs, legumes, barley, potatoes, or soybeans. Corn, oilseeds, and wheat can be vectors for disease and are not recommended as fore crops. Spice crops, such as cumin or caraway, are also not recommended as fore crops because they can impart unwanted flavors into hemp oil during pressing.

Seeding

Sow FINOLA in shallow rows (1- 2 cm), into moist soil, and after the soil temperature has reached 10 °C, with mid-April to mid-May as an optimum-sowing window. Expect germination in 2 to 4 days, and emergence within 4 to 7 days, depending on soil moisture and temperature. An optimal plant density of 100 plants / m² can be achieved for grain production with 25-30 kg/Ha. More exact seeding rates should be estimated from germination testing results, which are included on the official tags of each seed bag. Hemp seedlings are frost tolerant to about -4 C. A hemp bushel weights 44 lbs, for those who might like to think about it that way.

Fertilization

Under optimum conditions, FINOLA will grow vigorously and requires moderate nutrient availability. Conventional NPKS (nitrogen, phosphorous, potassium and sulfur) fertilization is recommended for FINOLA at the same levels required to grow wheat or rapeseed. FINOLA grain and fiber yields are most responsive to N & P fertilization, and optimum yield and returns are often realized at about 75 kg of actual N/Ha. Phosphate should be applied at about 75 kg of actual P/Ha. Hemp will tolerate some seed-placed N and P (about 15-20 kg/Ha) during sowing. Apply additional K and S where soils are deficient. FINOLA will grow somewhat taller and produce more biomass with increased fertilization. However, increasing fertilization may also delay seed maturation, which is a concern at high latitudes with short growing seasons. For environmental reasons, very high amounts of N are not recommended, however a FINOLA crop will tolerate up to 150 kg/Ha and exceed 2 meters in height.

Organic producers are recommended to precede a FINOLA crop with a perennial soil breaking crop or green manure plow down, with added urine or manure to increase nutrient availability for rapid initial growth. Reduce weed pressure with plowing and harrowing. The seedbed must be as fine and even as possible. **Please note!** Good soil,

good farming experience and proper nutrient levels are essential for successful organic hempseed production. Be sure to have enough nitrogen! It is best to consider hemp as a two-year crop within an organic production system and use the first year to control weeds and improve soil fertility and the second year for grain production.

Weed Management

Given a good start, FINOLA can be an effective weed suppressant. A quick, even emergence is the key for FINOLA to effectively compete with weeds, by rapidly creating a dense leaf canopy within the first month of growth. However, producers are still recommended to minimize weed pressure by Fall and (at least) Spring tilling and harrowing, and through the use of perennial forages or green manure plow downs. Problem weeds include wild buckwheat, wild oats, rapeseed, pigweed, volunteer wheat, coriander and other spice crops.

Disease and Pest Management

Hemp has very few disease and pest problems in most places. The most important disease issue is *Sclerotinia* stem rot, especially under wet conditions in the Autumn. Another diseases of note is *Botrytis* (gray mold / head blight), especially under wet conditions. Grasshoppers, gophers, the Bertha army worm, hemp borer and Lygus plant bugs have been known to attack hemp in some places. Note; there are no pesticides registered for use on oilseed hemp in the EU. Pesticides and herbicides should not be used on crops that are consumed by humans or other animals. Flocking migratory birds will be attracted to the mature seed in the late Autumn.

THC Test Sampling

FINOLA is a rapidly maturing variety of hemp, and requires some vigilance to recognize the correct sampling time. The end of flowering for FINOLA is no later than 55 days after sowing under ideal conditions, and even sooner under stressful conditions. According to the sampling methodology described in Annex I of EU Regulation No 796/2004, the latest sampling interval begins 10 days after the end of flowering, and then continues for only 10 days. In practical terms, the latest possible sampling interval begins 65 days after sowing and ends no later than 75 days after sowing. This sampling interval can be earlier when the crop is under stress, and especially under hot and dry conditions, or later if the season has been unusually wet and cold. According to Canadian sampling regulations, the correct sampling time for FINOLA is about 70 days after sowing under ideal conditions, and even sooner under hot and dry conditions. Later samples may result in THC levels over 0.2%. For more information on FINOLA morphology and development, please visit <http://www.finola.com/FinolaDevelopment%20gif.pdf>.

Harvest

Approximately 135-140 days after sowing, FINOLA may be combined for grain while the plant is still “green”, in order to minimize fiber strength and fiber wrapping during harvest. This should be done when the crop and the weather are as dry as possible, and drying facilities must be nearby and ready to receive the harvested grain. FINOLA can be swathed at 85% seed head maturity in a warm continental environment, such as Canada or Central Europe and possibly in the UK, being cut near to the ground and combined dry at ~10% seed moisture. Preferably, FINOLA can also be straight combined at about 12 to 15% seed moisture during dry autumn days with a typical grain harvester, without modification. Aerate grain immediately off

the combine down to about 9% moisture – this is critical to prevent seed heating, reduce mold and to preserve seed quality. Cut or hay-bind the remaining stalk (ranging between 1- 1.5 meters in height) within a few days and bale. Reduce cylinder, rotor and unloading auger speeds to prevent seed damage while harvesting. Watch for fiber wrapping around shafts, particularly the drive shaft and sprockets of the feeder chain, or front beater, and front drum for the feeder chain. While producers use all types of harvesters, CIH rotaries, JD & NH conventional harvesters with draper headers seem to work best. There are some combine modifications that limit fiber wrapping and speed up harvesting, and modest combine speeds and input rates also help limit potential problems with wrapping. As always, careful attention by an experienced operator is the best prevention of problems.

Drying and Cleaning

After slowly drying hempseed down to 9% moisture, immediately after harvest, at LOW temperatures (20-25 °C max) and HIGH volumes of air flow, FINOLA grain can be effectively cleaned with the following sieve sizes; 1.60- 3.25 mm oblong and 2.50- 5.00 mm round. A gravity table may be necessary to remove some weeds seeds.

Storage

Ensure that your harvested hemp grain is slowly and carefully dried at low temperatures (20- 25 °C) to about 9% moisture, with proper aeration and turning, to preserve freshness and general grain quality. Ideally, drying should begin in the field, either by swathing in climates that allow for it, or by transferring combined grain directly into a trailer bed that has the ability to dry grain already in the field. Do not store the grain for any amount of time without drying! Mold will develop within hours. Be sure that your moisture meter is pre-calibrated for hempseed!

Some other things you should know about FINOLA:

Uses for the seed

Hempseed is a high value food product that provides a rich source of polyunsaturated *omega*-3, -6 & -9 oils. This seed also contains an easily digested protein, carbohydrates, vitamins and minerals. Unlike many other seeds and seed meals, hempseed is lacking in anti-nutritional components: such as the protease inhibitors found in soya, glucosinolates in rapeseed or linamarin found in linseed. As feed, hempseed meal can be feed to ruminants and pigs. Chickens and other birds will aggressively eat whole hempseed. Hens fed hempseed will produce “omega” eggs.

Uses for the fiber

Hemp fiber is the longest and strongest of all natural bast fibers, and is still used in a variety of commercial applications that range from rough non-woven insulations to tea bags, cigarette papers, paper money, other specialty papers and also composites for the automotive industry. The unprocessed stalk is over 40% cellulose and about 15% lignan. As a simple nonwoven material, the fiber and biomass from a hemp crop make excellent animal bedding, geotextiles and geo-remediation products, compost substrates, insulation, and a light weight plaster/cement known as hempcrete.

FINOLA is an oilseed hemp variety that was developed in Finland in 1995 under the breeder code FIN-314. It was admitted to the Canadian list of hemp cultivars as FINOLA in 1998, where it has remained to this day. FINOLA was finally admitted to

the EU list of subsidized hemp varieties in 2003, after much unnecessary dithering and shameful bureaucratic delays. FINOLA is the first hemp variety to be developed as an industrial oilseed crop.

FINOLA is a short, dioecious, early-maturing oilseed hemp crop. In fact, of all hemp varieties, FINOLA is the earliest maturing and most productive in terms of grain yield. It is harvested by conventional harvesters for its grain and fiber, and produces up to 5-7 tons of stalk with sufficient fertilization. FINOLA grows best in continental and temperate regions, particularly between latitudes 40°- 60°. It will benefit from irrigation in areas that are prone to drought. FINOLA's high grain production (over 2,000 kg of grain/hectare under ideal conditions), short stature, ease of harvest, sweet seed taste and unique fatty acid profile of the pressed seed oil make it the crop of choice for hempseed foods and animal feed. Because of its highly unsaturated seed oil, the healthy gourmet dietary oil from hempseed is also useful in certain industrial products; for example, as a "drying oil" in the production of specialty inks, paints and other technical coatings. This highly unsaturated oil can be added to bio-diesels for the purpose of lowering the diesel solidification point in cold environments, for example. For more info on the unique oil profile of FINOLA, please visit <http://www.finola.com/oil.html> and <http://www.finola.com/nutrition.html>

When should a FINOLA field sample be taken for THC? According to Procedure A of the sampling methodology described in Annex I of EU Regulation No 796/2004, the earliest sampling window can begin soon after the onset of flowering, which is typically 30-35 days after sowing FINOLA. The latest time for sampling, according to Procedure B, would begin 10 days after the end of flowering, and then end 10 days after that point. Unfortunately, Procedure B provides a VERY narrow time window of only 10 days, which is easily missed by the untrained civil servant who many not be very familiar with hemp, in general, or FINOLA, in particular. In practical terms, this "end of flowering" point is typically achieved no later than 55 days after sowing FINOLA, and it can be even earlier if the crop is under stress, especially during hot and dry summer conditions or under poor growing conditions. At the absolute latest, FINOLA is not correctly sampled for THC analysis past 75 days after sowing.

Finola ky is an incorporated partnership that was formed to maintain and administer the FINOLA variety of hemp, and sell hempseed food products, such as Finola® oil. In 1995, Dr. Jace Callaway began to develop FINOLA in Finland, then secured the Plant Variety Rights in 1999, and has continued to provide stewardship in the EU for this unique oilseed hemp variety. For more info, please visit <http://www.finola.com>

Finola® is also a registered trademark for food products made from the FINOLA grain, and especially for the promotion and sales of Finola® oil. It is perfectly within your rights to purchase and grow FINOLA seed, and to produce your own oil and other hempseed food products, but please do not sell or promote your products as Finola® without prior agreement. If you would like to use the Finola® trademark to promote and sell your products, please use the contact information in this document to get in touch with Dr. Callaway and discuss a licensing agreement. We are especially interested in having the Finola® name represented by high quality products.

Can the FINOLA oilseed hemp variety be used for drug purposes? No! For sound scientific reasons, it is simply not possible to use FINOLA for drug purposes. This is also true of most industrial hemp varieties. Quite simply, the levels of THC are too low and the levels of CBD are too high for illegal drug purposes. Unfortunately, “cannabiphobia” still casts a long and fearful shadow over anything related to hemp these days. This form of mental illness is not genetic or contagious. Cannabiphobia can be effectively treated by exposure to factual information and hemp products!

Cultivated hemp still suffers the same legal restrictions as drug cannabis in some parts of the world today, particularly in the USA. In contrast, hemp continues to be a growing business in Canada; the “other” country in North America. Please be sure that you are fully informed about your local laws and customs before importing viable hempseed, and be aware of potential subsidies or penalties for the cultivation of hemp in your nation. Also, do understand that **we have very limited resources to advise on matters of legislation or general agriculture**, or even to provide small amounts of personalized advice to people who are not already customers. Consulting, and even general information, is only available to those who have purchased certified FINOLA planting seed. Free and useful information on various aspects of hemp can be found on the Finola website: please have a look! <http://www.finola.com>

Viable FINOLA seed will not be shipped to the USA (please, continue to vote for smarter politicians over there!). For farmers in Canada, please contact Mr. Shaun Crew of Hemp Oil Canada for your FINOLA planning seed.

Thank you again for your interest in Finola!

Dr. J.C. Callaway, Ph.D.
Finola ky
PL 236
FI-70100 Kuopio
Finland

callaway@finola.com
cell +358 40 725 2534
<http://www.finola.com>