

Basic information on FINOLA Agronomy for 2016

Crop Description

The FINOLA variety of industrial hemp (non-drug *Cannabis sativa* L.) is a short, dioecious, auto-flowering oilseed crop that was developed in Finland for hempseed grain production. It is properly spelled with capital letters, and can be harvested with a modern combine. The fiber/biomass from this variety is best chopped and left to decompose in the field. FINOLA is cultivated like other industrial oilseed crops, such as rapeseed. The typical seed weight for FINOLA may range from 12- 15 grams /1000 seeds, with smaller seed in the northern latitudes (> 50° N) and somewhat larger seed in the south (< 50° N). Average potential grain yields also vary, with up to 1000 kg/ha near 60° N and 2000 kg/ha near 50° N, under good conditions. Continental climates are preferred. As latitude decreases, so does the height. Grain yields are dependent on the amount of thermal energy during the growing season.

FINOLA seed and meal are excellent sources of oil and vegetable protein for human foods and animal feed. Hempseed is lacking in the anti-nutritional agents found in rapeseed (glycosinolates), soya (protease inhibitors) and linseed (cyanogenic glucosides). Laying hens will produce *omega-3* eggs when feed the hempseed or the seed cake that remains after pressing. Pigs and all ruminants will enjoy 10-20% hempseed cake added to their normal rations.

Field Selection: For best results, sow FINOLA in warm, moist, well-drained soils that are rich in organic matter with high nutrient availability. Well-drained, sandy loams are best. Soil temperatures must be above 15 °C at the time of sowing. Clay, heavy, compacted soils and low, wet areas should be avoided (see the soil triangle at the end of this document). High microbiological activity in the soil will support vigorous growth through mycorrhizal symbioses under organic cultivation. A light to medium textured soil is preferable, near pH 6.5. FINOLA is best preceded by perennial alfalfa/grass breaking crops, green manure plow downs, legumes, potatoes, or soybeans. Corn, other oilseed crops, oats, rye and wheat can be vectors for disease and are not recommended as fore crops. Spice crops, such as cumin and caraway are also not recommended as fore crops, as volunteers can impart unwanted flavors into hempseed oil.

Weed Management: Given a good start, FINOLA can be an effective weed suppressant. A quick, even emergence is the key to effectively compete with weeds, by rapidly creating a dense leaf canopy within the first month of growth. Farmers are recommended to minimize weed pressure in the autumn, if possible, and (at least) with spring tilling and harrowing. Perennial forages or green manure plow downs are good fore crops. Problem weeds include black bindweed or wild buckwheat (*Fallopia convolvulus*), wild oat (*Avena fatua*), pigweed (*Amaranthus* species), fat hen (*Chenopodium album*), rapeseed, caraway, coriander and other volunteer crops. *Fallopia convolvulus* seed is especially difficult to clean away from hempseed.

Seeding: The seedbed must be raked evenly and uniform; sow or drill 1 cm deep in warm, moist, weed free soil. Most failures can be explained by deep sowing (>2cm), especially in poorly suited soils. Roll if heavy rains are expected after sowing. Late May to early June is an optimum-sowing window near 50° N, and mid May near 60° N. FINOLA can be sown earlier near latitude 40° N, but should not be sown before May. 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 should be achieved for grain production by sowing 25-30 kg/Ha. Cold nights can be detrimental, but not fatal.

Fertilization: Under good conditions, FINOLA will grow vigorously and requires normal amounts of nutrients. Fertilize like rapeseed (Canola- *Brassica napus*) with 15% additional nitrogen. Conventional NPKS (nitrogen, phosphorous, potassium and sulfur) fertilization is recommended for FINOLA at the same levels required to grow rapeseed, for example NPK (23-3-6) at 295-330 kg/ha, with an additional 10-20% N as urea or animal urine. Apply additional K and S wherever soils are deficient in these elements. FINOLA will grow somewhat taller and produce more biomass with increased fertilization. Increasing fertilization may also delay seed maturation, which is a concern at higher latitudes with short growing seasons. For environmental reasons, very high amounts of N and P are not recommended. Amounts up to 150 kg N/Ha may cause the crop to exceed 2 meters in height at some latitudes.

Organic producers are recommended to precede a FINOLA crop with a perennial breaking crop, clover or green manure plow down, with added urine or manure to increase nutrient availability for rapid initial growth. Reduce any weed pressure by plowing and harrowing prior to sowing. The seedbed must be as fine and even as possible. **Note!** Good soil, farming experience and proper nutrient levels are essential for successful organic oilseed hemp production. **Be sure to have enough nitrogen (N)!**

Disease and Pest Management

Hemp has very few disease and pest problems in most places. Under wet conditions, *Sclerotinia sclerotiorum* (stem rot) and *Botrytis cinera* (gray mold/ bud blight), may be a problem. Early harvest is recommended to avoid fungal damage. Grasshoppers, gophers, the Bertha Army Worm, the Hemp Borer and Lygus plant bugs have been known to attack hemp in some places. Note; there are no pesticides or herbicides that are registered for oilseed hemp in Europe. Pesticides and herbicides should not ever be used on FINOLA grain crops. Flocking migratory birds will be attracted to the mature seed in late autumn. Ideally, hempseed should be harvested just before birds begin to visit the field. Birds spread disease as they sit on the buds to eat the seeds.

Sampling the field for THC

FINOLA is a rapidly maturing variety of hemp, which requires some vigilance to recognize the correct sampling time. The beginning of flowering is typically 30 days after sowing, when male flowers begin to shed pollen, and sooner at latitudes below 50° N. The end of flowering for FINOLA is typically no later than 50 days after sowing under normal conditions, and even sooner at lower latitudes, and under stressful conditions caused by drought or competition with weeds. According to the field sampling methodology described in EU regulations, the earliest sampling interval begins 10 days after the onset of flowering, which is about 40 days after sowing FINOLA, and continues until 60 days after sowing. The latest possible sampling time begins 10 days after the end of flowering (about 60 days after sowing). In Canada, the field sampling of FINOLA may begin 50 days after sowing, and sooner if the crop is stressed. In general, field sampling will normally begin 40-50 days after sowing, and the latest possible sampling time can be no later than 60 days after sowing. Sampling times will begin much earlier at lower latitudes (<50° N), especially under hot and dry conditions. Late field samples may result in THC levels over 0.2%. For more information, please download our 2.6 MB pdf, which has specific information and pictures of FINOLA's morphology and development over time: <http://www.finola.fi/>

Harvest

Approximately 100-130 days after sowing, depending on latitude, FINOLA may be combined for grain while the crop is still “green” (70-90% seed head maturity), in order to minimize problems of fiber wrapping during harvest. Harvesting should be done when both the crop and the weather are relatively dry. An early harvest of good quality grain may be possible after 100 days near 50° N and 120 days near 60° N. Crops near 40° N may be harvested after 75 days. Harvest should begin soon after birds are noticed in the field. Early harvest is recommended if wet conditions are expected. Drying facilities must be nearby and ready to receive the harvested grain, especially in wet climates. FINOLA should not be swathed. Preferably, FINOLA should be straight combined at about 10 to 15% seed moisture during dry autumn days with a standard grain harvester, without modification, by cutting only the top third of the plant. Aerate grain immediately off the combine down to about 9% moisture – this is critical to prevent seed heating, reduce mold growth and to preserve seed quality. Chop the remaining stalk and leave in field to decompose. 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 grain producers use all types of harvesters, CIH rotaries, JD & NH conventional combines with draper headers seem to work best. There are some combine modifications that may limit fiber wrapping and speed up harvesting. Modest ground speeds and input rates, with high engine speeds should help to limit potential problems. As always, careful attention by an experienced operator is the best way to prevent mechanical problems. Caution: wrapped fibers can burn!

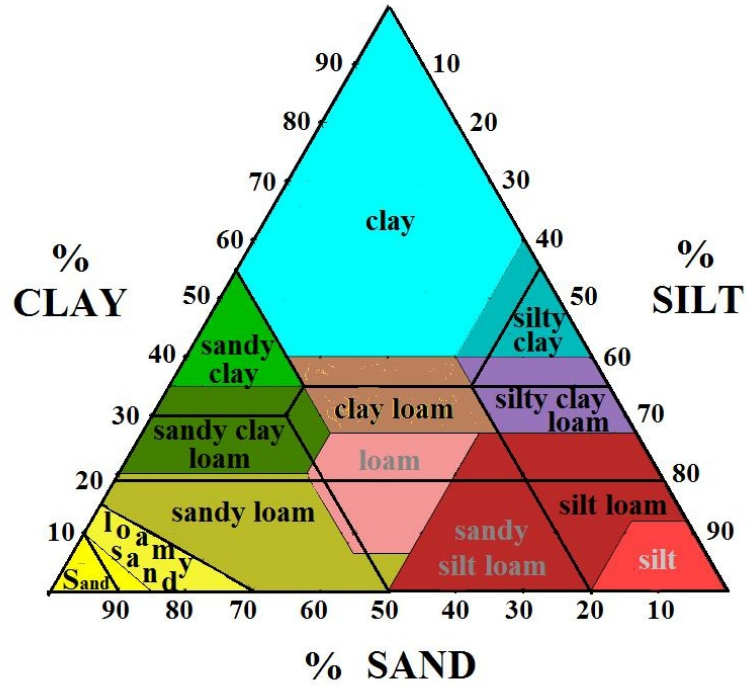
Drying and Cleaning

Ideally, drying should begin in the field, in climates that require such machinery. In wet climates, transfer combined grain into a ventilated trailer bed that grain can begin to dry during the harvest. For the highest quality grain, SLOWLY dry hempseed down to 9% moisture in a grain dryer, immediately after harvest, at LOW temperatures (30-40° C max) and HIGH volumes of airflow, for 10-14 days. Faster drying temperatures can be used for lower quality grain and animal feed. Seed moisture should be checked with a calibrated meter. Rapeseed moisture calibrations may overestimate oilseed hemp moisture by about 3%. 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

Do not store the grain for any amount of time without sufficient drying! Mold problems can ruin a harvest within a few hours. Be sure that your drying facility is nearby and available at harvest time, and be sure that your moisture meter is pre-calibrated for oilseed hemp! Store dried grain in bins or 500 kg tote bags, away from birds. High germination hempseed should keep well for 2-3 years, if properly dried and stored.

A soil textural triangle showing the subtle differences between the USDA (colours) and UK- ADAS (black lines) soil classes



For basic information on soil texture, visit:
http://en.wikipedia.org/wiki/Soil_texture