

# Guidelines for food grain cultivation of hulless barley variety KORNELIJA

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Cultivation stage	Description of food grain growing	
	For maximum grain protein content	For maximum grain yield
<b>Choice of field</b>	<ul style="list-style-type: none"> <li>- Soil type: sod carbonate soils; sod lightly podzolic or loamy soils; sod glacial soils or humus-rich, cultivated sandy soils.</li> <li>- Data on basic soil agrochemical parameters are known: pH, organic matter content, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O.</li> <li>- <u>Soil reaction</u>: optimally pH<sub>KCl</sub> 6.0–7.0. Acidic soils are a limiting factor in grain yield and quality; liming of the soil before sowing is recommended for maximum grain yield using fast-acting granulated liming materials.</li> <li>- Optimal content of organic matter in loamy soils 2.5-3.0%; clay sand 2.0-2.5%.</li> <li>! Fields with consequences of plants where there may be admixture of other cereals, especially hulled types, and accumulation of barley diseases, should be avoided.</li> </ul>	
<b>Pre-crop</b>	Root and tuber cultures, legumes, winter cereals, oats, buckwheat, oilseed rape.	
<b>Augsnes sagatavošana</b>	<ul style="list-style-type: none"> <li>- For sowing, certified seed shall be used, which ensures purity of the sowing, guarantees optimal germination, without diseases, pests and impurities.</li> <li>- Grain seed treatment is obligatory for the primary protection of the crop from fungal infections.</li> <li>- Additional sowing machine calibration: hulless barley grains flow faster through the seed tubes of the sowing machine than hulless barley.</li> </ul>	
<b>Seed selection, preparation and quality</b>	<ul style="list-style-type: none"> <li>- For sowing it is necessary to use certified seed, which ensures the purity of the sowing, guarantees optimal germination, free of diseases, pests and impurities.</li> <li>- When sowing self-grown seed, it is mandatory to determine the germination capacity of the seed (seed with undamaged germ must have a root and a shoot) and the weight of 1000 seeds.</li> <li>- Grain seed treatment is obligatory for the primary protection of the crop from fungal infections.</li> <li>- Additional sowing machine calibration: hulless barley grains flow faster through the seed tubes of the sowing machine than hulless barley.</li> </ul>	
<b>Sowing</b>	<ul style="list-style-type: none"> <li>- Sowing time depends on the readiness of the soil for sowing; the soil must be warmed up to + 5°C; which in the climate temperate zone is in the 2<sup>nd</sup> and 3<sup>rd</sup> decades of April.</li> <li>- Sowing rate from 350-400 germinating seeds/m<sup>2</sup>; this quantity shall be adjusted depending on the sowing time, quality of the seed and sowing, level of the planned yield.</li> <li>! Each day of delayed optimal sowing time has a negative effect on crop productivity. Too deep sowing and lack of moisture during germination can reduce field germination.</li> </ul>	
<b>Growing technology: sowing rate, fertilization plan and application of plant protection products</b>	<p><i>The plant fertilization plan</i> must ensure an economically viable yield based on data from basic agrochemical indicators of the soil, matching the planned yield level with the yield potential of the early "Kornelija" variety.</p> <p><i>Weed control</i>: Herbicide application based on the assessment of the weed spectrum and distribution of the specific field; depending on the crop and weed development phases, spray the herbicide 1 or 2 times.</p> <p><i>Pest control</i>: Based on the development dynamics of pests (cereal aphids (<i>Oulema melanopus</i>) and/or Swedish flies (<i>Chloropidae</i>)) and on the observations of the farmer in the specific field, especially at the beginning of plant development.</p>	

	<p><i>Control of leaf diseases:</i> Use of fungicide (F) based on the farmer's observations about the spread of leaf disease mildew (<i>Blumeria graminis</i>) and net blotch (<i>Pyrenophora teres</i>) in the specific field.</p> <p><i>Adjustment of plant length/lodging:</i> The use of retardant (R) reduces the length of the plant by 5 cm and increases the resistance of plants to lodging by 1-2 scores; spraying of R is recommended when planning a yield <math>\geq 5</math> t/ha at the end of tillering of the plants (plant development phase No. 37).</p> <ul style="list-style-type: none"> <li>- <i>High protein yield t/ha and low cultivation costs, EUR per tonne of protein; soil pH and organic matter content IS appropriate:</i> sowing rate 350 germinating seeds/m<sup>2</sup>; fertilizer for the planned yield of 4 t/ha with F and R.</li> <li>- <i>High protein yield, t / ha, soil pH and organic matter content NOT appropriate for barley:</i> sowing rate 350 germinating seeds / m<sup>2</sup>; fertilizer for the planned yield of 5 t / ha with F and R.</li> <li>- <i>Low cultivation costs in EUR per tonne of protein, soil pH and organic matter content NOT for barley:</i> sowing rate 350 germinating seeds / m<sup>2</sup>; fertilizer for the planned yield of 5 t / ha without F and R.</li> </ul> <ul style="list-style-type: none"> <li>- In well-cultivated soils, if the soil pH level (6.0-7.0) and organic matter content (sandy loam 2.5-3.0%; loamy sand 2.0-2.5%) is optimal for barley cultivation, then the projected yield levels on average from 4.0 to 6.0 t ha<sup>-1</sup>; The use of F and R can provide an increase in yield and an extension of the vegetation period of plants by 2-4 days.</li> <li>- If the degree of soil cultivation, soil fertility and pH level is lowered (below the optimal), then the projected yield levels on average from 3.0 to 4.0 t ha<sup>-1</sup>.</li> </ul>
<p><b>Grain harvesting</b></p>	<ul style="list-style-type: none"> <li>- Food grain of high quality must be as clean as possible from hulls (&lt;5%), with minimum amount of broken kernels (&lt;5%), fully ripened, un-germinated and free from diseases, with a moisture content &lt;14.0%.</li> <li>- hullless barley 'Kornelija' is characterized by high threshing values, on average 95-97%, however, the proportion of hull in the bunker harvest depends on the moisture content of the grain during harvesting and the adjustments of the harvester combine. As the harvest approaches, the ripeness of the hulled barley must be checked regularly with control samples.</li> <li>- The hulls separate more easily during threshing if the grains are sufficiently dry, with an optimal moisture content of 14.5-15% on average.</li> <li>- It is necessary to adjust the threshing drum speed of the harvester combine, to reduce the width of the front threshing slit, which will reduce the crop feed speed, so the combine must run slower; the fans and screens must be adjusted appropriately.</li> <li>- During threshing, the grain tank must be inspected regularly to assess the proportion of unthreshed and broken kernels in the crop, and adjustments to the harvester combine settings must be made during the day. However, if the harvesting conditions are not favourable for sufficient separation of the hull, they must be separated by friction during the pre-treatment of the grain.</li> <li>! Harvest at maturity to prevent sprouting and premature sprouting/germinating of grain, and lodging.</li> </ul>
<p><b>Grain pre-processing</b></p>	<p>During the grain drying process, the heating temperature of the grain (&lt;60°C for food grains) should be monitored so as not to reduce the protein quality and the bulk density of the grain. The optimal grain storage moisture is 14%.</p>