

Seed production guidelines of hulless barley variety *Kornelija*

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Growth stage	Description of cultivation technology
Choice of field	<ul style="list-style-type: none"> - Soil type: sod carbonate soils; sod lightly podzolic or loamy soils; sod glacial soils or humus-rich, cultivated sandy soils. - Data on basic soil agrochemical parameters are known: pH, organic matter content, P₂O₅ and K₂O. - <u>Soil reaction</u>: optimally pH_{KCl} 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. <p>! For certified seed production, the field shall be selected in accordance with the Cereals Seed Growing and Seed Trade Regulations No. 632, observing the requirements specified for seed cultivation</p>
Pre-crop	<p>Root and tuber cultures, legumes, winter cereals, oats, buckwheat, oilseed rape.</p>
Soil preparation	<p>It is necessary to ensure optimal conditions for seed germination: good contact of the seed with the soil, and optimal depth, 2-3 cm, depending on the soil structure and moisture conditions.</p> <p>! When cultivating the soil, the basic rule must be observed – the seed must lie on a hard bed and must be covered with a loose layer of soil.</p>
Seed selection, preparation and quality	<ul style="list-style-type: none"> - For sowing, certified seed shall be used, which ensures purity of the sowing, guarantees optimal germination, without diseases, pests and impurities. - Grain seed treatment is obligatory for the primary protection of the crop from fungal infections. - Additional sowing machine calibration: hulless barley grains flow faster through the seed tubes of the sowing machine than hulless barley.
Sowing	<ul style="list-style-type: none"> - Sowing time depends on the readiness of the soil for the soil; the soil must be warmed to +5°C, which in the temperate zone takes place in the second and third decades of April. - Sowing rate from 350 to 450 germinating seeds/m²; this quantity shall be adjusted depending on the sowing time, quality of the seed and sowing, soil parameters, level of the planned yield. <p>! 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 fertility of the field.</p>

Growing technology: sowing rate, fertilization plan and application of plant protection products	<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 ≥ 5 t/ha at the end of tillering of the plants (plant development phase No. 37).</p>
Harvesting	<p>During harvesting, it is necessary to comply with the requirements set for seed cultivation, ensuring the cleanliness of the harvesting equipment. The optimal conditions for harvesting seed crops are in conditions when the relative humidity of the air does not exceed 75% and the grain humidity is 14-18%. If the moisture content of the grain is lower than 14% and higher than 18%, the risk of injury to the grain and grain germ increases, which reduces the germination capacity of the grain. Hulless grained barley intended for the production of certified seed must be threshed gently in order to prevent injury to the seed germ. The harvester combine's drum must be operated at full power but at a slower speed (less than 1000 rpm). During threshing, the grain tank must be inspected regularly to assess the proportion of broken grain in the crop, and adjustments to the harvester combine settings must be made. A high-quality batch of hulless barley seeds is characterized by a relatively high proportion of grains not threshed free from the hull.</p> <p>! Delayed harvesting may pose a risk of grain sprouting and/or premature grain spillage.</p>
Grain pre-processing	<p>In the grain drying process, it is necessary to comply with the requirements specified for seed cultivation, ensuring the purity of the seed; the heating temperature of the grains must be monitored so as not to reduce the germination of the seeds (for seed grain $<48^{\circ}\text{C}$). The optimal grain storage moisture is 14%.</p>

Seed quality assessment for hulless barley variety 'Kornelija'

Threshing drum revolutions, rpm/min; with a threshing drum slit of 12 mm	Grains with hulls, %	Split/broken grains, %	Grains with beaten sprout, %	Germinating ability, % (in 48h)
850	8.9	0.72	2.31	97
1000	5.7	1.02	2.92	96
1200	4.6	2.75	4.65	93

* grain moisture during harvest 17.5%; seed quality is determined for 100% pure yield.