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Spring barley variety Laudis 550

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Abstract: Laudis 550 is a mid-late malting spring barley variety, medium resistant to lodging and medium resistant to stem brackling. It is resistant to powdery mildew, medium resistant to brown rust, leaf blotch complex and scald. The variety reached 7.2 points of the malting quality index (to the registration date) and it is recommended by the Research Institute of Brewing and Malting, Plc for production of beer with the protected geographical indication České pivo (Czech beer).

Keywords: brown rust; *Hordeum vulgare*; malting quality index; powdery mildew; scald; variety description

Breeding method. Combination crossing of the barley (*Hordeum vulgare* L.) varieties Bojos and Sebastian was done on a cut-off stem under laboratory conditions in June 2003. F_1 and F_2 generations were grown in a greenhouse during the non-growing season (2003–2004). The individual plant selection proceeded in F_3 generation grown in the field in 2004. The plant progeny denominated as 2.9 became the basis of the variety Laudis 550. Plant progenies in F_4 generation were sown in 1 m^2 plots and all the lines were scored for susceptibility to powdery mildew (*Blumeria graminis* f.sp. *hordei*), to leaf blotch complex (*Pyrenophora teres*, *Cochliobolus sativus*) and for susceptibility to brown rust (*Puccinia hordei*) under the natural field infection beginning from this generation. The first informative yield trials were established in F_5 generation (1 location, 1 × 10 m^2) and harvested grain was used for micro-malting tests. The F_6 generation yield trials were established on three locations 4 × 10 m^2 on 1 location and 1 × 10 m^2 on two locations. At the same time, maintenance breeding of the variety started. The inter-station tests were carried out in 2008 and to the first year of testing for the registration of varieties (according to Act No. 219/2003 Coll.) the advanced breeding line was applied as HE 550A. In 2012, after three-year testing, the new variety was listed in the Slovak Republic and in 2013, after four-year testing in the Czech Republic as Laudis 550. It carries the gene of durable resistance *mlo* against powdery mildew (Dreiseitl 2017).

Graded grain (> 2.5 mm) yield. The performance of the variety was tested according to the Protocol for Official Examination of Value for Cultivation and Use (VCU) (Dvořáčková 2012) managed by Central Institute for Supervising and Testing in Agriculture (CISTA) in four production regions using two growing technologies (S1 – untreated technology; S2 – fungicides treatment technology). The variety achieved medium high to high yield level in untreated technology in maize production region, medium high yield level in untreated technology in sugar beet, cereals and potato production region, medium high to low yield level of 2.5 mm graded grain in treated technology in maize, sugar beet, cereal and potato production regions (Table 1).

Malting quality. Laudis 550 was evaluated on the basis of micromalting tests and following malt analyses conducted by the Research Institute of Brewing and Malting, Plc (RIBM) in Brno (Psota & Kosař 2002). Candidate's samples for micromalting tests were supplied by CISTA in Brno from harvest seasons 2010–2012. Extract yield was above average (82.6%) at the optimal content of nitrogenous substances

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Table 1. Important agronomic data of Laudis 550 and the standard varieties Bojos, Kangoo, Sebastian, Xanadu, and Tocada (CISTA 2013)

	Variety					
	Laudis 550	Bojos	Kangoo	Sebastian	Xanadu	Tocada
2.5 mm graded grain yield S1 (t/ha) maize production region	6.74	6.90	6.61	6.68	5.96	6.42
2.5 mm graded grain yield S2 (t/ha) maize production region	7.41	7.48	7.57	7.54	7.21	7.57
2.5 mm graded grain yield S1 (t/ha) cereals and sugar beet production region	6.23	6.28	6.12	6.08	5.95	6.17
2.5 mm graded grain yield S2 (t/ha) cereals and sugar beet production region	7.16	7.11	7.32	7.14	6.97	7.32
2.5 mm graded grain yield S1 (t/ha) potato production region	5.23	5.28	5.37	4.99	4.94	5.33
2.5 mm graded grain yield S2 (t/ha) potato production region	6.31	6.55	6.35	6.27	6.20	6.59
Powdery mildew (DC 37)	8.9	8.9	7.3	6.4	8.9	6.6
Powdery mildew (max.)	8.9	8.9	5.9	5.9	8.9	5.8
Leaf blotch complex	5.8	6.0	5.8	6.2	5.4	5.5
Scald	6.9	6.1	6.3	6.8	6.8	6.5
Brown rust	7.1	6.5	7.0	7.2	6.2	6.8
Fusarium head blight	6.5	6.7	7.1	6.4	6.8	6.8
Non-specific leaf spots	6.3	7.2	6.5	6.7	6.8	7.3
Brittleness of straw	6.8	7.0	7.3	7.2	6.2	6.7
Sprouting	8.0	7.0	7.0	6.3	8.7	8.0
Lodging at heading	6.9	6.9	6.9	6.7	6.9	7.0
Lodging at harvest	6.5	6.5	5.9	6.0	5.6	6.1
Lodging (max.)	7.0	6.7	6.2	6.2	6.1	6.4
Number of ears (m^2)	850	799	764	864	794	753
Plant height (cm)	70	74	72	64	70	73
Time of ear emergence (days)	68	70	69	70	68	69
Maturity (days)	118	118	119	119	117	118
2.5 mm grading grain lot (%)	93	95	94	92	94	92
Thousand grain weight (g)	45	48	48	46	47	51
Malting quality index	7.2	5.8	6.4	7.7	8.3	–

Scale (9–1): 9 = resistant to pathogen, resistant to lodging, the highest quality, 1 = susceptible to pathogen, fully lodged, without malting quality; S1 – untreated technology; S2 – fungicides treatment technology

in a non-malted grain. Degradation of nitrogenous substances was at the above-average level along with the optimal level of diastatic power, higher friability value and average β-glucan content in wort (166 mg/l). Laudis 550 reached premium malting quality ranking, with 7 (7.2) points of the malting quality index

Table 2. Important quality data of Laudis 550 and the standard varieties Bojos, Sebastian, Xanadu, and Kangoo (Psota *et al*. 2013) (mean values from harvest seasons 2010–2012)

Variety	MQI	Pb	E	VZ45	K	DP	FA	F	BGw
		(%)				(WKun)	(%)		(mg/l)
Laudis 550 (HE 550A)	7.2	11.0	82.6	39.2	42.3	308	81.2	90	166
Bojos	4.9	11.2	82.3	37.2	42.1	346	78.9	89	181
Sebastian	7.3	10.3	83.2	40.6	44.5	372	82.1	88	202
Xanadu	7.9	11.0	83.0	47.0	46.7	398	80.8	89	124
Kangoo	6.3	10.8	82.1	40.8	42.6	436	82.9	94	142

MQI – malting quality index; Pb – protein content in barley grain; E – extract yield in malt dry matter; VZ45/RE45 – relative extract at 45°C; K – Kolbach index; DP – diastatic power (Windisch–Kolbach units); FA – apparent final attenuation; F – friability; BGw – beta-glucan content in wort

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(Table 2). The RIBM recommended the variety for production of beer with the protected geographical indication (PGI) České pivo (Czech beer) as the variety met the conditions specified in the application for PGI České pivo (Commission Regulation 2008).

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