

Registration of 'Masami' Wheat

'Masami' soft white winter wheat (*Triticum aestivum* L.) (Reg. no. CV-977, PI 634715) was developed by the Agricultural Research Center of Washington State University (WSU) in cooperation with the USDA-ARS. Masami was jointly released by Washington and Idaho Agricultural Experiment Stations and the USDA-ARS in 2004. Masami is targeted for the low to intermediate rainfall (<460 mm average annual precipitation) wheat production regions of Washington State. It was released for its excellent grain yield, cold hardiness, end-use quality and disease resistance. Masami is named in honor of Masami "Dick" Nagamitsu, a retired WSU wheat researcher.

Masami (WA007916, VO95065, V89046) is an F_{3:6} selection from the cross 'MacVicar' (PI 552427)/PI 561031 generated by C. J. Peterson Jr. in 1989. The pedigree of MacVicar is 'Yamhill' (CItr 14563)/'McDermid' (CItr 14565)//*T. spelta* L. var. 'Alba' (PI 191303)/3/'Suwon 92' (PI 157603)/'Roedel' (CItr 15175)/4/NB 6813/'Hyslop' (CItr 14564)//'Backa' (PI 323647) and the pedigree of PI 561031 is VPM/'Moisson 951'//2*'Hill81' (CItr 17954). A modified pedigree-bulk breeding method was used to advance early generations. Bulk seed from F₁ plants was used to establish an F₂ field plot. Approximately 150 spikes were randomly harvested from individual F₂ plants and then planted to establish F₃ hill plots, each containing grain from a single F₂ spike. The F₃ hill plots were evaluated for general adaptation, maturity, resistance to stripe rust (caused by *Puccinia striiformis* Westend. f. sp. *tritici*) and eyespot foot rot [caused by *Tapesia yallundae* Wallwork and Spooner = *Pseudocercospora herpotrichoides* (Fron.) Deighton] in naturally infected fields using visual disease assessment. Approximately 50 F₃ spikes were randomly harvested from selected hill plots and planted to establish F₄ head rows. Seed from all the plants in each selected F_{3:4} row was used to establish an F_{3:5} field plot. Following selection for general adaptation, maturity, uniformity, and disease resistance, F_{3:6} seed was bulk harvested and assessed for grain yield, test weight, and end-use quality. F₁ to F₅ progeny were advanced in field nurseries at Pullman, WA, while subsequent generations were advanced in replicated yield trials throughout Washington State. Breeder seed of Masami was produced in 2004 from 2000 F_{3:14} heads selected from a pure seed increase at Pullman, WA, and planted in head rows under irrigation at Othello, WA.

Masami is an intermediate height, semidwarf cultivar. Spikes are fusiform and middense, with white awns and white glumes that are of medium length and width, wanting shoulders and acuminate beaks. Kernels are ovate, white, soft, and midlong. Seed of Masami has a midsize germ with a narrow, middeep crease, rounded cheeks with a midsize, short brush. Masami has intermediate juvenile plant growth habit, and flag leaves are erect and not twisted.

Masami has eyespot and stripe rust resistance similar to 'Madsen' (PI 511673) (Allan et al., 1989). It showed resistance to races PST-78, 45, and 43 of *P. striiformis* f. sp. *tritici* in 2003 greenhouse seedling tests performed under low-temperature cycle (diurnal temperature gradually changing from 4°C at 0200 h to 20°C at 1400 h) (Masami was rated 1 on the 1–9 stripe rust severity scale while susceptible check 'NuGaines' [CItr 13968] [Vogel and Peterson, 1974] was rated as 8). In greenhouse adult plant tests performed under high temperature cycle (diurnal temperature gradually changing from 10°C at 0200 h to 35°C at 1400 h), Masami was rated as 20% infection with a severity of 4 while susceptible check NuGaines was rated as 80% infection with a severity of 8. In field tests conducted under natural stripe rust infections at Mt. Vernon and Pullman, WA, from 1999 to 2003, Masami had lower infection types and severity in later growth stages than early stages, indicating high

temperature adult plant resistance to stripe rust. It also has shown resistance to leaf rust (caused by *Puccinia triticina* Eriks.) and powdery mildew [caused by *Blumeria graminis* (DC.) Golovin ex Speer (syn. *Erysiphe graminis* DC.) f. sp. *tritici* Em Marchal]. Masami expresses moderate resistance to Cephalosporium stripe (caused by *Cephalosporium gramineum* Nis. & Ika.) and dwarf bunt (caused by *Tilletia controversa* Kühn). Masami typically shows physiological leaf spotting under cool, wet spring field conditions.

Grain yields of Masami generally exceed ($P < 0.1$) those of Madsen, 'Eltan' (PI 536994) (Peterson et al., 1991) and 'Rod' (PI 558510) (Peterson et al., 1995). In 64 rain-fed field trials conducted from 1998 to 2003 in the low to intermediate precipitation zones (<460 mm precipitation) in Washington State, the grain yields of Masami, Madsen, Eltan, and Rod were 4623, 4112, 4435, and 4508 kg ha⁻¹, respectively. In 115 tests conducted from 1996 to 2003 encompassing all precipitation zones of Washington State, the grain yields of Masami, Madsen, Eltan, and Rod were 5772, 5389, 5516, and 5805 kg ha⁻¹, respectively. In the same yield trials, grain volume weight of Masami (761 g L⁻¹) was greater ($P < 0.1$) than Rod (752 g L⁻¹) and slightly less than ($P < 0.1$) Madsen (766 g L⁻¹) and Eltan (768 g L⁻¹). The average thousand-kernel weight of Masami (35.9 g) is less than ($P < 0.1$) Madsen (42.2 g), Eltan (40.1 g), and Rod (42.7 g). The average plant height of Masami is 92 cm, which is 2 cm taller ($P < 0.1$) than Madsen and Rod, 1 cm shorter ($P < 0.1$) than Eltan. The heading date of Masami (157 d of year [DOY]) is similar to Madsen and Rod (157 DOY), and 2 d earlier ($P < 0.1$) than Eltan. In artificial freeze tests conducted in growth chambers at the WSU Wheat Plant Growth Center, the LD₅₀ (temperature at which 50% of fully hardened plants survived) of Masami was -15.4°C, compared to Madsen (-12.7°C), Eltan (-14.9°C), and Rod (-11.3°C).

Milling and baking quality tests were conducted by the USDA-ARS Western Wheat Quality Lab in Pullman, WA, using grain produced in rain-fed breeding and commercial variety testing trials in Washington State from 1998 through 2003 ($n = 43$). Results from quality assessments were averaged over all trials in which Masami and the cultivar Stephens (CItr 17596) (Kronstad et al., 1978) were grown. Masami and Stephens, respectively, had flour protein concentrations of 80 vs. 89 g kg⁻¹, near-infrared (NIR) hardness values of 33.5 vs. 27.1, break flour yields of 49.8 vs. 46.7% by weight, flour yields of 68.2 vs. 67.9% by weight, flour ash values of 0.39 vs. 0.40% by weight, sugar snap cookie diameters of 9.4 vs. 9.3 cm, and sponge cake volumes of 1320 vs. 1244 mL. Masami was evaluated by the Pacific Northwest Wheat Quality Council in 2004 and found to have acceptable quality for domestic soft white winter wheat uses.

Masami will be protected by U.S. Plant Variety Protection. Seed of Masami will be maintained by the WA State Crop Improvement Association under supervision of the Department of Crop and Soil Sciences and the Washington State Agricultural Research Center and may be obtained by contacting the corresponding author or through the National Small Grains Germplasm Collection of the National Plant Germplasm System www.ars-grin.gov/npgs/.

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