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Registration of 'Calamylow-201' Rice

'Calamylow-201' (*Oryza sativa* L.) (Reg. No. CV-124, PI 642351) is a low amylose, semidwarf, early maturing, pubescent, premium quality short-grain cultivar. It was developed by the California Cooperative Rice Research Foundation, Inc. (CCRRF) at the Rice Experiment Station (RES), Biggs, CA, and was released jointly by the CCRRF, the California Agricultural Experiment Station, and the USDA-ARS on 15 April 2006.

Calamylow-201 is a pure line selection, originally designated as BL-1, made in 2000 at the RES from the X_2 generation of 'Calhikari-201' seed irradiated with 250 Gy of ^{60}Co. Calhikari-201 (McKenzie, 2001) is a semidwarf, early maturing, pubescent, premium quality, short-grain cultivar developed by the CCRRF. Calhikari-201 has the pedigree 'Koshihikari'/(91-Y-157)*2. Koshihikari is a tall, pubescent, late maturing, lodging susceptible, premium quality, Japanese short-grain cultivar recognized for its high milling and cooking quality. 91-Y-157 was a RES advanced short-grain breeding line with the pedigree Koshihikari/'S-101'. S-101 (Johnson et al., 1989) is a very early maturing, semidwarf short-grain cultivar developed by the CCRRF that is no longer in production. Calamylow-201 was tested under the experimental designation 02-Y-064 in the University of California Cooperative Extension (UCCE) Statewide Yield Tests.

Calamylow-201 has pubescent leaves and spikelets. The spikelet and apiculus are straw colored and sparsely awned. Leaves are erect and green in color and similar to Calhikari-201 but a lighter green color than the Calrose type medium grain cultivars.

Calamylow-201 was compared with Calhikari-201 and the Calrose medium grain 'M-202' (Johnson et al., 1986) in the UCCE multilocation yield tests from 2002 to 2004. Using a scale of 1 = poor and 5 = excellent, average seedling vigor scores for Calamylow-201 were slightly lower than Calhikari-201 and M-202, 4.5, 5.0, and 4.9, respectively. Heading averaged 1 d earlier than Calhikari-201 and 2 d earlier than M-202. Mature plant height averages were 95 cm for Calamylow-201 and Calhikari-201 and 105 cm for M-202, and all showed similar lodging in the tests. Calamylow-201 has a lower yield potential than Calhikari-201 and M-202. Average yields at 140 g kg^{-1} (14%) grain moisture were 7910, 9080, 10140 kg ha^{-1} for Calamylow-201, Calhikari-201, and M-202, respectively. UCCE nitrogen fertilizer rate tests in 2004 at RES indicated that high rates of nitrogen fertility (greater than 140 kg ha^{-1}) induced severe lodging without increasing grain yield and should be avoided. Calamylow-201 was more susceptible to stem rot (*Sclerotium oryzae* Catt.). Using a scale of 0 to 10 (Oster, 1990), stem rot disease ratings were 7.4, 6.7, and 5.9 for Calamylow-201, Calhikari-201, and M-202, respectively. Calamylow-201 is susceptible to the IG-1 race of blast fungus [*Pyricularia grisea* (Cooke) Sacc.] that is present in California. Reaction to other blast races and rice diseases not present in California is not known. Calamylow-201 has shown cool temperature induced sterility (blanking) in greenhouse and cold nursery tests and is not recommended for the cool or, especially, the cold rice producing regions of California.

Calamylow-201 kernels are smaller and lighter than Calhikari-201. The 2003–2004 brown rice kernels average 4.83 mm in length, 2.91 mm in width, and 18.5 mg in weight compared with 5.06 mm, 2.98 mm, and 20.0 mg for Calhikari-201. Calamylow-201 has a colorless apiculus, light brown pericarp, and a nonaromatic opaque white endosperm. Calhikari-201 has a translucent endosperm. Milling yields (mg g^{-1} whole kernel: mg g^{-1} total milled rice) averaged 615:707 for Calamylow-201 and 577:705 for Calhikari-201 in 2002–2004 RES tests. Apparent amylose content of 2003 and 2004 RES milled samples determined by the USDA-ARS Rice Research Unit, Beaumont, TX, averaged 62 and 174 g kg^{-1} for Calamylow-201 and Calhikari-201, respectively. Calamylow-201 and Calhikari-201 alkali spreading values in a 17 g L^{-1} KOH solution averaged 6.3 and 6.8, respectively, but were both 6.0 in a 15 g L^{-1} KOH solution. Rapid Visco Analyzer (RVA) amylographic profile analysis revealed that Calamylow-201 reaches both a significantly earlier peak viscosity and a lower final viscosity than Calhikari-201.

Low amylose in rice has been found to result in more resistance to staling and has been incorporated into Japanese cultivars for use in chilled or frozen rice products (Okuno et al., 1993; Takami and Koriyama, 2002). Sensory panel and mechanical texture testing indicated that Calamylow-201 remained stickier and softer after a 24-h staling treatment than the parent Calhikari-201 and the Japanese grown check sample Koshihikari and performed similar to the low amylose Japanese grown cultivar 'Milky Queen' (McKenzie et al., 2006). Calamylow-201 is being released as a special purpose low amylose rice for a new developing rice market. This will be the first of this quality type to be released and commercially produced in the USA.

Calamylow-201 was approved in 2006 for certification by the California Crop Improvement Association and classified in 2005 as a variety of commercial impact (tier 1) under the California Rice Variety Certification Act. The foundation seed field and headrows were rogued multiple times and off types, putative out crosses, and other visual variants were removed from the field. These included medium grains that were awned and smooth (glabrous), late medium grains, and taller short grains, in a total frequency of less than 0.01%. Application no. 200600111 has been made to protect Calamylow-201 under the U.S. Plant Variety Protection Act, Title V option. Breeder and Foundation seed of Calamylow-201 will be maintained by the California Cooperative Rice Research Foundation, P.O. Box 306, Biggs, CA 95917–0306. Requests for seed must be made to the corresponding author until 20 yr from the date of release by the California Cooperative Rice Research Foundation (2006), at which time seed will be available from NPGS.

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