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Registration of 'Foster' Barley

'Foster' six-rowed spring barley (*Hordeum vulgare* L.) (Reg. no. CV-268, PI 592758) was developed by the North Dakota Agricultural Experiment Station and released in March 1995. Foster was named for A. Earl Foster, former six-rowed barley breeder and department chair of the Department of Crop and Weed Sciences at North Dakota State University. Foster, whose experimental designation was ND11055, has the pedigree 'Robust'/ND8310. ND8310 has the pedigree ND5570/ND5424. ND5570 is a sib of 'Hazen' and has the pedigree ND1884/'Azure'. ND1884 has the pedigree 'Nordic'/NDB142, and NDB142 has the pedigree 'Dickson'/'Trophy'. ND5424 has the pedigree 'Glenn'/'Karl'. The low grain protein character in Foster presumably was derived from Karl. Foster is best adapted to the Upper Midwest malting barley growing region of the USA. The lower grain protein content of Foster may allow growers in the western malting barley growing region of North Dakota to produce barley with acceptable grain protein more consistently.

The cross that led to Foster was made in 1985. Foster originated from a single plant taken at random from a selected F_3 line. Selection of the F_3 line was based on maturity, plant height, straw strength, kernel color, and awn type. Replicated agronomic and disease testing began in North Dakota in 1987 and regional testing began in 1990. Malt quality evaluation began in 1987 and industry malting and brewing evaluation began in 1990.

Foster has semismooth awns, and its covered kernels have long rachilla hairs and a white aleurone. The spike is medium lax, medium long, and semierect. Based on spike and kernel morphology, it is very difficult to distinguish between Foster, Hazen, and 'Excel'. DNA analysis using polymerase chain reaction–random amplified polymorphic DNA techniques (PCR-RAPD) (1) can easily differentiate Foster from Hazen and Excel. Using Operon Technologies (Alameda, CA) primer OP-AB07, a 700-kilobase band is produced in Foster, but not Hazen or Excel.

In 20 trials grown in North Dakota (1993–1995), Foster yielded 4697 kg ha^{-1}. This yield was intermediate between Robust (4460 kg ha^{-1}) and Excel (4826 kg ha^{-1}). Based on data from North Dakota and regional trials, Foster is similar in height to Excel (85 cm), is 4 cm shorter than Robust, and heads about 1 d later than Robust. Straw strength of Foster and Excel are similar, and both cultivars have better straw strength than Robust and 'Morex'. In 13 trials (1992–1995) of the Mississippi Valley Uniform Regional Barley Nursery (MVBN) where lodging occurred, percent lodging of Foster, Morex, Robust, and Excel was 26, 45, 31, and 27%, respectively. In 12 trials of the MVBN (1992–1995) in which kernel plumpness data were collected, Foster had a greater amount of plump kernels (860 g kg^{-1}) than Robust (820 g kg^{-1}), Morex (760 g kg^{-1}), and Excel (760 g kg^{-1}), based on kernels retained on a sieve with 0.24- by 1.9-cm slotted openings, according to the American Society of Brewing Chemists (2).

Like most midwestern barley cultivars, Foster possesses the NDB112 resistance to spot blotch [caused by *Cochliobolus sativus* (Ito & Kuribayashi) Drechs. ex Dastur] and the *Rpg1* (T) gene for resistance to the prevalent pathotypes of *Puccinia graminis* f. sp. *tritici* Eriks. & E. Henn., except Pgt-QCC. Foster is moderately susceptible to pathotype Pgt-QCC, net blotch (caused by *Pyrenophora teres* Drechs.), and barley yellow dwarf virus (BYDV). Foster has better resistance to net blotch than Morex, but is more susceptible than Robust and Excel. Foster is susceptible to loose smut [caused by *Ustilago tritici* (Pers.) Rostr.] and leaf scald [caused by *Rhynchosporium secalis* (Oudem.) J.J. Davis], and to several species of *Septoria* and *Fusarium* that attack barley in the midwestern USA.

Results from pilot malt quality evaluations conducted by the USDA-ARS Cereal Crops Research Unit at Madison, WI, and the American Malting Barley Association, Inc. (AMBA) show that Foster has more plump kernels and has similar malt extract and enzymatic activity as the six-rowed industry standard Morex. The fine–coarse extract difference and wort protein values of Foster were slightly lower than those of Morex. In 24 trials grown in North Dakota (1992–1995), grain protein of Foster was 15 g kg^{-1} lower than that of Morex. Foster passed plant-scale malting and brewing quality tests conducted by members of AMBA and was added to the list of recommended malting barley cultivars.

U.S. plant variety protection for Foster is pending (no. 9600154). Breeder seed is maintained by the Seedstocks Project, Dep. of Plant Sciences, North Dakota State Univ., Fargo, ND 58105-5051.

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References and Notes

1. Williams, J.G.K., A.R. Kubelik, K.J. Livak, J.A. Rafalski, and S.V. Tingey. 1990. DNA polymorphisms amplified by arbitrary primers are useful as genetic markers. Nucleic Acids Res. 18:631–635.
2. American Society of Brewing Chemists. 1992. Methods of analysis. 8th ed. ASBC, St. Paul, MN.
3. R.D. Horsley and J.D. Franckowiak, Dep. of Plant Sciences, P.B. Schwarz, Dep. of Cereal Science, and B.J. Steffenson, Dep. of Plant Pathology, North Dakota State Univ., Fargo, ND 58105-5051. Accepted 30 Sept. 1996. *Corresponding author (horsley@badlands.nodak.edu).

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Registration of 'S-102' Rice

S-102, a short-grain rice (*Oryza sativa* L.) cultivar (Reg. no. CV-104, PI 592738), was developed by the California Cooperative Rice Research Foundation, Inc. (CCRRF), at the Rice Experiment Station, Biggs, CA. S-102 was released jointly by CCRRF, the California Agricultural Experiment Station (CAES), and the USDA-ARS. Foundation seed of S-102 was distributed to California seed growers in 1996.

S-102 is an F_5 selection from the cross R11761 made at the Rice Experiment Station in the summer of 1985. Its pedigree is 'Calpearl'/'Calmochi-101'//Calpearl. The female parent, Calpearl/Calmochi-101, was the selected breeding line 85P1071. Calpearl is a proprietary California cultivar released in 1981 by N.F. Davis Drier and Elevator, Firebaugh, CA. It has high yield potential, a large kernel, and very early maturity. Calpearl has the pedigree 'Calrose 76'//'Earlirose'/IR 1318-16. Calmochi-101 (1) is a very early-maturing, pubescent, waxy endosperm, short-grain cultivar released in 1986 by CCRRF, CAES, and USDA-ARS. Calmochi-101 has high tolerance to floret sterility caused by cool temperatures before heading and has the pedigree 'Tatsumi mochi'//'M7'/'S6'. Selection and generation advance were made at the Rice Ex-

Table 1. Grain dimensions and weight of S-102 and S-201 rice sampled from foundation seed from the Rice Experiment Station (Biggs, CA), 1995.

Cultivar	Length (L)	Width (W)	Thickness	L/W	Grain wt.
	mm				mg
			Paddy rice		
S-102	7.66	3.90	2.37	1.96	34.0
S-201	6.90	3.70	2.31	1.87	30.0
			Brown rice		
S-102	5.50	3.27	2.25	1.68	27.6
S-201	5.17	2.97	2.28	1.74	25.8
			Milled rice		
S-102	5.33	3.17	2.09	1.68	26.2
S-201	5.16	3.10	2.11	1.67	23.0

periment Station, a San Joaquin County cold-tolerance nursery, and a rice winter nursery conducted by the University of Hawaii.

S-102 is a very early-maturing, semidwarf, short-grain cultivar. The floret hull (lemma and palea) and leaves are pubescent. Leaves are erect and dark green in color. The spikelet and apiculus are straw colored and have partial tip awns. S-102 has a colorless, nonaromatic, and nonwaxy endosperm with a light brown pericarp. It was tested under the experimental designation 91-Y-171 in the University of California Cooperative Extension (UCCE) Statewide Yield Tests from 1992 to 1995. Comparisons for quality were made to S-201 (2), the current California short-grain cultivar, and for maturity to the medium-grain cultivar M-103 (3). S-102 headed an average of 17 d earlier than S-201 and 1 d earlier than M-103. Average plant height and lodging rating for S-102, S-201, and M-103 were 88, 90, and 86 cm and 9, 13, and 20%, respectively. Visual seedling vigor ratings (where 1 = poor and 5 = best) in water-seeded rice were 4.3, 4.6, and 4.1 for S-102, S-201, and M-103, respectively. S-102 appears to have better resistance to cool-temperature-induced sterility than S-201, as indicated by less floret sterility in greenhouse and cold-tolerance nurseries, and significantly higher grain yield at the cool-temperature yield-test location. S-102 should be suitable for all rice growing regions of California because of its very early maturity and apparent tolerance to cool-temperature-induced sterility. S-102 has shown significantly higher grain yield potential than S-201 and was the top-yielding entry in the very early maturity group of the UCCE Statewide Yield Tests in 1993 and 1994, and ranked high in 1995. Average yields of S-102, S-201, and M-103 in the 16 replicated yield tests from 1992 to 1995 were 11 160, 10 040, and 10 210 kg ha^{-1} (140 g kg^{-1} moisture), respectively.

Test results from inoculated disease nurseries indicate that S-102 is more susceptible to stem rot (*Sclerotium oryzae* Cattaneo) and aggregate sheath spot [*Rhizoctonia oryzae-sativae* (Sawada) Mordue] diseases than S-201 and M-103. Stem rot resistance visual ratings (where 0 = no damage and 10 = plant killed), averaged 7.3, 6.4, and 6.5 for S-102, S-201, and M-103, respectively (4). The number of the top four leaves killed by aggregate sheath spot were 3.0, 2.7, and 2.8 for S-102, S-201, and M-103, respectively. Reaction to diseases not prevalent in California is unknown.

S-102 has a larger kernel than S-201 (Table 1). Milled rice of S-102 has a lower level of chalkiness (4.8%) than S-201 (9.4%). Its grain shape is in the range of Federal Grain Inspection Service standards for U.S. short-grain rice. Its kernel is heavier than any current U.S. short-, medium-, or long-grain cultivar. S-102 has shown high head and total milled rice yield potential in 5 yr of milling tests, which is often not the case with very early-maturing lines. Average S-102 head and total milled rice yield of 91 milling samples harvested above 170 g kg^{-1} moisture were 628 and 695 g kg^{-1}, respectively. Comparison of milling yield of S-102 with S-201 is difficult because of the great difference in maturity. S-102 exhibits much more synchronous heading than S-201. (The variable kernel maturity and moisture content resulting from asynchronous heading are believed to contribute to the lower head rice yield of S-201.)

Quality evaluations indicate that S-102 has physicochemical characteristics similar to S-201 and typical of the U.S. short-grain market type (5). Apparent amylose and protein content for milled S-102 and S-201 determined by the USDA-ARS Rice Quality Research Laboratory at Beaumont, TX, were 169 and 171 g kg^{-1} and 68.5 and 68.2 g kg^{-1}, respectively. S-102 and S-201 are low-gelatinization-temperature types, giving average alkali spreading values of 6.2 and 6.8, respectively. Rice flour viscosity curves measured on a rapid visco analyzer were very similar for both cultivars. Some textural differences between S-102 and S-201 were noted in cooking tests, and these differences may be associated with the large kernel size of S-102. The larger, more translucent kernel is generally considered a desirable attribute, and subtle differences in quality characteristics are observed among cultivars in the same market type. Quality evaluations received from rice marketing organizations were positive and included some large-scale quality evaluations for industrial applications (rice cakes and puffing).

S-102 was approved for certification by the California Crop Improvement Association in 1995. Variants and offtype plants (0.003%) were rogued from the foundation seed field; these included heavily awned short-grain plants, pubescent medium-grain plants, tetraploids, and elongated-upper-internode plants. Classes of seed will be breeder, foundation, registered, and certified seed. Foundation seed can be used to produce foundation seed if necessary and headrow and breeder seed will be produced in foundation fields as necessary to maintain cultivar purity. Variety protection of S-102 is pending (no. 9600305) under the U.S. Plant Variety Protection Act, Title V option of the Federal Seed Act. Breeder and foundation seed will be maintained by the California Cooperative Rice Research Foundation, Rice Experiment Station, P.O. Box 306, Biggs, CA 95917.

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References and Notes

1. Carnahan, H.L., C.W. Johnson, S.T. Tseng, J.J. Oster, and J.E. Hill. 1986. Registration of 'Calmochi-101' rice. Crop Sci. 26:197.
2. Carnahan, H.L., C.W. Johnson, S.T. Tseng, J.J. Oster, and D.M. Brandon. 1980. Registration of S-201 rice. Crop Sci. 20:551.
3. Johnson, C.W., H.L. Carnahan, S.T. Tseng, J.J. Oster, K.S. McKenzie, J.E. Hill, J.N. Rutger, and D.M. Brandon. 1990. Registration of 'M-103' rice. Crop Sci. 30:960–961.
4. Oster, J.J. 1990. Screening techniques for stem rot resistance in rice in California, Plant Dis. 74:545–548.
5. Webb, B.D., C.N. Bollich, H.L. Carnahan, K.A. Kuenzel, and K.S. McKenzie. 1985. Utilization, characteristics, and qualities of United States rice. p. 25–35. *In* Rice quality and marketing. IRRI, Manila, Philippines.
6. K.S. McKenzie, C.W. Johnson, S.T. Tseng, J.J. Oster, and D.M. Brandon, California Coop. Rice Res. Foundation, Biggs, CA 95917; J.E Hill, Dep. of Agronomy and Range Science, Univ. of California, Davis, CA 95616. Registration by CSSA. Accepted 30 Sept. 1996. *Corresponding author (ksmckenzie@ucdavis.edu).

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Registration of 'TCP 87-3388' Sugarcane

'TCP 87-3388' sugarcane (a complex hybrid of *Saccharum officinarum* L., *S. spontaneum* L., and *S. barberi* Jeswiet) (Reg. no. CV-104, PI 595084) was selected in Louisiana from progeny of a polycross with 'CP 70-321' (1) as the female parent (the male is unknown) that was made in 1982 at Canal Point, Florida. The seed was germinated at the USDA-ARS-SRRC Sugarcane Research Unit at Houma, LA, and seedling selection and early testing was done there. TCP 87-3388 was introduced into Texas in 1985 and developed and tested through cooperative research by Texas A&M University, Rio Grande Valley Sugar Growers, Inc., and Rio Farms, Inc. TCP 87-3388 was released in the summer of 1995.

The primary advantage of TCP 87-3388 is precocious ripening that permits processing to begin earlier and minimizes exposure of the crop to freezes. Superior cane quality (high sugar and low ash) makes TCP 87-3388 suitable for the early initiation of the Texas harvest season. It is suitable for milling in Texas in September before the dominant cultivar, CP 70-321, and is three months ahead of the late-season cultivars CP 72-1210 (2) and NCo 310 (3). When TCP 87-3388 is harvested early, yields of both sugar per tonne of cane (kg Mg^{-1}) and sugar per hectare (Mg ha^{-1}) are superior to the latter cultivars. TCP 87-3388 is a semierect cultivar that develops a moderately erect canopy. Leaves are moderate in length and width, with a reddish-brown collar and a moderate auricle. Stalks are of moderate height and diameter; stalk weights average 1.22 kg. Pith and pipe are absent. The conoidal internode has a waxy bloom like the parent, CP 70-321. Unlike CP 70-321, the internode has corky cracks and the bud grove is reduced or absent. The leaf scar on the lower internodes has a characteristic