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Registration of 'Post 90' Barley

'Post 90' barley (*Hordeum vulgare* L.) (Reg. no. CV-312, PI 549081) is a winter feed barley developed cooperatively by the Oklahoma Agricultural Experiment Station and the USDA-ARS and released in 1991. Post 90 is a composite of greenbug (*Schizaphis graminum* Rond.) resistant plant selections from the cultivar Post. Post (Edwards et al., 1985), released by the Oklahoma Agricultural Experiment Station in 1977, is a high yielding, widely adapted, winter feed barley reported to be resistant to all then known greenbug biotypes B, C, and E (Webster and Starks, 1984). Greenbug resistance is derived from a parent 'Will' (Jackson and Schelhuber, 1965), which was reported to carry the greenbug resistance gene *Grb* (Gardenhire et al., 1973) later renamed *Rsgla* (Merkle et al., 1987). Post, used extensively in greenbug biotyping studies (Puterka et al., 1988), was found heterogeneous for greenbug resistance. Post 90 is a composite of 105 Post plants that were selected for homozygous resistance to biotype C. Post 90 was assigned the experimental number OK82850 and is equivalent to Post for yield, test weight, and straw strength. It is more uniform in height, spike size, and maturity.

Post 90 is a short-strawed, six-rowed, rough-awned barley with mid- to late-season maturity. Early plant growth is semi-prostrate when fall-seeded. Spikes are short and dense with rachis internodes approximately 2 mm in length and edged with few hairs. Glumes are partially covered with long hairs and are approximately one-half the length of the lemma. Lemma awns are long and glume awns are longer than glumes. The covered kernels have a white aleurone and have a few lemma teeth on the lateral and marginal nerves. Rachilla hairs are short and hulls are slightly to semi-wrinkled. Post 90 is 2 cm shorter in stature than Post. Post 90 is adapted statewide in Oklahoma and also to some environments in the western, north western, eastern, and north eastern USA. It has been evaluated in replicated performance trials from 1983 to 1990 both in Oklahoma and in the Uniform Winter Barley Nursery at 17 locations across the barley growing areas of the USA and Canada. Average yields (22 station years) are 3961 kg ha⁻¹ for Post 90 and 3972 kg ha⁻¹ for Post. Test weight was 612.6 kg m⁻³ and heading date was 34 d after March 31 for both Post and Post 90. The average height of Post 90 and Post was 78 cm and 80 cm, respectively, and Post 90 exhibits good straw quality and winter hardiness. Post 90 is more homogeneous for greenbug resistance, height, spike size, and maturity than Post. A recent 4-yr study conducted at one location in Oklahoma from 1996 through 1999 showed Post 90 to be competitive in terms of yield and test weight with 10 other currently grown winter barley cultivars from across the USA. Post 90 was ranked third in grain yield and first in test weight.

Rsgla in Post 90 has recently been reported to confer resistant to all currently known greenbug biotypes, B, C, E, F, G, I, J, K, CWR, and WWG (Anstead et al., 2003) except biotype H. In 1983, *Barley yellow dwarf virus* infestations were severe at four of the 17 locations of the Uniform winter Barley Nursery. Post 90 exhibited a high level of tolerance to *Barley yellow dwarf virus* with a rating of 2.5 on a scale of 0 to 9, where 0 = immune and 9 = severe infestation.

Breeders seed of Post 90 will be maintained by the Oklahoma Agric. Exp. Stn. Foundation seed will be available from

the Oklahoma Foundation Seed Stocks, Inc., Plant and Soil Sciences Dep., Oklahoma State University, Stillwater, OK 74078. Seed has also been deposited in the National Seed Storage Laboratory, Ft. Collins, CO.

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Registration of 'Cache' Meadow Bromegrass

'Cache' meadow bromegrass (*Bromus riparius* Rehm.), (Reg. no. CV-22, PI 634710) was developed by a research team at the USDA-ARS, Forage and Range Research Laboratory at Utah State University, Logan, UT, and was released on 2 Feb. 2004 in cooperation with the Utah Agricultural Experiment Station. Cache meadow bromegrass is intended for use on irrigated and semi-irrigated pastures in the Intermountain Region and Northern Great Plains of western USA. Cache was evaluated under the experimental designation UT-MB.

The parental germplasm for Cache was derived from selections within PI 578532 ('Regar'; 20.9%) (Alderson and Sharp, 1994), PI 536012 ('Fleet'; 54.1%) (Knowles, 1990a), and PI 536013 ('Paddock'; 25%) (Knowles, 1990b). The original space-plant source nursery established in 1995 consisted of 1200 plants of meadow bromegrass representing 400 plants each of the three cultivars. On the basis of vegetative vigor in 1996, open-pollinated (OP) seed was harvested from 70 selected plants. On the basis of a selection index that included total seed yield and 100-seed weight, seed from 12 OP plants were selected and 100 seedlings from each plant were established in 1997 at the Evans Research Farm, Logan, UT, in a completely randomized design to initiate cycle-2 selection.

On the basis of vegetative vigor, OP seed from 133 cycle-2 plants were selected. With additional emphasis placed on seed yield, 100-seed weight, and seedling emergence from a 7.6-cm planting depth (Maguire, 1962), this number was reduced to OP seed from 28 plants. In 1999, the 28 progeny lines

(OP cycle-2 progeny) were established at Evans Farm in an evaluation nursery and a separate 28-clone crossing block. On the basis of increased seasonal growth under repeated defoliation and drought tolerance, 21 clones were selected in 2000 and allowed to polycross. Seed from each plant was evenly bulked to form Breeder seed in 2000. Breeder seed was additionally produced in 2001, 2002, and 2003.

Meadow bromegrass is a perennial grass of Eurasian origin (Tzvelev, 1976). It is less rhizomatous than smooth bromegrass, with leaves and stems that are pubescent. Morphologically, Cache is significantly taller, with longer flag leaves that are oriented higher on the culm than Fleet. In addition, Cache has a longer first glume and lemma than Fleet and Regar and fewer florets per spikelet than Regar, but more florets per spikelet than Fleet. Cache meadow bromegrass has a chromosome number of $2n = 10x = 70$, which is the same as Regar, Fleet, and Paddock (Tuna et al., 2001). Cluster analysis (Rohlf, 2000) based on amplified fragment length polymorphisms (Vos et al., 1995) distinguished eight of 11 Cache genotypes. Analysis of molecular variance (AMOVA) demonstrated significantly more DNA polymorphisms among cultivars relative to DNA variation within cultivars (Excoffier et al., 1992). Cache genotypes displayed significantly more genetic diversity than Fleet, less diversity than Regar, and diversity similar to Montana (Cash et al., 2002), MacBeth, and Paddock (Leonard et al., 1999).

Under a line-source study, with irrigation rates that ranged from 10.1 to 36.8 mm per week, Cache meadow bromegrass produced significantly more dry matter than Fleet at all irrigation rates and significantly more dry matter than Regar at the two lowest irrigation rates. Distribution of available forage throughout the growing season was similar to Fleet and Regar. Under repeated defoliation (six-harvests per year) Cache yielded significantly more total dry matter than orchardgrass (*Dactylis glomerata* L.) cultivars Ambassador and Latar on an irrigated site in northern Utah.

Cache meadow bromegrass was evaluated in the Northern Plains Regional Trials at Bluecreek, UT; Green Canyon, UT; Mead, NE; Sidney, NE; Mandan, ND; and Miles City, MT for dry matter forage production and percent stand. When combined over six locations and three years, Cache produced significantly more dry matter forage than Regar and Fleet, 'Paiute' orchardgrass, and 'Manchar' smooth bromegrass (*B. inermis* L.). Cache produced (not always significant) more dry matter forage than Regar and Fleet in all locations except for Sidney. Across locations, Cache meadow bromegrass was similar to Regar in establishment and persistence, but significantly better than Fleet, Paiute, and Manchar.

Seedling vigor of Cache meadow bromegrass, as indicated by seedling emergence from a deep planting depth (7.6 cm), was better than Regar and comparable to Fleet and Paddock. Individual seed weight of Cache was comparable to Fleet and Paddock, but significantly heavier than Regar. Cache produced 500 kg ha⁻¹ seed during the second year after planting when grown in rows 0.76 m apart on an irrigated site. At 100% purity, there are approximately 190 000 seeds per kg.

Breeder, Foundation, and Certified seed classes will be recognized. Breeder seed of Cache will be maintained by the USDA-ARS Forage and Range Research Laboratory at Logan, UT. Foundation seed will be produced by the USDA-ARS at Logan and distributed to seed growers by the Utah Crop Improvement Association. Protection will be applied for under the U.S. Plant Variety Protection Act of 1970. Conditions of this license specify that seed of Cache can be marketed only as a class of Certified seed.

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Registration of 'Choteau' Wheat

'Choteau' (Reg. no. CV-955, PI 633974) is a superior yielding, wheat stem sawfly (*Cephus cinctus* Nort.) resistant hard red spring wheat (*Triticum aestivum* L.) developed by the Montana Agricultural Experiment Station and released in February 2003. Choteau is targeted for production in areas of Montana infested with the wheat stem sawfly.

Choteau was derived as an F₄ plant selection from the cross MT 9401/MT 9328. MT 9401 was a selection from the cross MT 8603/'Amidon' (PI 527682). MT 8603 was derived from the cross MT 7635/'Nacozari'. MT 9328 was a selection from the cross MT 7810/MT7926. MT 7810 ['Tezanos Pintos Precos'/'Sonora 64'/'Fortuna' (PI 13596)] was a sister line to 'Glenman' (McNeal et al., 1985). MT 7926 was derived from a cross between an experimental line from North Dakota State University with unknown pedigree and MT 6830. MT 6830 has the pedigree 'Sheridan' (CI 13586)//CI 13253/5*'Centana' (CI 12974).

The breeding procedure for Choteau included single seed descent without selection in the F₂ and F₃ generations, followed by subsequent selection for height, maturity, stem solidness, and vigor in space-planted F₄ rows. F₅ head rows were evaluated for height, maturity, grain protein, stem solidness and apparent yield potential. Selected rows were entered into a single row replicated yield trial at Bozeman, MT, and evaluated for grain yield, grain protein, stem solidness, and dough mixing properties. Superior lines from this nursery, including Choteau, were entered into statewide yield trials following initial evaluation in preliminary yield trials in 1999.

Choteau has lax and tapering heads with white awns and