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Registration of 'Atlas *bmr*-12' Forage Sorghum

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Registration of 'Atlas *bmr-12*' Forage Sorghum

Atlas *bmr-12* forage sorghum [*Sorghum bicolor* (L.) Moench] (Reg. no. CV-136, PI 636763) was developed jointly by the USDA, ARS and the Agricultural Research Division, Institute of Agriculture and Natural Resources, University of Nebraska, and was released in January 2005.

Atlas *bmr-12* forage sorghum was developed by crossing 'Atlas' to the brown midrib source F220 (*bmr-12*, donated to our project by the late Robert Kalton) followed by four cycles of selfing and backcrossing. Crossing was facilitated by the use of the nuclear male-sterility gene *ms₃*. Following the fourth backcross, the line was selfed and advanced head-to-row for four generations to fix the brown midrib gene in the homozygous recessive condition (*bmr-12 bmr-12*) and the male-sterility loci in the male-fertile condition (*Ms₃ Ms₃*). The brown midrib cultivar was then selected for similarity to the wild-type Atlas phenotype and for male fertility.

Atlas *bmr-12* closely resembles Atlas and is completely male fertile in Lincoln, NE, and Ithaca, NE. Atlas *bmr-12* did not restore fertility in A₁ cytoplasmic male-sterile lines under greenhouse conditions. Atlas *bmr-12* is 4 d earlier in maturity and 8 cm shorter in height than Atlas. Like Atlas, Atlas *bmr-12* has white seed with no tannin-containing testa and normal white endosperm, is awnless, and has purple necrotic wound response and juicy culms. In yield trials conducted at Lincoln (dryland) and Ithaca (irrigated) in 2002 and 2003, average cell wall content of Atlas *bmr-12* was equivalent to Atlas. Lignin content was reduced in Atlas *bmr-12* (65 vs. 75 g kg⁻¹, standard error = 10 g kg⁻¹) and fiber digestibility was increased (630 vs. 604 g kg⁻¹, standard error = 11 g kg⁻¹). Average dry matter yield of Atlas *bmr-12* was reduced 14% when compared to Atlas (13.6 vs. 15.9 t ha⁻¹, standard error = 1.1 t ha⁻¹). In separate yield trials comparing Atlas *bmr-12* to commercial hybrids at Lincoln and Ithaca in 2003, Atlas *bmr-12* was not statistically different in yield at the *P* = 0.05 probability level when compared to commercial brown midrib hybrids of similar maturity class under dryland conditions, and not statistically different in yield *P* = 0.05 from four of five commercial brown midrib hybrids of similar maturity class under irrigated conditions.

Release of Atlas *bmr-12* makes the digestibility-enhancing brown midrib gene *bmr-12* available in a currently utilized self-pollinated forage sorghum cultivar with known performance and adaptation. This cultivar is well suited for use by small and sustainable farms that rely on the ability to produce their own seed and for small seed growers and companies specializing in the production and marketing of open-pollinating forage varieties.

Seed of Atlas *bmr-12* will be maintained by the USDA-ARS, Wheat, Sorghum, and Forage Research Unit, Department of Agronomy, University of Nebraska, Lincoln, NE 68583-0937. It will be available for research purposes, including development and commercialization of new varieties or cultivars without cost to each applicant on written request. It is requested that appropriate recognition be made if this germplasm contributes to the development of a new breeding line, variety, or cultivar. Foundation seed will be made available for Certified seed production on a nonexclusive basis to seed producers who contractually agree to produce and market the seed only as Certified seed using the cultivar name Atlas *bmr-12*. A technology development and transfer fee will be assessed by the University of Nebraska. Application has been made for U.S. Plant Variety Protection.

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