## University of Nebraska - Lincoln Digital Commons@University of Nebraska - Lincoln

Papers in Plant Pathology

Plant Pathology Department

1-24-2006

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

Jeffrey F. Pedersen

University of Nebraska - Lincoln, jpedersen1@unl.edu

Deanna L. Funnell

University of Nebraska - Lincoln, dfunnell2@unl.edu

John J. Toy

University of Nebraska - Lincoln, jtoy2@unl.edu

A.L. Oliver

University of Nebraska - Lincoln

R.J. Grant

W.H. Miner Agric. Res. Institute, Chazy, NY

Follow this and additional works at: http://digitalcommons.unl.edu/plantpathpapers



Part of the Plant Pathology Commons

Pedersen, Jeffrey F.; Funnell, Deanna L.; Toy, John J.; Oliver, A.L.; and Grant, R.J., "Registration of 'Atlas bmr-12' Forage Sorghum" (2006). Papers in Plant Pathology. Paper 35.

http://digitalcommons.unl.edu/plantpathpapers/35

This Article is brought to you for free and open access by the Plant Pathology Department at Digital Commons@University of Nebraska - Lincoln. It has been accepted for inclusion in Papers in Plant Pathology by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

## 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  $ms_3$ . 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 ( $Ms_3 Ms_3$ ). 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 A<sub>1</sub> 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<sup>-</sup> standard error = 10 g kg<sup>-1</sup>) and fiber digestibility was increased (630 vs. 604 g kg<sup>-1</sup>, standard error = 11 g kg<sup>-1</sup>). Average dry matter yield of Atlas bmr-12 was reduced 14% when compared to Atlas (13.6 vs. 15.9 t ha<sup>-1</sup>, standard error = 1.1 t ha<sup>-1</sup>). 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 = 0.05probability 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.

J.F. Pedersen,\* D.L. Funnell, J.J. Toy, A.L. Oliver, and R.J. Grant

J.F. Pedersen, D.L. Funnell, and J.J. Toy, USDA-ARS, NPA Wheat, Sorghum and Forage Research, 344 Keim, University of Nebraska-Lincoln, Lincoln, NE 68583-0937; A.L. Oliver, Dep. of Animal Science, University of Nebraska-Lincoln, Lincoln, NE 68583-0908; R.J. Grant, W.H. Miner Agric. Res. Institute, Chazy, NY 12921. Joint contribution of the USDA, ARS and the University of Nebraska Agric. Exp. Stn. as Paper no. 14571, Journal Series, Nebraska Agic. Exp. Stn. Registration by CSSA. Accepted 31 July 2005. \*Corresponding author (jfp@unlserve.unl.edu).

doi:10.2135/cropsci2005.06-0094 Published in Crop Sci. 46:478 (2006).