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### Registration of 'Bonanza' Big Bluestem

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### Registration of 'Bonanza' Big Bluestem

'Bonanza' big bluestem (*Andropogon gerardii* Vitman.) (Reg. no. CV-13, PI 641701) was released in May 2004 by the USDA, Agricultural Research Service and the Agricultural Research Division, Institute of Agriculture and Natural Resources, University of Nebraska. It is a broadly adapted perennial warm-season grass cultivar that produces forage with high in vitro dry matter digestibility (IVDMD) and improved animal gains in comparison to its parent cultivar when utilized by beef cattle in well-managed grazing systems. Bonanza was tested as Pawnee C3.

Bonanza was developed by three generations of breeding for improved forage yield and forage digestibility as measured by IVDMD. The base population was the cultivar Pawnee which was released in 1963 (Newell, 1968). Pawnee has a broad genetic base and has proven to be well adapted over a broad geographic area in the Central Plains and the Midwest. Pawnee was not selected or evaluated for forage quality; hence a need existed to improve its forage quality for use in livestock production systems. The breeding phase of the research was initiated in 1977. A modified restricted, recurrent selection breeding system (Vogel and Pedersen, 1993) was used in which forage yield and forage IVDMD were the main selection criteria. Approximately 53 to 63 selected plants were intermated in isolation each selection cycle to produce seed to start the next generation of selection. Each selection cycle took approximately five yr. The breeding research was conducted at the University of Nebraska's Agricultural Research and Development Center near Mead, NE. After the third cycle of selection was completed, seed was increased for use in small plot evaluation trials and a replicated grazing trial.

Two sets of multi-year forage evaluation trials were conducted at Mead, Clay Center, and Concord, NE during the period 1999 to 2002 to evaluate the hay production potential of the cultivar. Concord and Mead are in the tallgrass prairie ecosystem in Plant Hardiness Zones 4 and 5, respectively, while Clay Center is in the transition zone between the tallgrass and midgrass prairie ecoregions in Plant Hardiness Zone 5. One set of trials was managed for hay harvest at the mid- to late-boot stage of physiological development while the other set was managed for hay harvest after inflorescences emerged which was about a month later. Forage of Bonanza had significantly ( $P \leq 0.10$ ) greater IVDMD than Pawnee averaged over all trials and had equivalent forage yields. It had greater digestibility ( $P \leq 0.10$ ) than the big bluestem cultivars Rountree and Niagara that can be grown in similar regions. Bonanza was compared to Pawnee in a replicated grazing trial located near Mead, NE using yearling steers during the period 2000 to 2002 (Mitchell et al., 2005a). Based on weekly samples during the grazing season, there was significantly ( $P \leq 0.05$ ) more forage available in the Bonanza pastures and the forage was significantly ( $P \leq 0.05$ ) higher in IVDMD than in the Pawnee pastures. Averaged over 3 yr at Mead, NE, yearling steers grazing the Bonanza pastures had 16% greater average daily gain ( $P \leq 0.05$ ) than cattle grazing Pawnee pastures. Bonanza pastures produced 14% more kg ha<sup>-1</sup> beef cattle gains ( $P \leq 0.05$ ) than Pawnee pastures. Based on an economic analysis, the increased gain by cattle grazing Bonanza pasture in comparison to Pawnee pastures resulted in an increase of \$37 per ha net return (Mitchell et al., 2005b).

Bonanza is botanically typical of big bluestems that are native to the tallgrass prairie ecoregion of North America. Bonanza is most similar in appearance to Pawnee from which it was selected. In space-transplanted nurseries, plants of Bonanza are at the R2 stage of development (spikelets fully emerged/peduncle not emerged; Moore et al., 1991) two d later

than those of Pawnee when evaluated at Mead, NE (approximately 41° N Lat.). At Mead, NE, Bonanza is at the R2 stage of development about 1 or 2 August. In solid stands or sward trials, there are no differences in maturity between Bonanza and Pawnee. Plants of Bonanza vary for the unselected traits of glume and peduncle color. Bonanza can be distinguished from Pawnee by its greater flag leaf length (13.3 vs. 9.6 cm) and width (5.1 vs. 3.7 mm), and a smaller percentage of plants with brown or dark brown glumes (3 vs. 9%) and peduncles (5 vs. 17%). Bonanza in spaced-plant nurseries is at the R2 stage about 7 to 8 d earlier than 'Kaw' or 'Goldmine' and 4 and 10 d later, respectively, than Rountree and 'Champ'.

Bonanza is a stable, improved, random mating population and will be maintained and increased accordingly. It is adapted to USDA Plant Hardiness Zone 5 and lower Plant Hardiness Zone 4 of the U.S. Central Plains and Midwest, and pending additional tests, it may be adapted to other regions. Breeder seed will be jointly maintained and produced by USDA-ARS and the University of Nebraska-Lincoln with random-mated, isolated increase fields originating from the Syn 2 breeder seed produced from the cycle 3 polycross nursery. Foundation seed production of Bonanza will be managed by the Nebraska Foundation Seed Division, University of Nebraska-Lincoln, Lincoln, NE 68583. Foundation seed will be made available for Certified seed production on a non-exclusive basis to seed producers who contractually agree to produce and market the seed only as Certified seed using the cultivar name Bonanza. Foundation and Certified seed fields will be limited to a single generation. Certified seed production will be restricted to the southern half of USDA Plant Hardiness Zone 4 and Plant Hardiness Zone 5 where the cultivar is adapted. A technology development and transfer fee will be assessed by the University of Nebraska. Application has been made for U.S. Plant Variety Protection. Contact the corresponding author for all seed requests. Recipients are asked to recognize the source if it contributes to the development of a cultivar or germplasm or is used for other research purposes. Bonanza seeds will be deposited in the National Plant Germplasm System (NPGS) (USDA-ARS, 2006), but no seeds will be distributed by the NPGS without written permission for 20 yr from the date of publication in Crop Science, at which time seeds will also be available from NPGS.

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### References

- Mitchell, R.B., K.P. Vogel, T.J. Klopfenstein, B.E. Anderson, and R.A. Masters. 2005a. Grazing evaluation of big bluestems bred for improved forage yield and digestibility. *Crop Sci.* 45:2288–2292.
- Mitchell, Rob, Ken Vogel, Gary Varvel, Terry Klopfenstein, Dick Clark and Bruce Anderson. 2005b. Big Bluestem pastures in the Great Plains: An alternative to dryland corn. *Rangelands.* 27:31–35.
- Moore, K.J., L.E. Moser, K.P. Vogel, S.S. Waller, B.E. Johnson, and J.F. Pedersen. 1991. Describing and quantifying growth stages of perennial forage grasses. *Agron. J.* 83:1073–1077.
- Newell, L.C. 1968. Registration of Pawnee Big Bluestem (Reg. No. 1). *Crop Sci.* 8:514–515.
- USDA-ARS, National Genetic Resources Program. 2006. Germplasm Resources Information Network-(GRIN) [Online Database].

National Germplasm Resources Laboratory, Beltsville, MD.  
Available at: [www.ars-grin.gov/npgs/](http://www.ars-grin.gov/npgs/); verified 28 July 2006.  
Vogel, K.P., and J.F. Pedersen. 1993. Breeding systems for cross-pollinated perennial grasses. *Plant Breed. Rev.* 11:251–274.

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