

NOTICE OF RELEASE OF

# BOUNTY GERMPLASM BIG BLUESTEM

A SELECTED CLASS OF NATURAL GERMPLASM

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## ABSTRACT

Bounty Germplasm big bluestem (*Andropogon gerardii* Vitman [Poaceae]) is a selected class of natural germplasm release for use in conservation cover, erosion control, pasture and hayland, wildlife habitat, prairie revegetation, rangeland seeding, and landscaping in the Northern Great Plains and Upper Midwest of the US. Originating from native stands in Minnesota and eastern South Dakota, this selection is expected to perform well throughout Minnesota, the eastern Dakotas, and surrounding regions.

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## KEY WORDS

*Andropogon gerardii*, Poaceae, hayland, pasture, prairie revegetation

## NOMENCLATURE

Plants: USDA NRCS (2012)

Major Land Resource Areas (MLRA): USDA NRCS (2006)

## COLLABORATORS

USDA Natural Resources Conservation Service Bismarck Plant Materials Center, Bismarck, North Dakota; Minnesota Agricultural Experiment Stations, University of Minnesota, St Paul; North Dakota Agricultural Experiment Stations, North Dakota State University, Fargo; South Dakota Agricultural Experiment Stations, South Dakota State University, Brookings.

A selected class of big bluestem, *Andropogon gerardii* (Vitman) (Poaceae), has been developed to provide genetic diversity for conservation uses in Minnesota, the eastern Dakotas, and surrounding states in the Northern Great Plains and Upper Midwest. This germplasm will be referred to as Bounty Germplasm big bluestem. It has been assigned the USDA Natural Resources Conservation Service (NRCS) accession number 9063122.

## JUSTIFICATION

This germplasm selection fills the need for genetic diversity within the species and was selected to have a broad area of adaptability to the extremely variable and unpredictable growing conditions (Harris and others 2006) of the Northern Plains Region. Additional selection criteria were earlier maturity, vigor, disease resistance, leafiness, and forage quality. Bounty Germplasm big bluestem is expected to perform well wherever big bluestem is recommended in this region.

## COLLECTION SITE INFORMATION

Vegetative collections of 326 accessions of naturally occurring big bluestem were made by NRCS field personnel in Minnesota and in eastern South Dakota during fall 1985 (Figure 1). This area covers parts of 3 land resource regions including Northern Plains Spring Wheat Region, Northern Lake States Forest and Forage Region, and the Central Feed Grains and Livestock Region. Average annual rainfall ranges from approximately 508 to 864 mm (20 to 34 in) with a freeze-free period ranging from 95 d in northern Minnesota to 150 d near the Iowa border (USDA



**Species** | *Andropogon gerardii*  
**Common name** | Big bluestem  
**Plant symbol** | ANGE  
**Accession number** | 9063122

A selected germplasm of big bluestem has been released for conservation use in native plantings with the primary objective of ecological revegetation, wildlife habitat, and forage production in the Northern Great Plains and Upper Midwest.

2006). Accession numbers were assigned to each collection and the vegetative crown pieces were divided and potted into small containers during spring 1986.

### DESCRIPTION

Big bluestem is a tall, stout, perennial, warm-season, native grass with stiff, erect culms. Leaf blades have prominent midribs, flattened and keeled sheaths, and fringed membranous ligules below the collar (Figure 2). Rachis internodes are thinly to rather densely hairy (Sedivec and Barker, no date). It is often called “turkeyfoot” because the seed heads usually have 3 spikelets. Big bluestem is shorter in more northern climates, varying in height from 1.2 to 2.4 m (4 to 8 ft) tall. The forage is one of the most palatable grasses. Its deep, spreading root system makes it an excellent erosion control plant. It can form a sod and has short, scaly rhizomes. Big bluestem performs best on fertile, well-drained soils but is also adapted to sites with

shallow depth, low pH, and low fertility. Big bluestem is the dominant grass species of the tall grass prairie of the Midwest. It provides excellent wildlife habitat and food sources. Native to most of the US and Canada except for the far western areas (USDA 2012), big bluestem is a host plant to many butterflies and other pollinator species (Tallamy 2009). It is becoming more popular as a landscaping plant.

### METHOD OF SELECTION

The evaluation nursery was located at the USDA Agricultural Research Service, Northern Great Plains Research Laboratory at Mandan, North Dakota. More than 4000 plants were established in the nursery from 27 May to 13 June 1986 (USDA 1990–1991). The experimental design was a randomized complete block with 4 replications. Individual subplots of 3 cloned big bluestem plants were randomly planted within each block. Individual blocks contained 1071 plants or 357 three-plant subplots. Six different varieties of big bluestem were included in the nursery as standards of comparison, including Champ, Pawnee, Rountree, Bonilla, Bison, and Sunnyview.

Data collected from 1987 to 1990 included survival, vigor, disease, size, leafiness, and forage quality. These plants displayed 97% survival the first year. Approximately 41% of those surviving plants were rated as having low vigor, and 2% as very high vigor. Most plants were rated as having good vigor. The most vigorous plants had a broader crown and were larger than were the plants having low vigor. Disease problems consisted mostly of leaf and stem rust.

Evaluations in 1989 and 1990 included gridding the nursery into 4 × 6 plant plots. Two superior plants were selected in each 24-plant grid. Each was representative of an early and a late-maturing population. Selection factors included leafiness, disease

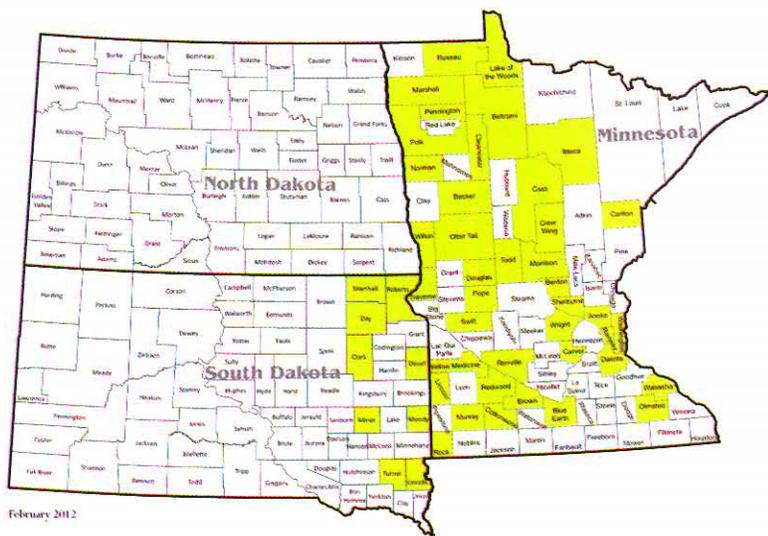


Figure 1. Accession areas for vegetative collections are shown in green.



Figure 2. Bounty Germplasm big bluestem plant structures. Photo by Wayne Markegard

resistance, seed production potential, and vigor. In 1990, selected plants were rated for phenology and separated into early and late-maturing populations. Based primarily on forage quality parameters, 94 out of 177 (53%) of the early-maturing accessions were selected for further study. Generally, these plants had finer leaf and stem material, and were smaller and less robust than the later-maturing population. The selected plants were vegetatively established into a polycross block in 1991. Additional evaluation and some roguing were completed prior to seed harvest. Leaf, stem, and culm samples were collected from the remaining 82 plants at first flowering. These samples were analyzed for crude protein, acid detergent fiber, neutral detergent fiber, and relative feed value by the Northern Great Plains Research Laboratory at Mandan, North Dakota. Crude protein ranged from 6 to 10% and Relative Feed Values varied from 62 to 77%. The standards of comparison were also sampled for forage quality. The most northern origin big bluestem,

Bison, averaged 7% crude protein compared with Rountree, which averaged 4%.

The selected big bluestem plants composing Bounty Germplasm averaged slightly more than 7% crude protein, higher than the population average of 6%. The average relative feed value increased from 67% for the base population to 69% for the selected plants. Seed harvested from the selected early-maturing population was seeded in the increase field at the Bismarck Plant Materials Center in June 2010. This seed (Bounty Germplasm) from 82 superior plants contains a broad representation originating from 40 Minnesota and 9 South Dakota counties.

#### Field Measurements

On 26 July 2011, data were collected from the foundation field that was planted in 2010. To document the diversity within the population, the field was divided into 5 representative

sample areas. Ten plants were systematically flagged for sampling in each of the 5 sample areas. Data from those samples indicated that individual plant height varied from 1.1 to 1.8 m (3.75 to 6 ft). Sample means were more uniform from 1.5 to 1.7 m (4.9 to 5.45 ft). Width was less variable and most of the 2-year-old plants were nearly 15 cm (a half foot) wide. Most plants rated best for leafiness, and none of the sample means rated more than 1.4 (1=best; 3=poor). Phenology varied up to 3 wk from medium boot (12%) to medium flower (2%). Most of the plants were late boot (44%) to early flower (42%).

### ECOLOGICAL CONSIDERATION

Big bluestem is relatively easy to establish and competes well with other species. It has been known to establish from seed in smooth brome grass stands over time, especially if the brome grass is mowed or grazed during critical periods, allowing the big bluestem to gain a foothold. Big bluestem is a native species with many desirable traits. Encroachment off-site would not generally be considered negative. Seed is spread by birds and other animals, as well as by natural events such as flooding and wind storms. Vegetative spread is minimal. Big bluestem is considered noninvasive and is easy to control as a landscape plant.

### ANTICIPATED CONSERVATION USE

The conservation uses of Bounty Germplasm big bluestem are many and include conservation cover, erosion control, pasture and hayland, wildlife habitat, prairie revegetation, rangeland seeding, and landscaping.

### ANTICIPATED AREA OF ADAPTATION

Bounty Germplasm big bluestem is expected to perform well throughout Minnesota (MLRA 57, 88, 90–91, 102–103), the eastern Dakotas (MLRA 53, 56, 102), and surrounding regions in the Northern Great Plains and Upper Midwest (MLRA 52–55).

### AVAILABILITY OF PLANT MATERIALS

Breeder seed (Generation 0) will be maintained by the Bismarck Plant Materials Center (PMC). Foundation seed will be grown by the Bismarck PMC and distributed through North Dakota State University Foundation Seed Stocks as a selected class (green tag) germplasm.

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