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5-1990

## Registration of 15 Germplasm Lines of Grain Sorghum and Sweet Sorghum

Herman J. Gorz

*United States Department of Agriculture*

Francis A. Haskins

*University of Nebraska-Lincoln, fhaskins@neb.rr.com*

B. E. Johnson

*University of Nebraska-Lincoln*

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Gorz, Herman J.; Haskins, Francis A.; and Johnson, B. E., "Registration of 15 Germplasm Lines of Grain Sorghum and Sweet Sorghum" (1990). *Agronomy & Horticulture -- Faculty Publications*. 231.  
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#### REGISTRATION OF 15 GERMPLASM LINES OF GRAIN SORGHUM AND SWEET SORGHUM

FOUR inbred lines (N97–N100) and 11 pairs of A and B (male-sterile and maintainer) lines (N101–N111) of sorghum [*Sorghum bicolor* (L.) Moench] were developed cooperatively by the USDA-ARS and the Nebraska Agricultural Research Division and were released in April 1989. The lines contain one or more traits that may have value for use in producing hybrids and/or conducting breeding and management studies. All A-lines have milo (A1) cytoplasm.

N97 (Reg. no. GP-246, PI 535782) is an R-line with reduced dhurrin content selected from the RP2B (2) population. A single  $S_1$  family that was unusually low in dhurrin content was identified in Cycle 5 of the RP2B recurrent selection program for lower dhurrin content. Continued selection in three additional selfed generations resulted in the bulking of two  $S_4$  families to make up the seed lot released as N97. The spectrophotometric assay for dhurrin (1) as measured by hydrocyanic acid potential (HCN-p) of first leaves from 1-wk-old seedlings grown in the same test resulted in the following values for means and standard errors (mg kg<sup>-1</sup> fresh weight, bulk of 10 seedlings per replication,

three replications): N97—474 ± 16; B-‘Redlan’—1020 ± 74; B-‘CK60’—1045 ± 72. N97 has purple plant color and green midribs, reaches the heading stage in approximately 64 d, is 135 cm in height at maturity, and has white caryopsis color.

N98, N99, and N100 (Reg. no. GP-247–GP-249; PI 535783–PI 535785) were derived from crosses made with the objective of transferring sweet sorghum germplasm into earlier-maturing lines with improved adaptation to growing conditions in the Central Great Plains. Each of the lines has purple plant color and green midribs and has been selfed more than six generations. N98 is a composite of four  $F_6$  lines from an initial cross of an experimental A-line [AN39 × (N4692-Rio)<sup>4</sup>] to ‘Waconia’ sweet sorghum, followed by a final cross to ‘Fremont’ forage sorghum. The following values were obtained in 1988 for days to heading, height at maturity, and Brix, respectively: 69, 250 cm, 21%. Caryopsis color is dark brown. N99 is an  $F_7$  selection with light brown caryopsis color from a cross of Fremont forage sorghum × ‘Theis’ sweet sorghum. Values in 1988 for days to heading, height at maturity, and Brix were 58, 235 cm, and 20%, respectively. N100 is an  $F_7$  selection with light brown caryopsis color from a cross of Waconia × ‘Wray’ sweet sorghum. Values for days to heading, height at maturity, and Brix in 1988 were 80, 270 cm, and 18%, respectively.

N101, N102, and N103 (Reg. no. GP-250 to GP-252; PI 535786–PI 535788) are combine-height grain sorghums selected for lower HCN-p from the RP2B population. N101 and N103 have had more than six crosses of the cytoplasmic male-sterile to the recurrent male parent, and the male also has been selfed more than six generations. N102, on the other hand, has had only three crosses to the male parent and four self-pollinations of the male. N101 and N102 have green midribs, purple plant color, white caryopsis color, and are approximately 120 cm in height. N103 has brown midribs (obtained by pollinating a low-HCN-p genetic male-sterile RP2B selection with B-Redlan *bmr-6*), averages 150 cm in height, has purple plant color and white caryopsis color, and is 4 or 5 d later in maturity than N101 and N102. The spectrophotometric assay for HCN-p for first leaves from 1-wk-old seedlings grown in the same test resulted in the following values for means and standard errors (mg kg<sup>-1</sup> fresh weight, bulk of 10 seedlings per replication, six replications for N101 and N103; three replications for Redlan and CK60): N101—442 ± 40; N103—677 ± 62; B-Redlan—1020 ± 74; and B-CK60—1045 ± 72. N102 has not been assayed for HCN-p but the immediately preceding generation had a mean value of 408 ± 50 for two replications. These inbreds have not been tested in hybrid combinations with sudangrass but are potentially useful for producing low HCN-p sorghum-sudangrass hybrids or as a source of grain sorghum germplasm with reduced HCN-p for use in breeding programs.

N104, N105, N106, and N107 (Reg. no. GP-253–GP-256; PI 535789–PI 535792) represent the four phenotypic combinations that resulted from a cross of bloomless Redlan (B-Redlan *bm<sub>1</sub>*) × brown midrib Redlan (B-Redlan *bmr-6*). Thus, N104 has bloom and green midribs. N105 has bloom and brown midribs, N106 is bloomless with green midribs, and N107 is bloomless with brown midribs. The heights (cm) of N104, N105, N106, and N107 are 120, 115, 130, and 109, respectively. Plants of all four phenotypes, identified in a single  $F_4$  family heterozygous for both bloom and brown midrib, were selfed for two additional generations to identify those plants within each phenotype that were homozygous for both traits. Homozygous  $F_6$  plants of each phenotype were then crossed to A-Redlan to begin the development of A- and B-lines. A total of five crosses were made to each recurrent parent and the males were advanced to the  $F_8$  generation. The four lines have purple plant color, light brown caryopsis color, and are similar to Redlan except for the presence of the bloomless and/or brown midrib traits and

**Table 1. Brief description of inbred lines N108, N109, N110, and N111.**

Inbred	Pedigree	Bloom (d)	Height (cm)	Plant color	Caryopsis color	Brix (%)
N108†	Saccharum-Sorgo <sup>6</sup>	75	162	Tan	Lt. Tan	17 ± 0.5
N109	White Collier × Grain Sorghum Line	75	143	Purple	White	19 ± 0.4
N110	Red ×	73	256	Purple	Brown	20 ± 0.2
N111	Waconia	75	260	Purple	Brown	20 ± 0.2

† Has wrinkled seeds.

should be of value for the production of hybrids, as a source of germplasm in breeding programs, and for studies in which the bloomless and brown midrib traits are examined for their effects on forage quality and other agronomic traits.

N108, N109, N110, and N111 (Reg. no. GP-257-GP-260; PI 535793-PI 535796) were developed with the objective of obtaining sweet sorghum female parents. A brief description of these inbred lines is presented in Table 1. Some additional entries, grown in the same nursery as these inbreds, had the following Brix values: B-Redlan— $8.3 \pm 0.07$ , B-CK60— $12.6 \pm 0.32$ , 'Sart'— $16.2 \pm 0.50$ , 'Rio'— $17.6 \pm 0.34$ , 'Williams'— $19.4 \pm 0.70$ , 'Brandes'— $20.4 \pm 0.32$ , Wray— $21.3 \pm 0.07$ , and 'Keller'— $22.0 \pm 0.12$ . Each of the four inbreds has green midribs and all A-lines have milo (A1) cytoplasm; there have been at least six crosses of the cytoplasmic male-sterile to the recurrent parent, and each male parent has been selfed at least six generations. N108 and N109 have not been evaluated in hybrid combinations, but preliminary evaluation of N110 and N111 revealed that they make productive hybrids when crossed to sweet sorghum males. These inbred lines may be useful for producing sweet sorghum hybrids or as a source of germplasm for breeding programs.

Seed of inbreds N97 to N111 will be maintained and distributed by the Department of Agronomy, University of Nebraska, Lincoln, NE 68583. It will be available in germplasm quantities only. Recipients of seed are asked to make appropriate recognition of the source of the germplasm if it should contribute to the development of a new germplasm, parental line, cultivar, or hybrid.

H. J. GORZ,\* F. A. HASKINS, AND B. E. JOHNSON (3)

#### References and Notes

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3. H.J. Gorz (retired), USDA-ARS; and F.A. Haskins (retired) and B.E. Johnson, Dep. of Agronomy, University of Nebraska, Lincoln, NE 68583. Co-operative investigations of the USDA-ARS and the Nebraska Agric. Res. Division. Published as Journal Series Paper no. 8929, Nebraska Agric. Res. Division. Registration by CSSA. Accepted 31 Aug. 1989 \*Corresponding author.

Published in *Crop Sci.* 30:762-763 (1990).