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‘Bantam’ and ‘Redspike’ Indiangrass

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Indiangrass was a key grass species of the tallgrass prairie ecosystem, and at the time of European settlement, it was native in over half of what is now the continental United States (Darke, 1999). Today, it is easily recognizable in prairie remnants, reconstructed prairies, and along roadsides by its inflorescences, which appear as tall, narrow spires from August through October. Despite its wide adaptability and landscape potential, few ornamental cultivars exist. ‘Sioux Blue’ and ‘Indian Steel’ make up a short list of the ornamental cultivars currently available commercially. ‘Sioux Blue’, a Longwood Gardens clonal cultivar with an upright habit (Darke, 1999), has been the standard ornamental cultivar for many years, but recently, it has been replaced by ‘Indian Steel’, a uniform seed-propagated cultivar introduced in 1995 by Jelitto Perennial Seeds (Anonymous, 2009). Because of the need for new cultivars, a mutation study was done to recover indiangrass mutants of ornamental value (Stephens, 2009). Two mutants from that study are being introduced as ‘Bantam’ (Fig. 1) and ‘Redspike’ (Fig. 2).

Origin

‘Bantam’ (ISU06-35) and ‘Redspike’ (ISU06-56) were selections from a mutation study (Stephens, 2009). Both plants were selected in the field in Aug. 2006 after ethidium–bromide treatment during tissue culture of inflorescences of the original unnamed selection obtained from Kurt Bluemel Inc. Nurseries, Baldwin, MD. Surviving plants that were regenerated from the mutagen-containing medium were transplanted in May 2006 to the field at the Iowa State University (ISU) Horticulture Farm, Gilbert, IA (central Iowa). Both selections were dug late fall 2006, transplanted to a site near Slater, IA, 20 miles south of the ISU Horticulture Farm, and were grown during Summer 2007 to evaluate trueness to type. Seedlings from both selections were grown out in 2008 to verify that the mutations were dominant, nuclear mutations (Stephens, 2009). ‘Bantam’ was selected because of its dwarf stature; stiff, upright leaves; and uniform habit. ‘Redspike’ was selected because of its unique grayed purple floret hairs, giving the inflorescence a dusky red hue, especially during sunny mornings and afternoons. Both cultivars possess the blue–green foliage consistent with the standard ornamental indiangrass cultivars.

Description

‘Bantam’ is 40% shorter (Table 1) and 56% shorter (Table 2) than ‘Redspike’ at the end of one and two growing seasons, respectively. Each of the inflorescence internodes of ‘Bantam’ is shorter than the corresponding one of ‘Redspike’, progressively so from the crown of the plant (Table 3). For example, for the internode most proximal to the crown, the internode length of ‘Bantam’ is 89% that of ‘Redspike’. For the second-most proximal and third-most proximal internodes, ‘Bantam’ is 77% and 71% that of ‘Redspike’, respectively. For the internode most distal from the crown, ‘Bantam’ is 70% of the internode length of ‘Redspike’ (Table 3).

‘Bantam’ has leaves that range from 29 to 37 cm long with a mean of 33 cm. Leaf width ranges from 10 to 14 mm with a mean of 12 mm. ‘Redspike’ has a longer leaf with a range of 36 to 52 cm and a mean of 44 cm, but slightly narrower at 9 to 14 mm with a mean of 11 mm wide. ‘Redspike’ appears to have a wider leaf blade because it is flatter than ‘Bantam’, which has a more V-shaped leaf. This trait makes the leaves of ‘Bantam’ appear stiffer with very few pendulous leaves in contrast to ‘Redspike’ (Figs. 1 and 2).

Color descriptions of indiangrass ‘Bantam’ and ‘Redspike’ are based on The Royal Horticultural Society’s color chart (Royal Horticultural Society, 1966). Summer leaf color is green 137A on the abaxial side and green 137B on the adaxial side for both cultivars. ‘Redspike’ fall leaf color is grayed orange 167B–C on the abaxial side and grayed orange 168C–D on the adaxial side. As foliage senesces, the leaf browns out to a grayed orange 166A–B on the abaxial side and grayed orange 166B–C on the adaxial side. ‘Bantam’ fall leaf color is grayed orange 167B–C on the abaxial side and grayed orange 167C–D on the adaxial side, fading as the leaf dries to grayed orange 165B on the abaxial side and grayed orange 165C on the adaxial side. As leaf color changes, the tiller base color changes from green 137A–B to grayed purple 186C–D. ‘Redspike’ tiller base fall color shows a grayed purple 186B–C. ‘Indian Steel’ has a summer leaf color very similar to ‘Bantam’ and ‘Redspike’, whereas the winter foliage tends toward pink rather than the orange shades of ‘Bantam’ and ‘Redspike’.

‘Bantam’ inflorescences have a predominant color of grayed green 195B with an undertone of grayed purple 183C (Royal Horticultural Society, 1966) at anthesis. ‘Redspike’ has a predominant color of grayed purple 183B–C with an undertone of grayed green 195B. Summer color persists on each inflorescence for 2 to 3 weeks and then starts to fade. Summer color persists on some inflorescences until first frost in central Iowa, because the shorter current-season tillers continue to flower after the first inflorescences have senesced. Inflorescence fall and winter color is grayed orange 165B–C for

Fig. 1. Indiangrass ‘Bantam’ 10 d after first bloom (to view this image in color, see *HortScience* online at: http://hortsci.ashspublications.org).

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Fig. 2. Indiangrass 'Redspike' 10 d after first bloom (to view this image in color, see *HortScience* online at: http://hortsci.ashspublications.org).

Table 1. Comparison of indiangrass 'Bantam' and 'Redspike' with 'Indian Steel' for growth and flowering parameters at the end of one growing season.[z]

Cultivar	Mean days to flower	Mean no. of tillers	Mean plant ht (cm)	Mean top canopy diam. (cm)	Mean base circumference (cm)
Bantam	98	16	94	46	45
t[y]	5.14***	3.11*	21.04***	12.23***	3.21**
Redspike	88	26	156	52	46
t[x]	9.00***	0.10 NS	7.42***	7.17***	2.89*
Indian Steel[w]	107	26	183	74	54

[z]Field-planting was of five to eight plants of each cultivar on 19 May 2009. Final data were collected 8 Sept. 2009.
[y]Calculated *t* value for 'Bantam' versus 'Indian Steel'.
[x]Calculated *t* value for 'Redspike' versus 'Indian Steel'.
[w]Obtained as potted plants from Bluebird Nursery, Clarkson, NE.
NS, *, **, ***Not significant or significant at $P \leq 0.05$, 0.01, or 0.001, respectively.

Table 2. Growth and flowering parameters for indiangrass 'Bantam' and 'Redspike' over two growing seasons.

Cultivar	No. of seasons (plant no.)	Mean no. of tillers[z] (SE)	Mean plant ht (cm) (SE)	Mean top canopy diam. (cm) (SE)	Mean base circumference (cm) (SE)
Bantam	1 (8)	16 (2.12)	94 (2.88)	46 (1.46)	45 (1.90)
	2 (7)	79 (16.73)	87 (4.34)	53 (2.37)	87 (4.34)
Redspike	1 (8)	26 (1.40)	156 (2.42)	52 (1.86)	46 (1.88)
	2 (8)	75 (7.83)	197 (1.57)	63 (3.06)	86 (4.44)

[z]Data were tillers present at the beginning of the season. Date of first flowering of both cultivars on plants grown two seasons was 27 July 2009. Average date of first flowering on plants grown one season was 25 Aug. 2009 and 15 Aug. 2009 for 'Bantam' and 'Redspike', respectively. Two-year-old and 1-year-old plants were field planted 5 May 2008 and 19 May 2009, respectively. Final data were collected 8 Sept. 2009.

Table 3. Mean lengths of four internodes of 'Bantam' and 'Redspike' flowering tillers.

	Internodes[z] (cm)			
Cultivar	1	2	3	4
Bantam	51	24	17	16
Redspike	73	34	22	18

[z]Measurements made 8 Sept. 2009 on first flush of flowering tillers on 2-year-old plants that were planted 5 May 2008. Internode 1 is most distal from the crown and internode 4 most proximal to the crown. 'Bantam' tillers contained four internodes only, whereas 'Redspike' contained either four or five internodes per flowering tiller. Three tillers were sampled randomly from each cultivar.

'Redspike' and grayed orange 165C–D for 'Bantam'. The summer and fall inflorescence color of 'Indian Steel' is similar to that of 'Bantam'. Reseeding, sometimes a problem with seed-propagated cultivars, does not occur with either 'Bantam' or 'Redspike' planted singly or en masse, because both cultivars are self-incompatible (Stephens, 2009).

Performance

'Bantam' and 'Redspike' were compared with 'Indian Steel' for growth and flowering parameters after one growing season (Table 1). One representative 'Indian Steel' plant was divided and propagules planted into 10-cm pots in March. 'Bantam' and 'Redspike' were propagated by division and tissue culture and both were planted into 10-cm pots in March. Five to eight plants of similar size of each cultivar were planted through a black polyethylene weed-barrier mulch in a completely random design. Soil was a well-drained Clarion loam (fine-loamy, mixed, mesic Typic Hapudolls), pH 6.1, and organic matter of 2.6%. Plants were irrigated through drip tubes at predetermined tensiometer readings. No phenotypic differences were observed between tissue-cultured and conventionally propagated 'Bantam' and 'Redspike' plants, so these data were pooled for further analysis (data not shown). Student's *t* tests were performed to compare 'Bantam' and 'Redspike' with 'Indian Steel' according to methods of Steel and Torrie (1960) and using Microsoft Excel software (Microsoft Corporation, 2007).

'Bantam' flowered 9 d earlier than 'Indian Steel' and 'Redspike' 19 d earlier in plants established over one season (Table 1). 'Bantam' produced fewer tillers, was shorter by 89 cm, and spread less at the base and the top compared with 'Indian Steel'. 'Redspike' produced the same tiller number but at a shorter height and with less spread at the base and the top than 'Indian Steel' (Table 1). Only tillers formed from primary tillers present at the start of the growing season were counted. 'Bantam' contained fewer tillers than 'Redspike' at the end of one growing season, but tiller number was nearly the same for both cultivars at the end of the second growing season (Table 2). Mean plant height was noticeably shorter for 'Bantam' than for 'Redspike'. Plant height was nearly the same for 'Bantam' whether it was grown for one season or two, but 2-year-old 'Redspike' plants were considerably taller than 1-year-old plants under irrigated conditions. Plants of 'Redspike' grown under nonirrigated conditions at another location were 20 to 30 cm shorter than those under irrigation, and these were less prone to lodging than plants under irrigation. 'Bantam' has shown excellent resistance to lodging over two growing seasons, whether irrigated or not. 'Bantam' had a smaller top canopy diameter than did 'Redspike', but base circumference was similar (Table 2). Both cultivars have shown excellent cold hardiness in USDA plant hardiness zone 5 (Agriculture Research Service, 1990) over three winters.

Propagation

Propagation is by division or tissue culture. Tissue culture is described in Stephens (2009) and Chen et al. (1979). Plants are successfully divided during the dormant season, either in spring before active growth or in fall after foliage senescence.

Plants can be produced in pots by maintaining dormant plants in a 10 °C greenhouse until March and then by raising the temperature to 20 °C for forcing. Clumps can be divided anytime until the development of green shoots. Clumps are cut to include two to three shoots and then planted in 10- to 15-cm pots and grown in a 70% peat:30% perlite soilless medium that is pH-adjusted to 5.5 to 6.5. After shoots begin growth, plants are

fertilized with 50 to 100 ppm nitrogen of a complete liquid fertilizer. Plants can be transplanted to field conditions in the spring after danger of frost has passed.

Availability

Limited numbers of potted plants for research purposes can be obtained by making a request to the author.

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