TECHNICAL NOTES

COFFEEVILLE PLANT MATERIALS CENTER

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INITIAL EVALUATION OF RESCUEGRASS FOR WINTER COVER (1989-1990)

Abstract

During the fall, winter, and spring, 110 accessions of rescuegrass (Bromus unioloides H.B.K.) were evaluated at the Coffeeville Plant Materials Center (PMC) for use as a cover crop for no-till cotton. The four accessions that were selected for advanced testing were 250648 from Pakistan, 442079 from Japan, 9054984 from Stephens Co., Oklahoma, and 9054989 from Wilson Co., Texas. These accessions may be increased to produce seeds for additional testing.

Introduction

Rescuegrass (Bromus unioloides H.B.K.), also called prairie grass or B. catharticus, is a cool-season bunchgrass that is native to South America, especially Argentina and Uruguay. The bunches, which are very leafy at the base, may grow to 1 foot in diameter and produce erect to spreading seedheads 2 to 3 feet tall. The inflorescence is an open panicle up to 9 inches long with several erect to drooping spikelets about 1 inch long. Each spikelet has 4 to 12 overlapping florets. Lemmas are pointed but awnless, or nearly so, and compressed-keeled resulting in flat spikelets resembling Uniola (seaoats). As seeds mature, the spikelets often have a pink tint before turning brown. The lower florets ripen first and the seed falls with lemma and palea attached. Spikelets, stems, and blades are commonly glabrous although the sheaths may sometimes be pilose. The flat leaf blades are 8 to 12 inches long and up to 1/2 inch wide. The combination of characteristics that are used to distinguish B. unioloides from other common southern bromes such as cheat (B. secalinus) and Japanese brome (B. japonicus) are its flat spikelets, V-shaped keels, and nearly awnless, glabrous florets (Hitchcock, 1950; Pohl, 1968).

Rescuegrass is a short-lived perennial in areas with humid climates and mild winters, but if winters are severe or summers hot and dry, it acts as an annual. It is adapted to regions with mild winters and is widely cultivated for hay and pasture in many countries including Argentina, Uruguay, Brazil, Australia, Spain, Italy, and the southern United States (Whyte et al., 1959).

No one knows when rescuegrass was first introduced into the United States, but in 1803 it was identified as Festuca unioloides by a German scientist who had grown it from seeds collected in "Carolina" (Hitchcock, 1950). It proved to be well adapted to the southeastern United States and soon became popular for cool-season pasture and erosion control. Being better than the cool season grasses of northern origin commonly grown in the South, its value was soon recognized and it was given the common name of "rescuegrass" in 1853. It is now naturalized in many places across the southern half of the United States (Pohl, 1968).

Rescuegrass is grown alone or in mixtures with lucerne (Medicago sativa), sainfoin (Onobrychis viciifolia), red clover (Trifolium pratense), or other cool season grasses. In both quantity and quality, rescuegrass is comparable to the major grasses used for cool season pasture, i.e., orchardgrass (Dactylis glomerata), tall fescue (Festuca arundinaceae), Italian ryegrass (Lolium multiflorum), and timothy (Phleum pratense). Dry matter production and crude protein data of these grasses have been compared in many parts of the world in monoculture and in mixtures with lucerne (alfalfa), sainfoin, or other legumes (Baars, 1976, 1980: Baars and Cranston, 1977; Baars et al., 1976; Betin, 1979; Betin and Mansat, 1979a; Betin et al., 1975; Bettinotti, 1980; Bigos et al., 1982a, 1982b; Burkert, 1977; East et al., 1980; Ferret, 1975; Field, 1980; Habib et al., 1978; Harris et al., 1980; Koter and Krawczyk, 1978; Krzywiecki, 1979; Krzywiecki et al., 1984; Malko and Lidtke, 1985; McQueen and Baars, 1980; Pawlus and Gos, 1982; Pronczuk and Pronczuk, 1980; Rys et al., 1977; Salem et al., 1976; Salem and Paetzold, 1977; Shah, 1989; Soares et al., 1978; Stuczynska and Jakubowski, 1977; Talamucci and Casanova, 1980; Watkin, 1975; Zorawska and Polkowski, 1982). The data do not consistently favor any species, but the values for protein content and dry matter production depend largely on location, soil fertility, management, cultivar, and degree of maturity. In a forage trial in southern Louisiana, rescuegrass produced 2,974 lb/A dry matter compared to 3,281 lb/A for 'Kenhy' tall fescue when harvested on May 21. However, for the entire year, fescue production was about double that of rescuegrass because the fescue continued to produce on into the summer (Taylor and Meche, 1982).

Growth and nutritive quality of all of the species depended greatly upon the amount of nitrogen fertilizer used (Frymus, 1981; Hill and Watkin, 1975a; Krzywy and Grzeskowiak, 1984; Nowacki and Weznikas, 1975; Pawlus et al, 1984; Pazzi, 1980; Skrabka et al., 1979a, 1979b; Yungen et al., 1977). When crude protein data from many publications were compared, Miller (1958) reported average crude protein percentages of 16.8, 16.3, 16.3, 13.8 and 11.3 for 'Ky-31' tall fescue, rescuegrass, Italian ryegrass, orchardgrass, and timothy, respectively.

Other chemical analyses showed that rescuegrass as well as annual bluegrass (Poa annua) tended to have relatively high (0.8-1.0%) calcium contents (Falkowski and Kukulka, 1974). In other studies, Gabriels (1972) determined that B. unioloides was one species exhibiting good salt tolerance, and Smith et al. (1978) classified it as a natrophile since it concentrated much more sodium in the leaves than in the roots. However, Stuczynska et al., (1987) determined that in rescuegrass the sodium content did not increase as much with higher concentrations of sodium in the soil as did orchardgrass, tall fescue, or ryegrass which increased most. Others have also found that roots and shoots of rescuegrass concentrate certain elements differently. Stuczynska and Jakubowski (1980) determined that Ca and Na content was higher in roots, but N, P, K, and Mg were more concentrated in above-ground parts. Copper was found to concentrate in the roots which could be analyzed to determine copper toxicity (Kabata-Pendias and Wiacek, 1974). Also, Kabata-Pendias (1972) determined that cobalt and manganese were easily taken up from montmorillitic basaltic soil. While analyzing rescuegrass for lead, Kabata-Pendias and Bolibrzuch (1976) and Kabata-Pendias (1977) determined that Cd and Pb concentrations were 10 to 100 times higher in roots, and that Pb uptake by roots was very rapid.

Metabolically, rescuegrass is photosynthetically a C3 grass (Pheloung and Brady, 1979). Gibberllins increase seed and shoot production (Falkowski et al., 1983a; Nowak et al., 1988), but rescuegrass is not significantly affected by mefluidide or malic hydrazide (Zappala and Maluh, 1983). In herbicide studies, Henderson and Brock (1976) found that ethofumesate was highly toxic to rescuegrass, but ryegrass and tall fescue were unaffected. However, methabenzthiazuron had little affect on rescuegrass and tall fescue but reduced growth of ryegrass. Terbutryne has been shown to give excellent control of chickweed (Stellaria media) in rescuegrass pasture (Patterson, 1973), and fluazifop-butyl was highly toxic to rescue grass while many broad-leaf species exhibited complete tolerance (Stewart et al., 1982).

Rescuegrass appears to inhibit growth of nematodes (Colbran, 1979), but is damaged by grass grubs (Costelytra zealandica) and aphids (Botto et al., 1979; Kain et al., 1979; Quiroz et al., 1986). Inflorescenses are sometimes infected by Claviceps sp. and Ustilago spp., which may be controlled by shaking the seeds with powdered fungicide containing benomyl or thram (Falloon, 1979; Ratera, 1981; Rumball, 1974; Thomas et al., 1981).

Some studies show that rescuegrass affects the growth of other plants, but it is not clear that the inhibition of other plants is due to presence of a toxic substance (Cameron and Mullaly, 1974). A pasture predominantly of ryegrass was replaced by rescuegrass (Facelli et al., 1988). However, studies have shown that wheat production is better following rescuegrass pasture than with continuous cropping (Littler, 1984; Whitehouse and Littler, 1984). Rescuegrass is used for control of barley grass (Hordeum murinum) in New Zealand (Henderson and Grant, 1974; Popay and Sanders, 1976).

An improved cultivar of rescuegrass should be useful for the Coffeeville PMC service area. It was once popular in the southern United States before the development of tall fescue and ryegrass cultivars. Rescuegrass naturally is more hardy in the South and matures later than ryegrass. Rescuegrass is less suitable than the fescue or ryegrass because it is more easily damaged by trampling and is not as tolerant of cold or wet conditions (Alexandre, 1982; Betin, 1979). For breeding purposes, Goldblatt (1981) reports the haploid chromosome number of rescuegrass to be 7 and 21, and Devesa and Romero (1984) found the diploid number to be 42. The grass is essentially self-fertilized since most flowers are cleistogamous (Frankel and Galun, 1977; Tanaka, 1975) The species exhibits considerable variation over its world-wide range although studies in Japan show it to be uniform within limited geographic areas (Betin and Mansat, 1979b; Ohta and Ochi, 1986). Primarily in Europe and New Zealand, several cultivars have been released, some of which are perennial (Gimenez and Rumi, 1987). Seeds do not mature uniformly (Falkowski et al., 1983b), but this problem was solved by using a Bizon seed harvester (Fruzynski, 1983) or by mowing and allowing seeds to mature before thrashing since seed have been shown to mature for 10 days after the plants were cut (Hill and Watkin, 1975a, 1975b).

Because rescuegrass has characteristics that make it a good species for winter cover, the Coffeeville PMC selected it as one which may be used, with selection, for winter cover in cotton fields where erosion may be severe on sloping loessal soils. If it is not possible to identify a cultivar to use in cotton fields, the selection of a better cultivar for winter pasture would still be possible and desirable (Coffeeville PMC, 1983).

Materials and Methods

An assembly of 110 accessions of rescuegrass was made by the PMC in 1988. Of these, 81 were supplied by the Agricultural Research Service (ARS) and 29 obtained through the Soil Conservation Service (SCS). Of the 81 accessions obtained through the ARS West Plant Introduction (PI) Station at Pullman, Washington, all but 2 were of foreign origin as follows: Argentina (10), Australia (9), Belgium (1), Bolivia (1), Brazil (5), Chile (4), England (1), France (1), India (3), Japan (9), Lesotho (2), Morocco (1), New Zealand (2), Norway (1), Pakistan (1), Peru (7), South Africa (10), South America (3 with no county named), Spain (1), and Uruguay (7). Those obtained from the SCS were from Alabama (2), Alaska (1), Louisiana (3), Mississippi (6), New Mexico (2), New York (1 commercial variety), Oklahoma (2), South Carolina (2), and Texas (10).

On September 6, 1989, seeds of each accession were planted in greenhouse flats containing a commercially available medium of ground sphagnum peat with a starter fertilizer amemdment. Several accessions germinated within five days of planting, but most germination occurred during the second week following planting. Of the 110 accessions, germination was poor for 21, and 12 never germinated.

Before the seedlings became overcrowded in the flats, they were transplanted into pots containing sterilized sandy soil from the PMC field on September 28, 1989. Each pot, a two-gallon plastic container, had 25 grams of slow release (3-4 month) 14-14-14 fertilizer mixed into the soil. Five plants were uniformly spaced in each pot. These pots were then placed outside the greenhouse until they were moved to the field in early November 1989. The pots were placed in the field with 1 inch extending above the soil surface.

The planting plan was a randomized complete block design with four replications. Each block was a grid with a 1-foot spacing between pots. Only 77 accessions had enough pots for the four replications, and pots of other accessions were used to fill gaps. Also a border row of pots was placed around the entire block to eliminate any edge effect.

Pots were watered in the fall when they became dry, and holes were punched in some pots to remove standing water during wet weather in the winter. Evaluations were made periodically for survival, vigor, cold damage, and seed production according to procedures in the National Plant Materials Manual (USDA, 1984).

Results and Discussion

Growth of the rescuegrass during the winter of 1989-1990 was fairly slow, probably due to the unusually cold period around December 21 when the temperature plunged to -3° F. Many other species, accustomed to milder conditions, froze during this period. Most rescuegrass accessions suffered foliage burn, but they recovered when temperatures moderated. Winter rains also adversely affected rescuegrass plants in spite of efforts to keep water from standing in the pots.

A very few accessions began putting up seedheads as early as March 20, 1990, but the majority did not flower until early May. Therefore, most did not mature seed until June and consequently would not be useful as an early seed-producing cover crop for no-till cotton.

Evaluation data for all evaluations are given in Table I. Those marked (*) were substitutions for missing plots and were not used for in statistical analysis.

Criteria for selection for additional testing were germination, survival, cold tolerance, vigor, seed production, and early seed maturation.

Conclusions

Four accessions consistently performed better than the others. Two introductions were the best in all respects except they matured seeds a little later than a few others. Two other accessions from SCS field collections were about 2 weeks earlier and still performed well. These four accessions were:

ACCESSION	ORIGIN	SOURCE
250648	Pakistan	West PI Station
442079	Japan	West PI Station
9054984	Stephens Co., OK	Kurt Owens
9054989	Wilson Co., TX	Astor Boozer

These four accessions appear to the best adapted to the Coffeeville PMC service area. They should be increased to obtain more seeds for further comparisons. Some selection and breeding may be used to select an early cultivar for no-till systems. If not, an improved cultivar of rescuegrass may be selected for winter pasture and erosion control.

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TABLE 1. EVALUATIONS FOR RESCUEGRASS (Bromus unioloides) AT COFFEEVILLE PMC

ACCESSION	PLOT	NO SURV	INJ	VIGOR 1	VIGOR 2	FOLIAGE HT	FOLIAGE WD	FOLIAGE ABN	FLOWER STAGE	FLOWER DATE	SEEDHEAD HT	SEEDHEAD ABN	BLOOM DATE	MATURE DATE	GROW FORM
158372	A-41	0	0	*	*	*	*	*	*	*	*	*	*	*	*
158372	B-66	0	0	*	*	*	*	*	*	*	*	*	*	*	*
158372	C-61	0	0	*	*	*	*	*	*	*	*	*	*	*	*
158372	D-09	0	0	*	*	*	*	*	*	*	*	*	*	*	*
168556	A-39	0	0	0	7	7	5	5	1st BT	05/02	*	9	*	06/12	*
168556	B-40	0	0	*	*	*	*	*	*	*	*	*	*	*	*
168556	C-33	0	0	*	*	*	*	*	*	*	*	*	*	*	*
168556	D-43	1	8	8	7	3	7	7	*	*	*	*	*	*	*
168564	A-15	0	0	*	*	*	*	*	*	*	*	*	*	*	*
168564	B-30	2	8	8	5	13	27	6	1st BT	04/09	40	8	*	*	PR
168564	C-70	0	0	*	*	*	*	*	*	*	*	*	*	*	*
168564	D-03	0	0	*	*	*	*	*	*	*	*	*	*	*	*
185500	A-11	1	7	7	5	14	29	5	1st EM	05/02	15	9	*	06/12	PR
185500	B-24	0	0	*	*	*	*	*	*	*	*	*	*	*	*
185500	C-68	0	0	*	*	*	*	*	*	*	*	*	*	*	*
185500	D-15	0	0	*	*	*	*	*	*	*	*	*	*	*	*
187000	A-63	2	8	7	6	11	18	6	*	*	*	*	*	06/12	ER
187000	B-68	5	6	7	4	14	27	4	1st EM	05/02	44	7	*	*	ER
187000	C-14	2	8	7	4	9	14	7	*	*	*	*	*	*	*
187000	D-23	2	8	7	6	5	20	6	*	*	*	*	*	*	*
189612	A-57	0	0	*	*	*	*	*	*	*	*	*	*	*	*
189612	B-04	0	0	*	*	*	*	*	*	*	*	*	*	*	*
189612	C-63	0	0	*	*	*	*	*	*	*	*	*	*	*	*
189612	D-22	0	0	*	*	*	*	*	*	*	*	*	*	*	*
193144	A-06	0	0	*	*	*	*	*	*	*	*	*	*	*	*
193144	B-17	0	0	*	*	*	*	*	*	*	*	*	*	*	*
193144	C-66	0	0	*	*	*	*	*	*	*	*	*	*	*	*
193144	D-32	0	0	*	*	*	*	*	*	*	*	*	*	*	*
195476*	A-87	5	6	6	5	23	32	5	1st EM	05/02	38	6	*	*	SM
195476*	B-88	1	8	8	4	16	20	6	1st BT	04/09	51	8	*	*	DC
195476*	D-87	0	0	*	*	*	*	*	*	*	*	*	*	*	*
197848	A-25	5	7	6	5	12	17	5	FUL EM	05/02	58	6	*	06/12	ER
197848	B-14	1	8	8	6	10	14	6	1st EM	*	50	9	*	*	SM
197848	C-77	0	0	*	*	*	*	*	*	*	*	*	*	*	*
197848	D-10	1	8	6	4	10	20	7	*	*	*	*	*	*	*
197849	A-24	0	0	*	*	*	*	*	*	*	*	*	*	*	*
197849	B-09	0	0	*	*	*	*	*	*	*	*	*	*	*	*
197849	C-06	1	8	7	4	18	17	6	*	*	*	*	*	*	*
197849	D-38	0	0	*	*	*	*	*	*	*	*	*	*	*	*

ACCESSION	PLOT	NO SURV	INJ	VIGOR 1	VIGOR 2	FOLIAGE HT	FOLIAGE WD	FOLIAGE ABN	FLOWER STAGE	FLOWER DATE	SEEDHEAD HT	SEEDHEAD ABN	BLOOM DATE	MATURE DATE	GROW FORM
202359*	A-82	5	3	2	3	22	67	4	1ST BT	04/09	92	3	04/25	05/22	ER
202359*	B-80	5	4	4	3	17	57	3	1st EM	04/09	86	4	05/02	05/22	ER
202359*	D-82	0	0	*	*	*	*	*	*	*	*	*	*	*	*
202360	A-04	0	0	*	*	*	*	*	*	*	*	*	*	*	*
202360	B-19	2	9	8	5	9	8	7	*	*	*	*	*	*	PR
202360	C-72	0	0	*	*	*	*	*	*	*	*	*	*	*	*
202360	D-05	2	8	7	5	13	15	6	*	*	*	*	*	*	*
202360*	C-86	2	8	7	4	10	21	6	*	*	*	*	*	*	*
202693	A-13	0	0	*	*	*	*	*	*	*	*	*	*	*	*
202693	B-46	0	0	*	*	*	*	*	*	*	*	*	*	*	*
202693	C-60	2	8	7	4	14	29	7	*	*	*	*	*	*	*
202693	D-16	0	0	*	*	*	*	*	*	*	*	*	*	*	*
203616	A-55	0	0	*	*	*	*	*	*	*	*	*	*	*	*
203616	B-21	0	0	*	*	*	*	*	*	*	*	*	*	*	*
203616	C-76	0	0	*	*	*	*	*	*	*	*	*	*	*	*
203616	D-77	1	8	8	0	*	*	*	*	*	*	*	*	*	*
204157	A-19	1	7	7	7	13	8	7	*	*	*	*	*	*	SUR
204157	B-72	0	0	0	0	0	0	0	*	*	*	*	*	*	*
204157	C-03	1	8	7	4	10	20	6	*	*	*	*	*	*	*
204157	D-54	4	8	7	4	13	32	5	*	*	*	*	*	*	*
209100	A-51	3	7	5	5	13	20	5	1st BT	04/09	54	6	*	06/12	SUR
209100	B-31	4	8	8	6	12	24	6	1st EM	05/02	35	7	*	*	ER
209100	C-12	4	8	7	8	5	4	8	*	*	*	*	*	*	*
209100	D-27	5	3	3	4	23	32	4	*	*	*	*	*	*	*
209100*	C-79	3	8	7	5	10	14	7	*	*	*	*	*	*	*
209100*	C-80	3	7	7	5	13	21	6	*	*	*	*	*	*	*
217582	A-10	3	7	6	5	11	28	5	1st EM	05/02	26	8	*	06/12	PR
217582	B-12	0	0	*	*	*	*	*	*	*	*	*	*	*	*
217582	C-71	3	8	7	4	17	18	7	*	*	*	*	*	*	*
217582	D-24	1	8	7	5	9	12	6	*	*	*	*	*	*	*
217583	A-16	2	7	7	6	13	25	6	1st BT	04/09	17	7	*	06/12	PR
217583	B-36	0	0	*	*	*	*	*	*	*	*	*	*	*	*
217583	C-47	0	0	*	*	*	*	*	*	*	*	*	*	*	*
217583	D-67	0	0	*	*	*	*	*	*	*	*	*	*	*	*
217593	A-58	1	9	7	0	*	*	*	*	*	*	*	*	*	*
217593	B-73	2	8	8	5	17	19	7	1st EM	05/20	42	8	*	*	ER
217593	C-08	4	8	6	6	10	9	7	*	*	*	*	*	*	*
217593	D-44	0	0	*	*	*	*	*	*	*	*	*	*	*	*
219801	A-36	0	0	*	*	*	*	*	*	*	*	*	*	*	*
219801	B-34	0	0	*	*	*	*	*	*	*	*	*	*	*	*
219801	C-17	0	0	*	*	*	*	*	*	*	*	*	*	*	*
219801	D-36	0	0	*	*	*	*	*	*	*	*	*	*	*	*

TABLE I. EVALUATIONS FOR RESCUEGRASS (Bromus unioloides) AT COFFEEVILLE PMC

ACCESSION	PLOT	NO SURV	INJ	VIGOR 1	VIGOR 2	FOLIAGE HT	FOLIAGE WD	FOLIAGE ABN	FLOWER STAGE	FLOWER DATE	SEEDHEAD HT	SEEDHEAD ABN	BLOOM DATE	MATURE DATE	GROW FORM
219802	A-35	0	0	*	*	*	*	*	*	*	*	*	*	*	*
219802	B-22	0	0	*	*	*	*	*	*	*	*	*	*	*	*
219802	C-56	0	0	*	*	*	*	*	*	*	*	*	*	*	*
219802	D-55	0	0	*	*	*	*	*	*	*	*	*	*	*	*
219802*	C-88	2	8	7	5	7	13	7	*	*	*	*	*	*	*
237793	A-60	5	5	5	4	18	56	4	1st BT	04/09	61	3	*	05/22	SUR
237793	B-48	5	7	5	4	17	59	4	1st BT	04/09	52	5	*	05/22	DC
237793	C-44	8	7	8	3	17	48	3	*	*	*	*	*	*	*
237793	D-50	5	7	7	4	13	38	5	*	*	*	*	*	05/22	*
250648	A-27	5	2	2	3	15	44	2	1st EM	04/09	53	3	*	05/15	SM
250648	B-06	5	2	2	2	17	54	2	1st BT	04/09	65	3	05/02	05/15	*
250648	C-57	5	3	3	3	16	47	3	*	*	*	*	*	05/15	*
250648	D-62	5	2	1	3	17	48	3	*	*	*	*	*	05/22	*
283201	A-70	5	4	3	3	19	46	3	1st BT	04/09	65	4	*	05/22	SM
283201	B-42	5	3	2	3	25	55	3	1st BT	04/09	75	3	*	05/15	SM
283201	C-32	5	4	3	3	26	43	3	*	*	*	*	*	05/22	
283201	D-56	5	4	4	3	23	48	3	*	*	*	*	*		
283202	A-33	5	4	6	4	16	33	4	1st BT	04/09	45	6	*	06/12	PR
283202	B-55	5	7	7	4	15	47	4	1st BT	04/09	39	8	*	*	DC
283202	C-38	5	5	5	4	19	42	4	*	*	*	*	*	*	*
283202	D-58	4	7	7	4	15	37	5	*	*	*	*	*	*	*
283203	A-17	5	3	2	3	25	38	2	1st BT	04/09	85	3	*	05/22	ER
283203	B-53	5	4	3	3	30	44	3	1st BT	04/09	100	3	05/07	*	ER
283203	C-04	5	4	3	2	30	49	3	*	*	*	*	*	05/22	*
283203	D-04	5	4	4	3	25	42	3	*	*	*	*	*	05/22	*
283204*	A-80	5	6	5	4	24	43	5	1st EM	04/09	73	5	*	06/12	SM
283204*	A-86	5	5	5	4	24	39	4	1st EM	05/02	61	5	*	05/22	SM
283204*	B-84	4	6	6	4	23	47	4	Ful EM	05/02	64	4	*	*	ER
283204*	D-80	1	8	8	0	*	*	*	*	*	*	*	*	*	*
283204*	D-86	0	0	*	*	*	*	*	*	*	*	*	*	*	*
283205	A-49	5	6	3	4	19	38	4	Ful EM	05/02	73	3	*	05/15	UR
283205	B-37	5	5	3	2	23	57	2	1st BT	04/09	100	2	05/02	02/22	ER
283205	C-65	5	4	4	2	18	46	2	*	*	*	*	*	05/15	*
283205	D-75	5	3	3	2	23	58	2	*	*	*	*	*	05/22	*
284107*	A-78	5	4	3	4	28	41	4	Ful EM	05/02	60	3	*	06/12	ER
284107*	B-85	5	5	4	3	28	42	3	Ful EM	05/02	84	3	*	05/22	ER
284107*	D-78	0	0	*	*	*	*	*	*	*	*	*	*	*	*
284108*	A-83	4	6	6	4	24	47	5	1st BT	04/09	64	7	*	*	SM
284108*	B-87	5	7	6	4	21	44	5	1st BT	04/09	67	5	*	*	SUR
284108*	D-83	1	8	8	0	*	*	*	*	*	*	*	*	*	*

ACCESSION	PLOT	NO SURV	INJ	VIGOR 1	VIGOR 2	FOLIAGE HT	FOLIAGE WD	FOLIAGE ABN	FLOWER STAGE	FLOWER DATE	SEEDHEAD HT	SEEDHEAD ABN	BLOOM DATE	MATURE DATE	GROW FORM
284109*	A-88	5	4	2	3	30	51	2	1st BT	04/09	84	3	*	05/22	ER
284109*	B-83	5	4	3	4	28	42	4	1st BT	04/09	101	4	04/25	05/22	ER
284109*	D-88	0	0	*	*	*	*	*	*	*	*	*	*	*	*
284110*	A-81	5	5	3	4	26	42	4	1st EM	05/02	85	5	*	06/12	ER
284110*	B-82	5	3	3	3	24	45	3	1st BT	04/09	96	4	*	05/22	ER
284110*	D-81	0	0	*	*	*	*	*	*	*	*	*	*	*	*
284111	A-30	0	0	*	*	*	*	*	*	*	*	*	*	*	*
284111	B-27	0	0	*	*	*	*	*	*	*	*	*	*	*	*
284111	C-40	0	0	*	*	*	*	*	*	*	*	*	*	*	*
284111	D-52	0	0	*	*	*	*	*	*	*	*	*	*	*	*
284788*	A-84	5	5	4	5	25	44	4	1st BT	04/09	64	5	*	*	SM
284788*	B-86	3	8	7	3	22	35	4	1st BT	04/09	46	6	*	*	DC
284788*	D-84	3	8	7	*	*	*	*	*	*	*	*	*	*	*
292258	A-43	5	6	5	4	23	45	4	1st BT	04/09	38	6	*	06/12	SUR
292258	B-52	5	7	6	4	19	46	4	1st BT	04/09	55	6	*	*	SUR
292258	C-55	5	7	6	4	17	38	4	*	*	*	*	*	*	*
292258	D-11	4	8	5	4	14	36	4	*	*	*	*	*	*	*
292258*	C-81	0	0	*	*	*	*	*	*	*	*	*	*	*	*
299500	A-46	1	9	9	0	*	*	*	*	*	*	*	*	*	*
299500	B-18	0	0	*	*	*	*	*	*	*	*	*	*	*	*
299500	C-15	2	8	8	6	5	6	8	*	*	*	*	*	*	*
299500	D-41	3	8	7	6	8	23	5	*	*	*	*	*	*	*
308504*	B-78	5	5	5	5	15	33	5	BOOT	05/02	*	*	*	*	SM
309957*	A-79	5	6	4	5	19	32	5	1st EM	05/02	71	6	*	06/12	SM
309957*	B-81	5	4	4	4	21	39	4	BOOT	04/09	74	4	04/25	05/22	ER
309957*	D-79	0	0	*	*	*	*	*	*	*	*	*	*	*	*
309958*	B-79	5	7	6	5	18	32	5	1st EM	05/02	68	6	*	*	ER
316173	A-56	0	0	*	*	*	*	*	*	*	*	*	*	*	*
316173	B-47	0	0	*	*	*	*	*	*	*	*	*	*	*	*
316173	C-16	0	0	*	*	*	*	*	*	*	*	*	*	*	*
316173	D-60	0	0	*	*	*	*	*	*	*	*	*	*	*	*
316175	A-22	1	7	7	0	*	*	*	*	*	*	*	*	*	*
316175	B-15	1	8	8	0	*	*	*	*	*	*	*	*	*	*
316175	C-34	1	8	8	0	*	*	*	*	*	*	*	*	*	*
316175	D-63	1	8	7	4	11	28	6	*	*	*	*	*	*	*

ACCESSION	PLOT	NO SURV	INJ	VIGOR 1	VIGOR 2	FOLIAGE HT	FOLIAGE WD	FOLIAGE ABN	FLOWER STAGE	FLOWER DATE	SEEDHEAD HT	SEEDHEAD ABN	BLOOM DATE	MATURE DATE	GROW FORM
316177	A-54	4	7	7	7	6	20	7	*	*	*	*	*	06/12	SUR
316177	B-51	5	6	6	6	9	21	6	*	*	*	*	*	*	SUR
316177	C-52	4	8	7	7	4	11	8	*	*	*	*	*	*	*
316177	D-26	2	7	7	5	11	22	5	*	*	*	*	*	*	*
331171	A-32	2	7	7	7	10	6	6	*	*	*	*	*	*	SUR
331171	B-59	0	0	0	0	0	0	0	*	*	*	*	*	*	*
331171	C-05	2	8	7	6	11	14	6	*	*	*	*	*	*	*
331171	D-47	0	0	*	*	*	*	*	*	*	*	*	*	*	*
337517	A-09	3	7	7	7	8	23	7	*	*	*	*	*	06/12	SUR
337517	B-01	4	7	7	6	19	21	6	1st EM	05/20	45	7	*	*	SM
337517	C-59	5	8	7	5	12	20	6	*	*	*	*	*	*	*
337517	D-53	2	8	7	5	11	9	7	*	*	*	*	*	*	*
338633	A-66	0	0	*	*	*	*	*	*	*	*	*	*	*	*
338633	B-71	0	0	*	*	*	*	*	*	*	*	*	*	*	*
338633	C-31	0	0	*	*	*	*	*	*	*	*	*	*	*	*
338633	D-59	0	0	*	*	*	*	*	*	*	*	*	*	*	*
345967*	A-85	5	5	5	5	20	29	5	1st EM	05/02	53	5	*	*	SM
345967*	D-85	0	0	*	*	*	*	*	*	*	*	*	*	*	*
364330	A-74	1	8	8	0	0	0	0	*	*	*	*	*	*	*
364330	B-62	2	7	7	7	10	19	7	*	*	*	*	*	*	*
364330	C-37	1	8	8	0	*	*	*	*	*	*	*	*	*	*
364330	D-33	2	8	7	7	5	17	8	*	*	*	*	*	*	*
377533	A-77	0	0	*	*	*	*	*	*	*	*	*	*	*	*
377533	B-56	0	0	*	*	*	*	*	*	*	*	*	*	*	*
377533	C-21	3	8	7	5	9	13	8	*	*	*	*	*	*	*
377533	D-13	3	8	7	6	13	22	7	*	*	*	*	*	*	*
409137	A-12	0	0	*	*	*	*	*	*	*	*	*	*	*	*
409137	B-43	0	0	*	*	*	*	*	*	*	*	*	*	*	*
409137	C-29	2	8	7	5	15	18	8	*	*	*	*	*	*	*
409137	D-45	2	7	7	5	11	16	7	*	*	*	*	*	*	*
409138	A-72	4	7	7	6	79	19	6	BOOT	*	*	9	*	*	SP
409138	B-07	0	0	*	*	*	*	*	*	*	*	*	*	*	*
409138	C-01	3	8	7	6	6	6	8	*	*	*	*	*	*	*
409138	D-68	2	8	8	8	3	4	8	*	*	*	*	*	*	*
409139	A-40	2	7	7	0	*	*	*	*	*	*	*	*	*	*
409139	B-76	3	8	7	5	12	20	5	*	*	*	*	*	*	ER
409139	C-67	2	8	8	7	6	9	8	*	*	*	*	*	*	*
409139	D-61	1	8	8	0	*	*	*	*	*	*	*	*	*	*

TABLE I. EVALUATIONS FOR RESCUEGRASS (Bromus unioloides) AT COFFEEVILLE PMC

ACCESSION	PLOT	NO SURV	INJ	VIGOR 1	VIGOR 2	FOLIAGE HT	FOLIAGE WD	FOLIAGE ABN	FLOWER STAGE	FLOWER DATE	SEEDHEAD HT	SEEDHEAD ABN	BLOOM DATE	MATURE DATE	GROW FORM
442076	A-48	1	9	9	0	*	*	*	*	*	*	*	*	06/12	SUR
442076	B-49	0	0	0	0	*	*	*	*	*	*	*	*	*	*
442076	C-62	3	8	7	5	9	28	6	*	*	*	*	*	*	*
442076	D-37	0	0	*	*	*	*	*	*	*	*	*	*	*	*
442077	A-44	5	7	7	7	10	17	6	*	*	*	*	*	06/12	SUR
442077	B-03	5	5	4	5	15	41	4	1st EM	05/20	58	6	*	*	SP
442077	C-18	5	5	4	4	13	40	4	*	*	*	*	*	*	*
442077	D-71	5	7	7	5	8	24	5	*	*	*	*	*	*	*
442078	A-61	2	8	7	6	11	27	6	1st BT	05/02	*	*	*	06/12	PR
442078	B-64	0	0	*	*	*	*	*	*	*	*	*	*	*	*
442078	C-64	1	8	8	0	*	*	*	*	*	*	*	*	*	*
442078	D-30	0	0	*	*	*	*	*	*	*	*	*	*	*	*
442079	A-02	5	2	2	2	15	46	3	1st BT	04/09	56	3	05/02	06/12	SUR
442079	B-20	5	3	2	2	29	64	2	1st BT	04/09	104	2	04/25	05/22	ER
442079	C-43	5	2	2	2	23	52	1	*	*	*	*	*	*	*
442079	D-02	5	2	2	2	18	57	2	*	*	*	*	*	*	*
442080	A-47	5	5	3	4	17	45	4	1st EM	05/02	50	6	*	06/12	SUR
442080	B-39	5	5	4	4	18	36	4	1st BT	04/09	59	5	*	*	SM
442080	C-69	5	5	4	3	23	42	3	*	*	*	*	*	*	*
442080	D-66	5	4	4	3	24	46	3	*	*	*	*	*	05/22	*
442081	A-52	5	5	3	4	24	46	4	Ful EM	05/29	61	4	*	*	SUR
442081	B-13	5	7	7	4	20	43	5	1st BT	04/09	40	6	*	*	DC
442081	C-13	5	6	6	4	21	49	4	*	*	*	*	*	*	*
442081	D-49	5	7	7	4	14	46	5	1st BT	03/20	*	*	*	*	*
442082	A-31	5	7	5	5	14	31	5	1st BT	04/09	37	7	*	06/12	PR
442082	B-33	5	7	7	4	17	48	4	1st BT	04/09	25	8	*	*	PR
442082	C-11	5	5	5	4	21	42	4	*	*	*	*	*	*	*
442082	D-74	5	6	6	4	17	34	4	*	*	*	*	*	*	*
442083	A-14	5	7	6	3	15	34	3	1st BT	04/09	41	6	*	06/12	DC
442083	B-67	5	7	7	5	14	35	5	1st EM	05/02	29	8	*	*	PR
442083	C-53	5	6	5	4	21	37	4	*	*	*	*	*	*	*
442083	D-06	5	7	6	4	17	36	4	*	*	*	*	*	*	*
442467	A-18	5	2	2	3	24	29	3	1st BT	04/09	84	3	*	06/12	ER
442467	B-38	5	5	3	3	16	42	3	1st BT	04/09	95	3	05/02	05/22	ER
442467	C-73	5	4	3	3	16	26	3	*	*	*	*	*	*	*
442467	D-17	5	5	5	3	15	45	3	*	*	*	*	*	*	*
477057	A-71	5	4	2	3	19	45	3	1st BT	04/09	66	4	*	05/22	SM
477057	B-60	5	3	3	3	20	54	3	1st BT	04/09	74	3	05/02	05/22	SM
477057	C-50	5	3	3	3	14	47	3	*	*	*	*	*	05/22	*
477057	D-72	5	4	4	3	22	41	4	*	*	*	*	*	05/22	*
477057*	C-87	3	7	7	5	13	22	5	*	*	*	*	*	*	*

ACCESSION	PLOT	NO SURV	INJ	VIGOR 1	VIGOR 2	FOLIAGE HT	FOLIAGE WD	FOLIAGE ABN	FLOWER STAGE	FLOWER DATE	SEEDHEAD HT	SEEDHEAD ABN	BLOOM DATE	MATURE DATE	GROW FORM
478512	A-29	5	6	3	5	13	27	5	1st EM	05/02	26	7	*	06/12	SUR
478512	B-32	5	5	5	5	17	41	4	BOOT	05/02	*	*	*	*	SM
478512	C-10	5	4	4	4	17	36	5	*	*	*	*	*	*	*
478512	D-08	5	5	5	3	20	41	3	*	*	*	*	*	*	*
9054927	A-20	3	7	7	6	6	3	6	1st BT	04/09	30	8	*	06/12	SUR
9054927	B-05	5	7	7	4	15	33	5	1st BT	04/09	31	5	*	*	SM
9054927	C-24	5	7	6	3	21	32	4	*	*	*	*	*	*	*
9054927	D-19	2	7	7	5	13	18	5	*	*	*	*	*	*	*
9054927*	C-78	4	7	7	5	12	26	5	*	*	*	*	*	*	*
9054947	A-45	5	7	6	5	15	34	4	1st EM	04/09	36	5	*	06/12	SUR
9054947	B-50	5	6	5	5	10	36	5	Ful EM	05/02	42	5	*	*	SM
9054947	C-39	5	5	4	4	26	32	4	*	*	*	*	*	05/22	*
9054947	D-20	5	7	6	4	19	22	4	*	*	*	*	*	*	*
9054948	A-01	0	0	*	*	*	*	*	*	*	*	*	*	*	*
9054948	B-23	3	8	8	5	10	19	6	1st EM	04/09	21	6	*	*	DC
9054948	C-35	3	8	8	4	9	15	7	*	*	*	*	*	*	*
9054948	D-14	3	8	7	6	12	15	6	*	*	*	*	*	*	*
9054952	A-69	5	6	5	5	17	31	5	1st EM	04/09	56	4	*	05/22	ER
9054952	B-11	5	7	6	5	18	22	5	1st BT	04/09	31	4	*	*	DC
9054952	C-75	5	5	5	4	13	21	5	*	*	*	*	*	*	*
9054952	D-01	4	8	7	6	7	18	2	*	*	*	*	*	*	*
9054954	A-73	5	7	6	5	15	18	5	1st EM	05/02	50	7	*	06/12	SP
9054954	B-02	5	5	3	4	25	40	4	Ful EM	04/09	65	3	*	05/22	SM
9054954	C-28	5	6	5	4	14	33	4	*	*	*	*	*	*	*
9054954	D-65	5	6	5	4	17	27	4	*	*	*	*	*	*	*
9054956	A-53	3	8	7	7	12	10	8	*	*	*	*	*	06/12	SUR
9054956	B-08	0	0	*	*	*	*	*	*	*	*	*	*	*	*
9054956	C-23	5	4	5	3	27	36	3	*	*	*	*	*	05/22	*
9054956	D-40	3	8	7	6	12	13	6	*	*	*	*	*	*	*
9054959	A-62	5	6	6	6	16	24	6	1st EM	05/02	37	8	*	*	SUR
9054959	B-69	5	4	6	6	9	21	5	Ful EM	05/02	40	6	*	*	ER
9054959	C-41	5	7	6	4	18	29	4	*	*	*	*	*	*	*
9054959	D-70	5	7	7	6	13	21	6	*	*	*	*	*	*	*
9054961	A-34	4	7	7	6	9	26	6	1st EM	05/02	12	8	*	06/24	SUR
9054961	B-45	3	7	3	4	17	30	5	1st BT	04/09	22	6	*	*	DC
9054961	C-45	5	6	6	4	15	35	4	*	*	*	*	*	05/22	*
9054961	D-31	5	6	6	4	16	34	5	*	*	*	*	*	*	*
9054962	A-68	5	7	7	5	8	20	6	1st EM	05/02	14	8	*	06/12	SM
9054962	B-58	4	7	7	5	10	22	6	1st EM	05/02	16	8	*	*	*
9054962	C-30	5	8	7	5	8	27	6	*	*	*	*	*	*	*
9054962	D-69	5	7	6	4	9	34	5	*	*	*	*	*	*	*

ACCESSION	PLOT	NO SURV	INJ	VIGOR 1	VIGOR 2	FOLIAGE HT	FOLIAGE WD	FOLIAGE ABN	FLOWER STAGE	FLOWER DATE	SEEDHEAD HT	SEEDHEAD ABN	BLOOM DATE	MATURE DATE	GROW FORM
9054963	A-38	5	5	4	5	10	27	5	1st EM	05/02	50	8	*	06/12	PR
9054963	B-41	5	5	5	5	12	32	4	1st BT	04/09	51	4	04/25	*	PR
9054963	C-48	5	5	4	5	12	36	5	*	*	*	*	*	*	*
9054963	D-76	4	7	7	6	8	18	7	*	*	*	*	*	*	*
9054964	A-08	5	3	4	5	10	30	5	1st EM	05/02	28	7	*	06/12	DC
9054964	B-29	4	7	7	7	7	27	7	*	*	*	*	*	*	SM
9054964	C-49	2	8	8	0	*	*	*	*	*	*	*	*	*	*
9054964	D-57	1	8	8	7	6	4	8	*	*	*	*	*	*	*
9054969	A-23	5	7	6	5	12	19	5	Ful EM	05/02	35	5	*	06/12	SUR
9054969	B-65	5	5	6	4	17	27	5	1st BT	04/09	41	5	*	*	SM
9054969	C-54	5	5	5	4	17	28	4	*	*	*	*	*	*	*
9054969	D-35	5	5	5	4	17	33	4	*	*	*	*	*	05/22	*
9054971	A-07	5	3	5	6	9	17	7	1st EM	05/02	22	8	*	06/12	SUR
9054971	B-61	5	7	6	6	11	21	6	1st EM	05/02	13	9	*	*	SM
9054971	C-02	5	6	5	6	7	22	6	*	*	*	*	*	*	*
9054971	D-51	5	6	6	5	14	25	6	*	*	*	*	*	*	*
9054974	A-59	2	9	7	5	13	17	6	1st EM	05/02	37	8	*	06/12	SUR
9054974	B-26	2	8	8	6	11	20	7	1st EM	05/02	*	*	*	*	SM
9054974	C-26	4	7	7	5	12	19	5	*	*	*	*	*	*	*
9054974	D-21	4	7	6	5	14	26	5	*	*	*	*	*	*	*
9054975	A-26	5	7	7	5	10	14	5	Ful EM	05/02	30	6	*	06/12	ER
9054975	B-44	5	7	7	6	14	27	6	1st EM	04/09	27	6	*	*	SM
9054975	C-36	4	7	7	5	14	23	5	*	*	*	*	*	*	*
9054975	D-18	5	7	7	5	13	22	5	*	*	*	*	*	*	*
9054976	A-05	5	3	3	3	16	33	3	Ful EM	05/02	72	3	*	06/12	*
9054976	B-10	4	8	8	6	9	20	6	1st EM	05/20	20	8	*	*	DC
9054976	C-07	5	5	4	3	21	38	3	*	*	*	*	*	05/22	*
9054976	D-28	5	7	6	5	9	23	5	*	*	*	*	*	*	*
9054977	A-03	5	3	3	2	14	36	3	1st EM	04/09	54	3	05/08	05/15	SUR
9054977	B-70	5	3	3	3	20	48	3	Ful EM	04/09	64	3	04/25	05/15	ER
9054977	C-51	5	3	3	2	18	57	2	1st EM	03/20	*	*	*	*	*
9054977	D-07	5	4	4	3	27	42	3	*	*	*	*	*	*	*
9054977*	C-83	4	7	6	4	14	32	5	*	*	*	*	*	*	*
9054980	A-64	2	8	7	7	7	9	7	*	*	*	*	*	06/12	ER
9054980	B-28	5	7	7	5	17	27	5	1st BT	04/09	52	6	*	*	SM
9054980	C-74	4	7	7	4	10	20	5	*	*	*	*	*	*	*
9054980	D-34	5	6	5	4	22	42	4	*	*	*	*	*	05/22	*
9054981	A-28	5	5	3	3	18	31	3	1st BT	04/09	92	2	*	05/22	ER
9054981	B-54	5	4	3	3	27	48	3	1st EM	04/09	92	3	05/07	05/22	ER
9054981	C-09	5	3	3	2	28	57	3	*	*	*	*	*	05/22	*
9054981	D-29	5	3	3	2	29	46	2	*	*	*	*	*	05/09	*

ACCESSION	PLOT	NO SURV	INJ	VIGOR 1	VIGOR 2	FOLIAGE HT	FOLIAGE WD	FOLIAGE ABN	FLOWER STAGE	FLOWER DATE	SEEDHEAD HT	SEEDHEAD ABN	BLOOM DATE	MATURE DATE	GROW FORM
9054982	A-75	5	3	3	3	23	43	3	1st BT	04/09	68	4	*	06/12	ER
9054982	B-74	5	4	3	4	25	42	3	Ful EM	05/02	58	5	*	05/22	ER
9054982	C-42	5	3	3	2	23	49	2	*	*	*	*	*	*	*
9054982	D-12	5	4	3	4	27	53	2	*	*	*	*	*	05/22	*
9054983	A-50	5	5	3	3	24	42	3	1st BT	04/09	91	2	*	05/22	SUR
9054983	B-35	3	8	7	6	11	20	6	1st EM	05/02	35	9	*	*	ER
9054983	C-58	5	7	7	4	15	31	5	*	*	*	*	*	*	*
9054983	D-73	5	4	4	3	38	47	3	BOOT	03/20	*	*	*	*	*
9054984	A-65	5	5	4	3	23	45	4	1st EM	04/09	56	4	05/02	05/09	SUR
9054984	B-16	5	2	2	3	30	65	3	1st EM	03/20	54	3	04/15	05/09	SM
9054984	C-20	5	3	3	3	26	53	2	*	*	*	*	*	05/09	*
9054984	D-39	5	3	2	2	27	53	2	1st BT	03/20	*	*	*	05/15	*
9054986	A-42	5	6	7	6	8	22	6	Ful EM	05/02	31	8	*	06/12	ER
9054986	B-25	5	7	7	8	6	20	8	*	*	*	*	*	*	SM
9054986	C-22	5	6	6	7	3	20	8	*	*	*	*	*	*	*
9054986	D-48	3	8	6	5	12	16	6	*	*	*	*	*	*	*
9054989	A-76	5	2	2	2	35	46	2	Ful EM	04/09	64	3	04/25	05/09	SM
9054989	B-77	5	4	3	3	18	42	3	Ful EM	05/02	55	3	*	05/09	ER
9054989	C-19	5	3	3	2	36	47	2	*	*	*	*	*	*	*
9054989	D-25	5	5	4	3	21	38	3	*	*	*	*	*	*	*
9054996	A-37	1	7	4	5	16	28	5	1st BT	04/09	58	6	*	06/12	SP
9054996	B-75	4	8	7	5	12	20	5	BOOT	05/02	*	9	*	*	ER
9054996	C-46	5	6	5	3	19	51	3	*	*	*	*	*	05/22	*
9054996	D-42	5	6	5	4	20	41	4	*	*	*	*	*	05/22	*
9054996*	C-82	2	8	7	5	10	20	6	*	*	*	*	*	*	*
9054996*	C-85	1	8	7	5	11	11	7	*	*	*	*	*	*	*
9054997	A-67	5	5	3	4	21	43	4	1st EM	04/09	63	3	05/10	05/22	SM
9054997	B-63	5	5	5	4	20	43	4	1st EM	04/09	60	4	*	05/22	SM
9054997	C-25	5	4	3	2	27	53	2	*	*	*	*	*	05/22	*
9054997	D-64	5	4	5	3	18	48	3	*	*	*	*	*	05/22	*
9054998	A-21	5	7	5	5	13	27	5	1st EM	04/09	62	4	*	06/12	ER
9054998	B-57	4	7	7	4	17	28	5	1st EM	04/09	62	6	05/07	*	ER
9054998	C-27	5	8	7	5	13	21	5	*	*	*	*	*	*	*
9054998	D-46	5	7	7	4	16	22	5	*	*	*	*	*	*	*
9054998*	C-84	4	8	7	5	9	17	6	*	*	*	*	*	*	*

TABLE I. EVALUATIONS FOR RESCUEGRASS (Bromus unioloides) AT COFFEEVILLE PMC

LEGEND:
* = No evaluation.
NO SUR = Number of plants surviving of 5 planted.
INJ = Cold or water injury.
VIGOR = 1 to 9, 1 best; 0 none or all dead.
1 = 1/31/90.
2 = 3/20/90.
FOLIAGE
HT = Height in inches.
WD = Width or spread in inches.
ABN = Abundance (1 to 9, 1 best).
FLOWER STAGE
BT = Boot.
EM = Emergence.
FUL = Full.
SEEDHEAD
HT = Height in inches.
ABN = Abundance (1 to 9, 1 best).
GROW FORM = Growth form.
DC = Decumbent.
ER = Erect.
PR = Prostrate.
SM = Semierect.
SP = Semi-prostrate.
SUR = Semi-upright.
UR = Upright.