Kentucky Bluegrass (*Poa pratensis* L.) Germplasm for Seed Production without Field Burning

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INTRODUCTION

With the loss of field burning of post-harvest residue in grass seed production in Washington, identifying Kentucky bluegrass germplasm that has sustainable seed yield without field burning while still maintaining acceptable turfgrass quality would be highly desirable for the turfgrass seed industry of Washington.

OBJECTIVE

Identify high yielding turf-type Kentucky bluegrass germplasm that can be grown for several years without open-field burning of post-harvest residue.

MATERIALS & METHODS

This long-term study initially evaluated 228 USDA-ARS Plant Introduction (PI) accessions for turf and agronomic parameters (Fig. 1; Johnston et al., 1997). Eight PIs (plus checks 'Kenblue' and 'Midnight'), identified in follow-up research, expressed high seed yield without burning of post-harvest residue and good turfgrass quality (Fig. 2 and 3; Johnson et al., 2003). Next, in a space-plant nursery, several agronomic yield parameters were evaluated over a 2-year period and individual plants were reselected within each accession, or check, with the highest seed weight, highest seed/panicle, highest panicles/area, highest seed/panicle, and highest seed yield (Fig 4; Johnson et al., 2010). Turfgrass plots (replicated 2.25 sq. m plots) were established in 2006 (Fig. 5) and seed production plots (irrigated and non-irrigated, replicated 3.8 sq. m plots; Fig. 6) were established in 2007 at Pullman, WA and harvested 2008-2011 (Table 1). Seed increase plots (non-replicated 0.06 ha plots; Fig. 7) of the three best performing selections were established in 2011 and harvested 2012-2015 (Table 2).

Table 1. Non-burn Kentucky bluegrass turfgrass quality and seed yield.

Cultivar or PI	Selection parameter	Turfgrass quality* 5-yr mean Pullman	Seed yield (kg/ha) 4-yr mean Non-irrigated	Seed yield (kg/ha) 4-yr mean Irrigated
Midnight	Elite-type check	7.1 a**	152 c	272 d
Kenblue	Common-type check	5.3 c	446 b	681 c
Kenblue	Seed/panicle	5.4 c	890 a	1114 ab
371775	Seed/panicle	6.1 b	452 b	896 bc
368241	Panicles/area	5.1 d	1000 a	1234 a

*Turfgrass quality rated 1 to 9; 9 = excellent.

**Means within columns followed by the same letter are not significantly different. LSD P=0.05.

Table 2. Seed increase plots seed yield, Pullman, WA.

Cultivar or PI	Selection parameter	Seed yield (kg/ha) 2012	2013	2014	2015	Mean
Kenblue	Seed/panicle Non-irrigated	1355	1023	1005	340	931
371775	Seed/panicle Irrigated	819	1025	943	438	806
368241	Seed/area Non-irrigated	1049	776	475	235	634

RESULTS

In small plots under non-irrigated production (Table 1), Kenblue, selection seed/panicle, had good seed yield (890 kg/ha) and fair turfgrass quality (5.4); Kenblue check yielded 446 kg/ha. PI 371775, selection seed/panicle, had good turfgrass quality (6.1) while maintaining good seed yield (896 kg/ha) with irrigation. Despite the poor yields in the Pacific Northwest in 2015 due to poor vernalization and high temperatures (>38°C) during pollination, which resulted in Kentucky bluegrass seed yield reduction of 20-90% (Brede, 2015), in the seed increase plots at Pullman the Kenblue selection seed/panicle had excellent non-irrigated seed yield (931 kg/ha) over four harvests (Table 2). PI371775 produced fairly well (806 kg/ha) with irrigation. PI368241 has shown a steady decline in seed yield over time.

CONCLUSION

A germplasm release of Kenblue, selection seed/panicle, which shows good seed production without irrigation after four harvests without field burning is planned for 2016.

LITERATURE CITED

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Fig. 1 USDA-ARS Kentucky bluegrass collection evaluation.

Fig. 2 Seed plot treatments: burning, baling, and full residue.

Fig. 3 NTEP turfgrass evaluation: turfgrass quality, color, texture, etc.

Fig. 4 Space-plant nursery for individual plant characterization.

Fig. 5 Turfgrass evaluation at Pullman, WA.

Fig. 6 Seed production evaluation at Pullman, WA.

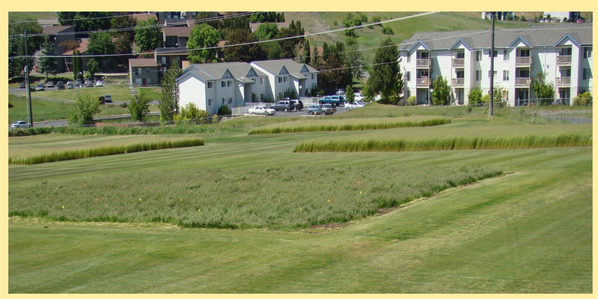

Fig. 7 Seed increase at Pullman, WA, June 2013.