EVALUATING DESICCANTS FOR AFTER-HARVEST BURN-DOWN IN KENTUCKY BLUEGRASS SEED FIELDS

G. Sbatella and S. Twelker

Introduction

Kentucky bluegrass seed fields can remain in a vegetative state when mild, moist conditions follow harvest. The removal of green biomass is then delayed, affecting development of the crop during the next season. Under these conditions, management of the remaining straw is a challenge to grass seed producers. Desiccants are used as harvest aids in many crops and could facilitate foliar burn-down of grass plants when applied after harvest. This approach would particularly benefit central Oregon seed growers, where burning fields within an eighth of a mile of highways is not allowed. However, there can also be benefits for fields that are burned, including more timely management of crop residues, reduced number of fires required after harvest (due to less remaining residue), and reduced propane burning. These factors can help minimize the amount of smoke produced by field burning.

The herbicide paraquat has been used as a desiccant, but increasing restrictions regarding pesticide residues make the labeling of this product very difficult. A new generation of harvest aids is being applied to other crops, but no information regarding their use or impacts in Kentucky bluegrass seed fields is available. The objective of this study was to evaluate the use of herbicides as desiccants for burn-down in Kentucky bluegrass seed fields with inadequate drying following harvest.

Materials and Methods

Two field studies were conducted in October 2013 on an established Kentucky bluegrass field at COARC, Madras, OR. The study design was a randomized complete block with four replications with a plot size of 12 feet x 25 feet. The treatments consisted of glufosinate (Rely 280®), saflufenacil (Sharpen®), diquat (Reglone®), flumioxazin (Valor®), and propane burner as the comparison standard. Some herbicides tested for burn-down are not currently labeled for use in grasses grown for seed; they were selected because they are being used in other crops as harvest aids.

Environmental conditions following desiccant application differed at the two fields. For instance, conditions after the applications in study “A” can be characterized as cloudy with showers (average daily radiation = 316 Langley/day; total rain = 0.1 inch). At the study “B” field, weather was mostly sunny and dry (average daily radiation = 437 Langley/day; total rain = 0).

Herbicides were applied with a backpack sprayer calibrated to deliver 20 gallons of spray solution per acre at 40 psi pressure using XR 8002 Teejet® nozzles. Application dates and environmental conditions for each study are detailed in Table 1. Herbicide rates and adjuvants are detailed in Table 2. Moisture content from plant tissue was estimated by harvesting plant biomass from a six-square-foot area. Fresh and dry weights of plant samples collected 3, 7, and 10 days after treatment (DAT) were recorded.

Results and Discussion

Since the studies were located adjacent to each other, the differences observed in herbicide performance can be attributed largely to differences in environmental conditions following application.

Diquat applied at 2 pt/acre reduced percent moisture in plant tissue regardless of the environmental conditions after spraying, although effects were more rapid with cloudy weather and rain showers. The percent moisture in plant biomass in study “A” was reduced quickly with diquat and was evident 3 DAT (Table 2). The moisture reduction recorded for the application of diquat was comparable to the use of propane burner. Moisture content steadily increased in the following days, reaching 48% for diquat 10 DAT. Nevertheless, this moisture content remained the lowest among the tested desiccants in study “A”.

Table 1. Application date and environmental conditions for herbicide applications.

	Study “A”	Study “ B”
Application date	10/3	10/10
Time of day	11 am	9 am
Air temperature (°F)	46	41
Relative humidity (%)	70	82
Wind speed (mph)	3	3
Wind direction	W	SW
Average daily radiation, 10 DAT[1]	316 L/d	437 L/d
Accumulated rainfall, 10 DAT	0.1 inch	0

[1]DAT = days after treatment

In study “B” (sunnier and drier conditions after application), diquat at 2 pt/acre and glufosinate at 3.5 pt/acre effectively reduced plant moisture similarly to the use of propane burner, but the reduction was only noticeable 10 DAT.

Although some herbicides used as desiccants were effective in reducing the percent moisture in plant tissue, they had no impact on the total biomass produced (Table 3). This fact should be taken into consideration if biomass reduction is a management objective.

In conclusion, some herbicides have the potential for use in burn-down of Kentucky bluegrass grown for seed. Their performance will depend not only on the active ingredient used, but also on environmental conditions following application. Nevertheless, none of these alternatives will have the same impact on plant biomass seen with the use of a propane burner.

Acknowledgments
The authors thank Hoyt Downing and Mitchell Alley for their collaboration on this project.

Table 2. Plant biomass percent moisture for each treatment, 3, 7, and 10 days after treatment.

			Plant biomass % moisture[1,2]					
			Study “A”			Study “B”		
	Treatment[3,4]	Rate	3 DAT	7 DAT	10 DAT	3 DAT	7 DAT	10 DAT
1	Glufosinate Ammonium sulfate	3.5 pt/a	58 a	60 a	57 a	57 ab	77 a	39 b
2	Saflufenacil MSO Ammonium sulfate	4 fl oz/a	58 a	57 a	60 a	58 a	76 a	55 a
3	Diquat NIS	2 pt/a	39 b	40 b	48 b	51 b	80 a	37 b
4	Flumioxazin MSO	3 oz/a	58 a	58 a	60 a	57 ab	74 a	51 a
5	Propane burner	—	31 b	34 b	42 b	34 c	27 b	34 b
	Untreated check	—	59 a	59 a	60 a	55 ab	75 a	51 a
LSD (*P* = 0.05)								

[1]DAT = days after treatment
[2]Means within columns followed by the same letter are not different at $P = 0.05$.
[3]MSO = methylated seed oil; NIS = nonionic surfactant
[4]Some treatments included in the study were used for experimental purposes and are NOT currently labeled for public use. Before using an herbicide, make certain it is properly labeled for the intended use.

Table 3. Average dry biomass 10 days after treatment.

Treatment[2,3]		Rate	---- Dry biomass[1] ----	
			Study "A"	Study "B"
			--------- (lb/a) ----------	
1	Glufosinate Ammonium sulfate	3.5 pt/a	609 a	449 a
2	Saflufenacil MSO Ammonium sulfate	4 fl oz/a	641 a	513 a
3	Diquat NIS	2 pt/a	545 a	481 a
4	Flumioxazin MSO	3 oz/a	641 a	609 a
5	Propane burner	—	192 b	64 b
	Untreated check	—	577 a	513 a
LSD (*P* = 0.05)			224	—

[1]Means within columns followed by the same letter are not different at *P* = 0.05.
[2]MSO = methylated seed oil; NIS = nonionic surfactant
[3]Some treatments included in the study were used for experimental purposes and are NOT currently labeled for public use. Before using an herbicide, make certain it is properly labeled for the intended use.