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GRASS CONTROL IN CORN WITH ACCENT AND BEACON

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The traditional method for grass control in corn is based on using herbicides applied to soil and incorporated before planting or to the soil surface after planting. This approach has been successful in controlling crabgrass, fall panicum and foxtails, but johnsongrass and shattercane control was sometimes inadequate.

Some of the problems with the soil-applied herbicides used for controlling johnsongrass and shattercane have been attributed to 1) poor application and incorporation, 2) poor mid- to late-season control if these herbicides were applied early in the spring or 3) poor control when used in the same field in consecutive seasons. Farmers have had to rely heavily on tillage in conjunction with preplant incorporated herbicides for controlling johnsongrass and shattercane, and therefore, are limited in their ability to control these problem grasses in conservation tillage systems.

Accent and Beacon were recently marketed for use in field corn. These herbicides are applied postemergence over-the-top or directed onto weeds following weed and crop emergence. Both products were registered for use in Kentucky during 1990. They are effective for controlling johnsongrass, shattercane, other grasses, and some broadleaf weeds.

Accent 75DF was developed and is manufactured by E.I. DuPont company. The active ingredient in Accent is nicosulfuron and is formulated as a water dispersible granule (75% active ingredient by weight). Accent 75DF is labeled for use at 2/3 oz/A as a single application. The total amount per growing season should not exceed 1 1/3 oz/A with two applications. Accent should be applied as a broadcast treatment on corn up to 24 inches tall or directed when corn plants are 24 to 36 inches in height. Optimum size for seedling johnsongrass and shattercane control is when the plants are 4 to 12 inches in height. Johnsongrass arising from rhizomes should be 8 to 18 inches tall when treated with Accent. For control of other weeds, Accent should be applied when the weeds are less than 4 inches tall.

Beacon 75DF was developed and is manufactured by Ciba-Geigy Corporation. The active ingredient in Beacon is primisulfuron and is formulated as a water dispersible granule (75% active ingredient by weight). The labeled rate for Beacon 75DF is 3/4 oz/A which can be applied either as a single treatment or as sequential applications consisting of 0.38 oz/A each. Beacon can be broadcast over-the-top of field corn that is 4 to 20 inches tall. When a second application is made, it should be directed between the corn rows before tassel emergence. Optimum size shattercane and johnsongrass arising from seed for a Beacon application is 4 to 12 inches in height. Johnsongrass arising from rhizomes should be 8 to 16 inches tall. Other weeds should be less than 4 inches in height at time of application.

A crop oil concentrate or a nonionic surfactant must be used when applying either Accent or Beacon. Both herbicides have the potential to cause crop injury. Factors which can contribute to crop injury include misapplication, unfavorable weather conditions slowing crop growth, applications following use of some organophosphate insecticides (such as Counter 15G), and tank mixtures with other pesticides. These and other precautions, such as rotational crop limitations, are discussed on the Accent and Beacon labels.

Methods and Materials

Data reported in the following tables were collected on Kentucky Agricultural Experiment Stations near Lexington and Princeton or on farms in Caldwell, Graves, Hardin, Hopkins, Montgomery, Russell, Simpson, Todd and Union counties from 1988-89. The data were obtained from naturally occurring weed infestations.

Each treatment was replicated three or four times depending on location. Plot sizes varied from 6 ft by 30 ft to 12 ft by 50 ft. All treatments were applied in water at 25 gallons per acre at a pressure of 30 psi and were broadcast over-the-top of corn.

Accent was applied at 0.67 oz/acre as a single treatment or in two sequential treatments of 0.33 oz/acre. Beacon was applied at 0.75 oz/acre as a single treatment or in two sequential treatments of 0.38 oz/acre. The sequential treatments were made to weed regrowth, usually 2 to 3 weeks after the first application. All treatments of Accent or Beacon contained either a non-ionic surfactant at 0.25 % (v/v) or a crop oil concentrate at 1 qt/acre.

The weed size at application varied because of the growth habits of each weed species. Most of the treatments were made to corn that was 6 to 12 inches in height. However, some treatments were made to corn up to 36 inches in height.

Weed control and crop injury ratings were based on a 0 to 100 scale with 0 being no control or no crop injury and 100 being 100% control or crop death.

Results and Discussion

Johnsongrass

The first evaluation of johnsongrass control in corn with Accent or Beacon was

in 1988. A limited supply of either herbicide was available and only a few experiments were conducted. Johnsongrass control in 1988 was poor compared to 1989 and 1990 (Table 1). This poor control was attributed to the extremely dry weather causing severe drought stress that occurred after Accent or Beacon application.

Johnsongrass control with Accent in 1989 was 88% or greater at all locations and there was no difference in control between a single or sequential Accent treatment (Table 1).

A single treatment of Accent provided greater control than a single Beacon treatment at Lexington, Caldwell county and Russell county in 1989. No difference in control was noted in 1989 at Princeton or Montgomery county (Table 1). Sequential treatments of Accent or Beacon provided equally good johnsongrass control in 1989 except for the Caldwell county site.

Control in 1990 was similar to that observed in 1989 (Table 1). A single application of Accent resulted in greater johnsongrass control compared to a single Beacon application at three of the five locations. The other locations provided similar control. No difference in johnsongrass control was found between sequential applications of Accent or Beacon.

Johnsongrass can be controlled in corn with Accent or Beacon. Accent provided greater control in the dry year of 1988; however, the greatest control obtained in 1988 was only 58%.

The Accent and Beacon labels refer to a range (4 to 12 inches) of johnsongrass sizes that will be controlled. From a practical weed control standpoint, we would suggest making the first Accent or Beacon application when the first johnsongrass plants that emerged reach 12 inches. The reason for waiting is that johnsongrass seeds do not germinate at the same time, and by allowing the first emerging plants to approach the 12 inch size, many other johnsongrass plants will have emerged and can be controlled with the herbicide. It has been our experience that Accent and Beacon applications to 4 to 6 inch johnsongrass will control those emerged plants, but other johnsongrass plants will emerge and will necessitate another treatment.

Shattercane

Shattercane control with Accent or Beacon was greater than 87% at all locations and years (Table 2). Shattercane less than 12 inches in height were controlled easily.

Giant foxtail

Giant foxtail control was variable in 1990 (Table 3). Similar results were obtained in 1989 (data not shown). This variable control was attributed to difference in giant foxtail size at the time of application. Accent, as a single or sequential treatment, resulted in greater control than a single Beacon treatment at Lexington. Only slight differences were noted at the Daviess county site. Sequential treatments of either Accent or Beacon provided more control than a single application in Shelby and Union county. The single treatments of

Accent and Beacon were made to 8 to 12 inch foxtail at these two locations and this large size resulted in less control.

Fall panicum

Accent provided greater fall panicum control than did Beacon (Table 3). With both herbicides, the sequential treatments resulted in greater control.

Other grasses

Accent and Beacon can provide control of other grasses. Limited data (not shown) indicate good control of broadleaf signalgrass with Accent. Large crabgrass plants less than 2 inches tall were controlled by Accent and Beacon. Control was much less when the large crabgrass was taller (data not shown).

Corn injury

Corn injury four weeks after treatment was 10% or less at all locations and years except at sites in Caldwell, Daviess, Graves and Union counties in 1990 (Table 4). Greatest injury at these sites occurred with the single treatment of Accent or Beacon. This greater amount of injury was attributed to the broadcast application to corn that was about 36 inches in height. The current labels restrict broadcast application corn less than 24 inches tall for Accent and 4 to 20 inch corn for Beacon. Directed treatments of Accent or Beacon can be made to larger corn and should be safer to the corn (see discussion on pages 1 and 2).

At those sites which had 10% injury or less, the corn recovered and injury symptoms were not noted eight weeks after treatment. Those treatments with 28% injury or greater did not recover fully and stunting was noted throughout the growing season.

Summary

Accent or Beacon can provide control of johnsongrass, shattercane, giant foxtail, fall panicum, broadleaf signalgrass and large crabgrass. Shattercane and johnsongrass are the most susceptible to these herbicides. As a result, the control of the other species is more dependent on factors such as weed size and environmental conditions. It is essential that Accent and Beacon be applied at the proper rate with an adjuvant to the correct weed size to achieve acceptable control.

Growers may find it difficult to control several weeds with Accent or Beacon due to uneven emergence from the soil. For example, at the time johnsongrass is the optimum size to treat, giant foxtail may be too tall to achieve acceptable control.

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Table 1. Johnsongrass control in corn with Accent or Beacon at various locations in Kentucky in 1988, 1989, 1990.[a]

Herbicide	OZ/A	1988	1989					1990				
		Princeton	Lexington	Princeton	Caldwell	Montgomery	Russell	Princeton	Caldwell	Graves	Simpson	Todd
		(% Control)										
Accent	0.67	30	88	90	95	90	90	80	88	85	90	100
Accent + Accent	0.33 0.33	58	90	93	95	100	93	90	98	100	88	100
Beacon	0.75	10	73	90	77	90	70	67	70	78	70	63
Beacon + Beacon	0.38 0.38	23	85	85	85	83	83	83	100	90	75	95
LSD (.05)		12	14	10	7	NS	10	13	10	8	14	10

[a] Data in each column separated by values less than the LSD are not significantly different.

Table 2. Shattercane control in corn with Accent or Beacon at various locations in Kentucky in 1988, 1989 or 1990.[a]

Herbicide	OZ/A	Lexington 1988	Lexington 1989	Union 1989	Lexington 1990	Hopkins Co. 1990	Shelby Co. 1990
		% Control					
Accent	0.67	92	95	92	95	98	98
Accent + Accent	0.33 0.33	-	90	-	98	100	95
Beacon	0.75	88	98	90	100	100	100
Beacon + Beacon	0.38 0.38	-	95	-	100	98	100
LSD (.05)		NS	NS	NS	NS	NS	NS

[a] Means within each column were not significantly different according to the LSD test.

Table 3. Giant foxtail and fall panicum control in corn with Accent or Beacon at various locations in Kentucky in 1990.[a]

Herbicide	OZ/a	Giant Foxtail Lexington	Giant Foxtail Davies Co.	Giant Foxtail Shelby Co.	Giant Foxtail Union Co.	Fall Panicum Hopkins Co.
		% Control				
Accent	0.67	83	85	78	30	80
Accent + Accent	0.33 0.33	88	83	95	65	100
Beacon	0.75	55	90	50	28	63
Beacon + Beacon	0.38 0.38	-	85	72	73	80
LSD (.05)		10	5	21	4	10

[a] Data in each column separated by values less than the LSD are not significantly different.

Table 4. Corn injury from Accent or Beacon at various locations in Kentucky in 1988, 1989 or 1990. Injury ratings were taken 4 weeks after treatment.[a]

		1988	1989				1990							
Herbicide	OZ/A	Princeton	Lexington	Princeton	Montgomery	Russell	Princeton	Caldwell[b]	Daviess	Graves[b]	Hopkins	Simpson	Todd	Union[b]
		(% Injury)												
Accent	0.67	3	3	3	10	0	0	38	0	13	0	0	0	0
Accent + Accent	0.33 0.33	3	3	7	3	0	0	13	5	0	0	3	0	0
Beacon	0.75	3	5	10	3	10	0	40	50	38	0	10	0	90
Beacon + Beacon	0.38 0.38	8	0	0	3	10	0	28	15	3	0	5	0	10
LSD (.05)		NS	NS	9	NS	NS	NS	13	9	11	NS	NS	NS	5

[a] Data in each column separated by values less than the LSD are not significantly different.

[b] Herbicides were applied to corn that was about 36 inches in height. This late application was made because of the late emergence of weeds in the plots.