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## REDUCED SCEPTER RATES FOR BROADLEAF WEED CONTROL IN SOYBEAN

D.S. Jones, H. Lin, M.V. Kane, and L.J. Grabau

Public agencies are placing greater scrutiny on herbicide applications by farmers. For example, the corn herbicide atrazine is now classified as a restricted use pesticide, with limits placed on allowable rates. While soybean growers may share some of this concern for the environment, rate reduction is more likely to be attractive for economic reasons. Some growers are already cutting back on herbicide rates. For example, Missouri data shows that the average application rates for soybean herbicides were only 75% of the labelled rate. While reduced rates might save growers money, and may be kinder to the environment, there is a concern that poorer weed control could show up under unfavorable conditions.

The herbicide Scepter, marketed by American Cyanamid, is a popular choice for control of many broadleaf weeds in soybean. It can be applied preplant incorporated, preemergence, or postemergence. Scepter's potential for surface or groundwater contamination appears to be relatively small. Although Missouri researchers found reduced postemergence Scepter rates to provide acceptable weed control, they cautioned that more timely herbicide application would be critical for success. Likewise, Mississippi data showed that postemergence Scepter rates could be cut to 20% of the label rate for two-leaf common cocklebur, but that 50% of the label rate was necessary for six-leaf common cocklebur or if the weeds were under water stress at the time of application. The weed species which are present also determine

whether Scepter rates can be reduced. For example, velvetleaf control with reduced postemergence Scepter rates has been less consistently successful than has common cocklebur control with reduced rates. Other factors likely to allow adequate weed control with reduced Scepter rates include narrow row spacing, cool temperatures on days before and after application, adequate soil moisture, and incorporation.

The objective of this study was to determine if Scepter rates could be reduced without sacrificing acceptable weed control or reducing soybean yield. Further, we wanted to see if weed and soybean response to lowered rates was consistent across a range of Kentucky trials using a preplant incorporated application strategy.

### Materials and Methods

This research included six trials over a three year period (1989-91). In each year, one trial was conducted in western Kentucky. Soils, dominant broadleaf weeds, planting dates, growing season rainfall, and trial average yields are shown in Table 1. Weed pressure was heavy in all three Fayette County trials, as well as in Hardin County, but was light in both Simpson and Hopkins Counties. As would be expected, average yields were highest in the trials with low weed pressure. Rainfall was below normal for the Hardin trial and for the 1991 Fayette trial, and above normal for the Simpson study. Rainfall for the other three studies was close to the long-term norms.

Scepter was preplant incorporated at 0, 0.22, 0.44, or 0.67 pints/A; these rates are shown as none, one-third, two-thirds, and full labelled rates on Tables 2 and 3. Lasso was applied preplant incorporated at 2.5 qt/A to control grasses. This herbicide also provides some broadleaf weed suppression. Escaping grasses were eliminated with Fusilade; perennial broadleaves (mostly field bindweed in Hardin and Fayette Counties) were hand-wicked with Roundup. Repeated applications of Gramoxone were required to burn down ivyleaf morningglory before harvest in Fayette County 1991. Broadleaf weed weights were recorded from an 8 ft.<sup>2</sup> area as soybeans matured. Harvest was with a small plot combine, and yields are presented on a 13% moisture basis. Broadleaf weed weights were subjected to a square root transformation prior to statistical analysis.

### Results and Discussion

#### Broadleaf weed weights:

Trials which had substantial amounts of early season broadleaf weeds (data not shown) had dramatic increases in weed weight by the end of the growing season (Table 2). For the two studies with light weed pressure (Simpson and Hopkins), increasing Scepter rates had only a trivial impact on broadleaf weed weight. Both the 1989 and 1990 Fayette County trials showed a sharp drop in broadleaf weed weights when the one-third Scepter rate was applied. Those studies had only slightly better weed control as Scepter rates were increased. The dominant weeds in these tests have been previously shown to be quite susceptible to Scepter; that trend was repeated in our studies. Wet, compacted soil conditions at planting and a 2,4-D application to a neighboring field 4 weeks after emergence slowed down early season growth in Hardin County, giving broadleaf weeds a better opportunity to compete. As a result, the one-third Scepter rate still resulted in relatively high broadleaf weed weights. It took the two-thirds rate to bring weed weights down to as low a level as the full rate. In Fayette 1991, each added increment of Scepter reduced broadleaf weed weights.

Since ivyleaf morningglory and velvetleaf are not particularly susceptible to this herbicide, it is not surprising that we could not reduce Scepter rates in that study. In fact, weed control in that case should probably have been done using a different herbicide.

#### Soybean yield:

With the very low broadleaf weed pressure in Simpson County, there was no need for broadleaf weed control (Table 3). Hopkins 1991, which had slightly more broadleaves than Simpson 1989, showed a small yield response to increasing Scepter rates. Although the ragweeds present there were few in number, these species are highly competitive with soybean. Fayette 1989 and Fayette 1990, which shared the same dominant weeds, had similar yield responses to Scepter rates. The main difference between these two studies is that weed pressure without Scepter was much higher in 1990 (Table 2), resulting in lower yields for the no-Scepter control in 1990 (Table 3). For Hardin County, soybean yield increased as Scepter was increased to the two-thirds rate. Yields for Fayette 1991 increased with each added Scepter dose, and closely mirrored the weed control results. In fact, rates exceeding the label may have improved both weed control and yield in that study. However, in a grower's situation, it would be much better to find a different chemical to control velvetleaf and ivyleaf morningglory.

### Conclusions

Of the six Kentucky tests conducted on reduced rates of preplant incorporated Scepter, five showed that adequate weed control and the maximum attainable soybean yields could be reached with rates below the label specifications. The only test which required full Scepter rates was Fayette 1991, which had weed species poorly controlled by this herbicide. Producers who have detailed knowledge of the broadleaf weed species present in their fields could potentially use that knowledge to select herbicides likely to control their broadleaves at sub-label rates. In our studies, reduced preplant incorporated Scepter rates provided good control of susceptible broadleaves like

common lambsquarter and Pennsylvania smartweed, even when the weed pressure was quite high (Fayette 1989 and 1990).

Kenneth L. Wells  
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Table 1. Characteristics of six Kentucky trials<sup>†</sup> measuring weed and soybean response to reduced Scepter rates.

Trial	Soil <sup>‡</sup>	Dominant broadleaf weeds	Planting date	Growing season rainfall <sup>§</sup>	Trial Average Yield (bu/A)
Fayette 1989	Maury silt loam	common lambsquarter Pennsylvania smartweed	April 26	23.5	36
Simpson 1989	Mountview silt loam	horsenettle redroot pigweed	May 2	27.5	42
Fayette 1990	Maury silt loam	common lambsquarter Pennsylvania smartweed	April 23	24.3	32
Hardin 1990	Crider silt loam	Pennsylvania smartweed redroot pigweed	May 9	17.7	23
Fayette 1991	Maury silt loam	ivy leaf morningglory velvetleaf common lambsquarter Pennsylvania smartweed	May 1	16.2	18
Hopkins 1991	Karnak silty clay	giant ragweed common ragweed	May 8	21.5	48

<sup>†</sup> Cooperating producers for western Kentucky trials were as follows: Mike Stratton (Simpson), Bob Wade, Jr. (Hardin), and Steve Stanley (Hopkins).

<sup>‡</sup> The silt loam soils were all well-drained. The Karnak silty clay was poorly drained, but the field had a functioning tile drain system.

<sup>§</sup> Rainfall measured at the nearest reporting station from April 15 through September 30. Thirty year norms were 22.7 inches for Fayette trials, 22.2 inches for Simpson County, 22.8 inches for Hardin County, and 21.3 inches for Hopkins County.

Table 2. Influence of Scepter rates on broadleaf weed weight measured at soybean maturity in six Kentucky trials.

Trial	Scepter rate			
	None	One-third	Two-thirds	Full
-----broadleaf weed dry weight in lbs/A-----				
Fayette 1989	1680a <sup>†</sup>	380b	230bc	60c
Simpson 1989	100a	40a	40a	30a
Fayette 1990	3840a	230b	160bc	50c
Hardin 1990	2680a	990b	540c	290c
Fayette 1991	3390a	2190b	1500c	530d
Hopkins 1991	270a	90ab	50b	60b

<sup>†</sup> within a trial, values followed by the same letter are not significantly different.

