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Scepter, Canopy, Gemini, Classic, and Command are new soybean herbicides which were introduced in 1986 and are being used in Kentucky. These herbicides have gained widespread popularity because of their excellent control of cocklebur, pigweeds, morninglories, and velvetleaf. In addition, they can be applied in a variety of ways which makes them attractive to the soybean producer. However, these herbicides do have potential shortcomings in that they can persist in the soil for several months and cause injury to rotational crops such as corn or wheat. Since greater than 60% of the soybeans grown in Kentucky are rotated to corn, it is important to know the persistence potential of these newer soybean herbicides. Chlorimuron is one of the active inredients in Canopy, Preview, Gemini, Lorox Plus, and Classic. We have conducted research with chlorimuron at rates comparable to those recommended for Canopy and Gemini. Research on the persistence of Scepter, Command, and Canopy was started in 1985. After having been applied to the soil and soybeans grown, corn was planted the following year, and the degree of corn injury monitored. The persistence of Scepter and Command was determined in three tillage systems: conventional moldboard plowing and disking; full-season no-tillage in which a wheat cover crop was killed with Gramoxone Super 10 days prior to planting; double-crop no-tillage in which soybeans were planted after wheat harvest. Canopy persistence was determined in conventionally tilled soils that had a pH of 5.3, 6.3, or 7.3. All herbicides were applied at their labeled rate and at 1.5 and 2 times the labeled rate.

Research Results

Command did not persist to cause corn injury 11 months after application in any tillage system at the recommended rate in any year evaluated. Corn injury has been observed at higher than labeled rates. Based on our results, we would not expect to see corn injury with Command at the recommended rate. However, in areas such as field margins where multiple overlaps can occur during application, corn injury could occur.

Scepter applied to conventionally tilled soil 11 months before corn planting injured corn in 1986 and 1987. Visual injury symptoms were usually

stunted corn plants that had underdeveloped root systems. Occasionally, the corn plants would have interveinal chlorosis. Even though corn was injured at the recommended rate, the injury was more severe at 1.5 and 2 times the recommended Scepter rate. Corn injury has ranged from 5 to 50%, depending on the year and rate of application. There was less injury to corn growth in both no-tillage systems, generally being 10% or less in these tillage systems. However, at the recommended Scepter rate of 2/3 pt/A on soybeans, the subsequent corn injury observed did not result in corn yield reductions. At rates greater than the 2/3 pt/A, corn yield was reduced in 1986 but not in 1987.

The recommended rate of Canopy, applied to soybeans 11 months before corn planting, did not cause injury to corn at soil pH 5.3 or 6.3 but did at a pH of 7.3. Corn was stunted about 30% at pH 7.3 and resulted in about 30% yield loss. This effect of soil pH on carryover of Canopy demonstrates the importance for corn and soybean growers to be aware of the pH in their fields. Corn should not be planted in Canopy treated fields if the pH is above 6.8.

In an attempt to predict the persistence or "carry-over" of these herbicides, we conducted various experiments to determine the rate at which these herbicides dissipate in the soil. In a conventionally tilled soil, with a pH of about 6.3, the number of days for one-half of the herbicide to degrade was: Command 26; Scepter 47; Canopy 18. These "half-life" values indicate the relative persistence of the herbicides. The larger the number, the more likely the herbicide will persist in the soil. In a full-season no-tillage system the half-life of Command was 11 days while Scepter was 28 days. A no-till double-cropped system resulted in a Command half-life of 10 days and a Scepter half-life of 43 days. Although half-lives of herbicides in soil indicate relative persistence, they cannot be used to predict injury to rotational crops. The sensitivity of the rotational crop must be considered. Corn is extremely sensitive to small concentrations of Scepter and Canopy. As little as 1 to 5 parts per billion of these herbicides can inhibit corn root growth. The dissipation pattern of Scepter and Canopy is similar to atrazine. However, the rotational crop (corn) is much more sensitive to Scepter or Canopy than soybean is to atrazine. This degree of sensitivity is the cause of much of the concern about using Scepter or Canopy in a soybean-corn rotation.

Diagnosing Rotational Crop Injury From These Herbicides

Corn injured from previous year applications of Scepter or Canopy will usually be stunted. The appearance of interveinal chlorosis (yellowing) may occur and the root system may be poorly developed. Any of these symptoms usually occur before the corn is knee-high. Corn or wheat injured from Command will be white in color shortly after emergence.

Preventing Carry-Over Problems

Use only the amount recommended on the herbicide label or in UK Publication AGR-6, Chemical Control of Weeds in Kentucky Farm Crops. A properly calibrated sprayer should be used and avoid overlapping, especially at field margins. When using Canopy be sure to know the pH of your soil and do not use if your soil pH is above 6.8.

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