EVALUATION OF S-METOLACHLOR AND MESOTRIONE IN SWEET SORGHUM. Joseph G. Masabni and William K. Vencill, Assistant Professor, Department of Horticulture, University of Kentucky, Princeton, KY 42445 and Associate Professor, Department of Crop and Soil Sciences, University of Georgia, Athens, GA 30602.

Introduction

Sweet sorghum is an important crop for Amish and Mennonite growers in Kentucky who rely on sweet sorghum syrup (popularly known as sorghum molasses) to attract tourists who enjoy watching cooking and bottling of the syrup. Very few herbicides are currently labeled for use in sweet sorghum due to the reluctance of pesticide companies to register chemicals. Syngenta Company is interested in this crop and continues to evaluate various herbicides and their combinations for their safety and efficacy.

A cooperative study with Syngenta was initiated to evaluate mesotrione herbicide applied alone or tank-mixed with s-metolachlor at various rates applied at 2 timings. Two similar studies were also established in Athens and Blairsville, GA with similar protocols and treatment lists. S-metolachlor and mesotrione and currently labeled for a variety of vegetable crops and have proven to be safe and effective in many crops.

Materials and Methods

In Kentucky, herbicides were applied using a CO_2-pressurized backpack sprayer with a four 11002-nozzle boom calibrated to spray a 1.8 m band at 30 psi and 5.1 kph. The nozzles were set at 20.3 cm above ground to obtain good spray overlap and complete spray coverage. Plots were 1.8 m x 7.6 m long. The experimental design consisted of a randomized complete block with 3 replications with 1 row of 'Dale' and 1 row of 'M81-E' in each treatment.

The experimental design specified applying the same set of herbicide treatments at 2 dates. The first set of treatments or the preplant (Pre-Plant) treatments (trts. 1 to 8) were applied on 14 June 2007. The second set of treatments or the preemergence treatments (PRE) (trts 9-15) were applied 15 days later on 29 June 2007. All treatments were applied early in the morning when the wind was calm, and soil and air temperatures were 18.3-21.1C and 29.4-30.5C, respectively. Concep III-treated sweet sorghum cultivars, 'Dale' and 'M81-E', were seeded immediately after PRE herbicide application. Each plot consisted of 1 row of each sweet sorghum cultivar with rows 0.76 m apart and seed spacing of 10 cm within rows. At harvest, plants were cut at ground level and whole plant fresh weight was measured for each cultivar separately.

In Georgia, the experiment was replicated at two locations, Blairsville and Athens. Herbicides were applied using a CO_2-pressurized backpack sprayer with one 11003-nozzle boom calibrated to spray a 1.8 m band at 30 psi and 5.1 kph. The nozzles were set at 36 cm above ground to obtain good spray overlap and complete spray coverage. Plots were 3 m x 7.6 m long. The experimental design consisted of a randomized complete block with 4 replications.

The experimental design specified applying the same set of herbicide treatments at 2 dates. The first set of treatments or the preplant (Pre-Plant) treatments (trts. 1 to 8) were applied on 16 May 2007 at Blairsville's site and on 2 May 2007 at Athens' site. The second set of treatments or the preemergence treatments (PRE) (trts 9-15) were applied on 30 May 2007 at Blairsville's site and on 15 May 2007 at Athens' site. Concep III-treated sweet sorghum cultivar 'M81-E' was the only cultivar used in GA.

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Results and Discussion

In Kentucky, at 22 days after Pre-Plant, sweet sorghum was 3.8 to 5 cm tall. At this date, visual injury ratings were taken for both cultivars combined (data not presented). No stunting was observed in any treatment at 22 days after Pre-Plant. The highest bleaching counts were found with mesotrione 0.42 kg ai/ha applied PRE alone (treatment 11) or tank-mixed with s-metolachlor at 1.39 kg ai/ha. Bleaching ranged from 15-22%. No significant bleaching levels were observed with the lowest rate of mesotrione tank-mixed with s-metolachlor (treatment 12). In general, more bleaching instances were observed in the PRE treatments than with the Pre-Plant treatments.

In the s-metolachlor and mesotrione tank-mix treatments, honeyvine milkweed was also bleached with yellowing of the growing point and weak growth. At 15 days after PRE, very few plants showed bleaching or stunting injury (data not presented). It appears that sweet sorghum has totally recovered from any initial injury whether treatments were applied Pre-Plant or PRE. At 29 days after PRE, sweet sorghum cultivars were at the 3 to 4 leaf stage and 25.4-35.6 cm tall. No bleaching or stunting was evident in any plot at this date either (data not presented).

Table 1 lists the plant fresh weight (kg/plot) at harvest. None of the herbicide treatments applied on either date resulted in significant yield reduction compared to the handweeded control. In addition, yields of the 2 cultivars were similar and ranged from 48 to 65 kg/plot for 'Dale' and 45 to 65 kg/plot for 'M81-E'.

This study indicated that mesotrione and s-metolachlor applied alone or in tank mixes are safe herbicides for use in sweet sorghum.

In Blairsville, GA, cool and dry conditions made for a challenging growing season. Access to irrigation water was very limited. The sweet sorghum displayed generally good tolerance to mesotrione although visual injury was present for several weeks at the highest rate. Weed control and yields trended higher from the PRE combination of mesotrione and s-metolachlor (Table 2). S-metolachlor alone did not provide adequate weed control and yields reflected this. The addition of mesotrione improved weed control and yield.

In Athens, GA, sweet sorghum tolerance to mesotrione was generally good although mostly cosmetic mesotrione injury could be seen several weeks after planting. Weed control was generally better from mesotrione/s-metolachlor combinations applied at planting. Unexpectedly, yields were higher from preplant applications. This may have resulted from early season injury from mesotrione. S-metolachlor alone did not provide adequate weed control and the mesotrione/s-metolachlor combination worked very well in that regard.