TOMATO AND NUTSEDGE RESPONSE TO ACROLEIN AND HERBICIDES APPLIED PREPLANT

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Previous research has shown acrolein to have good tolerance in tomatoes while providing control of many species of annual weeds. However, it's efficacy against nutsedge species (*Cyperus esculentus* and *C. rotundus*) has been inconsistent. Sandea (halosulfuron) is one herbicide labeled for use in tomatoes and has shown excellent activity on several sedge species. Eptam (EPTC) is thought to have potential based on previous research with Tillam (pebulate) in tomato. Both chemicals belong to the thiocarbamate family of herbicides and provide similar spectrums of weed control. Research conducted in greenhouse experiments showed Vapam (metam sodium) plus acrolein provided good weed control including yellow nutsedge provided the chemicals were separated in time by a few days.

A field trial was initiated April 2007 in Brewton, AL to evaluate tomato tolerance and yellow nutsedge control to acrolein when applied alone or in combination with other herbicides. All treatments were applied preplant and included a non-treated control, methyl bromide/chloropicrin (MeBr) (67/33) at 350 lb ai/A, Vapam HL at 160 and 320 lb ai/A, Eptam 7 EC at 2.6 ai/A, and acrolein at 400 lb ai/A. Acrolein (400 lb ai/A) was combined with Eptam at 2.6 ai/A, Sandea at 0.035 lb ai/A, and Vapam HL at 160 lb ai/A. Both Sandea and Eptam were sprayed on the bed surface before tarping with HDPE and followed immediately with acrolein. Acrolein and Vapam HL were applied through 2 drip tapes/bed in 0.75 acre-inches of water. In the acrolein + Vapam HL combination, Vapam HL was applied 1 week after acrolein. Due to a low population of native nutsedge, 15 hills of yellow nutsedge nutlets were planted in each bed the day initial treatments were applied. Each hill contained 2 to 3 nutlets. Data collected for tomatoes included plant vigor, stem diameter, and yield. Twelve plants were harvested in each bed for yield data. Data collected for nutsedge included percent control, number of hills with germinated nutsedge, and a green weight which was taken 11 weeks after treatment (WAT).

Results show that the highest marketable tomato yield in terms of both number and weight was provided by the acrolein + Vapam HL combination, yielding 269 tomatoes with a weight of 114.6 lbs. Poorest yield results were from plots treated with Sandea alone, with a total of 149 marketable tomatoes at a weight of 61.72 lbs. Methyl bromide yielded a total of 178 tomatoes weighing 78.1 lbs. Yellow nutsedge control was highest in plots receiving the acrolein + Eptam combination, which provided 97% control. Other treatments providing excellent nutsedge control (>90%) were acrolein + Sandea, acrolein + Vapam HL, and Vapam HL at

320 lb ai/A. Poorest control was in plots treated with MeBr (32.5%), Eptam (30%), Sandea (21%), and the non-treated (16%). Poor control with Eptam and Sandea may be due to the delay in herbicide activation which occurred 2 days after the herbicides were applied to bed surfaces and tarped. Methyl bromide beds were planted (holes sealed with tape) 1 day after application (safety concerns) which may have reduced efficacy.

Results from this study indicate that combining acrolein with other compounds may be a workable strategy to increase control of nutsedge and other weed species without adversely affecting yield. In some cases, yield may be improved through the use of these combinations. Another way to improve control of nutsedge with acrolein is application to emerged plants. This observation has been verified in greenhouse research and will be evaluated in field research during 2008.