S-METOLACHLOR (DUAL MAGNUM) SAFETY FOR STRAWBERRY IN SOUTHERN CALIFORNIA

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Yellow nutsedge (*Cyperus esculentus*) and occasionally purple nutsedge (*Cyperus rotundus*) have become extremely difficult to manage in plasticulture strawberry in Southern California because no effective herbicides are currently available and alternative fumigant provide only limited control. Physical barriers to shoot penetration and steam application have been very effective in preventing yellow nutsedge establishment but do add substantial costs to weed management (Daugovish et al. 2009 B). Dual Magnum (*S*-metolachlor) showed very good efficacy against nutsedge in vegetable crops (Daugovish et al. 2009A) and controlled yellow and purple nutsedges in strawberry 100 and 90%, respectively at 0.95 lb a. i. /acre but caused about 20% fruit yield reduction compared to untreated check (Daugovish et al 2009 B). Dual Magnum is an attractive option for plasticulture strawberry because of its low cost and compatibility with current production systems and very good nutsedge efficacy. However, safe use rates must be identified. The herbicide is currently under review with DPR IR-4 program (minor use crops) and additional crop safety data is needed to support the project.

In 2010-2011 we evaluated the effects of Dual Magnum at 0.63 and 0.95 lbs a.i. /A on Ventana strawberry in a randomized complete block experiment with four replications on clay loam soil at Santa Paula, CA. These rates were selected because they effectively controlled nutsedge in previous studies.

The herbicide was applied with a back-pack sprayer to individual 68-inch wide beds, the black LDPE mulch was installed within 1 day of application and high elevation nursery transplants were planted 30 days later (Oct 16, 2010). Two - dimensional plant diameter measurements were taken on Nov. 22 to estimate canopy size of 12 selected plants. Plant mortality and visual injury symptoms (0= no injury, 10 =dead) were recorded the same day. The same twelve plants per plot were harvested throughout the production season to determine early (by March 1) and total marketable and unmarketable fruit yields. All data were analyzed using SAS; model assumptions of equal variance and normal distribution were checked using the General Linear Model procedure. The overall error rate for multiple comparisons was controlled by Tukey-Kramer adjustment.

Dual Magnum application did not affect plant mortality, which was low in all treatments (Table) and no differences in injury were observed in Dual Magnum plots when compared with untreated check. However, plants in plots treated with

0.95 lb ai/A of Dual Magnum were 31% smaller than the control treatment while those treated with 0.63 lb ai/A were similar to the control. This rate dependent pattern was observed in yield measurements (Table). Early season marketable yield in the control and low rate of Dual Magnum were similar but numerically greater than the high rate, while full-season yield was 30% less with high rate of Dual Magnum compared to the low rate and control (which yielded similarly).

These results support previous observation of negative effects of high rates of DM on strawberry development and production. However 0.63 lb a. i./A rate, known for itôs effectiveness against moderate nutsedge densities was also safe on Ventana strawberry in this experiment. Further experimentation is needed at rates less than 0.63 lb a. i. /A to determine safe and effective level at which Dual Magnum can be applied pre-plant to strawberry.

Table. Dual Magnum effect on Ventana strawberry performance at Santa Paula, CA

Treatment	Plant mortality,	Plant injury, 0-10	Canopy size, Nov. 22. 2010	Early market fruit yield (by March 1),	Market fruit yield for season
	%	0 = safe, 10 = dead	$In.^2$	lbs/plant	lbs/plant
Dual Magnum 0.63 lb a.i./A	1.3 a*	2.6 a	25.0 ab	1.4 a	9.4 a
Dual Magnum 0.95 lb a.i./A	1.5 a	2.5 a	20.5 b	0.9 a	6.9 b
Control	1.4 a	2.0 a	29.8 a	1.4 a	10.3 a

* Treatments noted with the same letter within each column are not significantly different at *P*=0.05.

RERERENCES

Daugovish. O., S. A. Fennimore and R. F. Smith. Herbicide Evaluation for Fresh Market Celery (*Apium graveolens*). 2009 AWeed Technology 21(3):719-723.

Daugovish O., M. Mochizuki and S. Fennimore. 2009B. Yellow nutsedge management with chemical, physical and thermal treatments. MBAO proceedings, 14:1-4. San Diego, CA.