

**PENNSYLVANIA VEGETABLE MARKETING AND RESEARCH PROGRAM  
PENNSYLVANIA VEGETABLE GROWERS ASSOCIATION  
2017 RESEARCH REPORT**

## ***Authority MTZ: the fit for processing tomatoes***

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### **Introduction:**

Authority MTZ is a pre-packaged herbicide of sulfentrazone and metribuzin, labeled for transplanted tomatoes. The labeled rate range for transplanted tomatoes ranges from 6 to 16 oz. There has been little research with this product in the Mid-Atlantic States to help provide guidance to farmers and crop advisors about the appropriate rates. The Authority MTZ label mentions control of eastern black nightshade, ivyleaf morningglory, common lambsquarters, and pigweed species; all weeds that are difficult to control with current herbicide programs. The sulfentrazone portion of the product can help manage herbicide resistant weed biotypes. The Authority MTZ rate range for tomatoes is quite wide, for instance the rates for coarse textured soils with 1.5 to 3% organic matter ranges from 6 to 16 oz wt/A. Preliminary results at 8 oz/A, showed good crop safety, but this trial used only a single rate. Research is needed to determine optimum rate range for Mid-Atlantic growing conditions as well as our weed spectrum. In addition, it is important to evaluate Authority MTZ as part of a weed control program, not as single applications.

In order to obtain a wider range of weeds, soil types, and growing conditions, the studies were conducted at the Penn State research farm in Centre County and at the University of Delaware, Georgetown research farm. Benefits to state and regional processing tomato growers will include updated information effective rate range for our conditions and how best to integrate other effective herbicide modes of action into the program to reduce the potential for resistance. This information will be distributed through the vegetable production guides and other educational resources on how to more effectively control weeds with existing and new products.

### **Objectives:**

1. Evaluate Authority MTZ for safety with processing tomatoes
2. Determine level of early-season weed control from Authority MTZ

### **Work Statement:**

Experiments were conducted at two locations: the Russell E. Larson Agricultural Research Farm in Centre County and at the University of Delaware Research and Extension Center in Sussex County in 2017. Several rates of Authority MTZ with Dual were evaluated in transplanted tomato (*Solanum lycopersicum*, var. 'Heinz 3406') as pre-plant incorporated treatment (according to label) along with standard treatment of metribuzin plus Devrinol (Table 1) to determine impacts on crop injury and yield as well as effectiveness on annual weed control. The study was arranged as a randomized complete block design with three replications. The plots were 25-30 feet long. In order to obtain a wider range of weeds, soil types, and growing conditions, the studies were conducted at the Penn State research farm in Centre County and at the University of Delaware, Georgetown research farm.

## Results

- At Rock Springs (Centre Co.), PA, the Authority MTZ treatments (Table 2 & 3):
  - Crop injury: 25, 27, 32, 52, and 58% respective to the rate from lowest to highest at 27 DAA (days after application)
  - Crop injury dropped to 12, 15, 18, 24, and 27%, respectively, 68 DAA
  - 92 to 94% large crabgrass (*Digitaria sanguinalis*) control;
  - 88 to 95% common lambsquarters (*Chenopodium album*) control;
  - 84 to 96% redroot pigweed (*Amaranthus retroflexus*) and common purslane (*Portulaca oleracea*) control; and
  - 93 to 98% eastern black nightshade (*Solanum phycanthum*) control
- Yield was not taken at the Pennsylvania location due to tomatoes not reaching maturity in a reasonable timeframe. In general, the growing season was not conducive for optimum tomato growth. It was cool and cloudy many days, and necessary heat units were lacking to produce desirable fruit.
- In Delaware (Sussex Co.), the Authority MTZ treatments (Table 2 & 4):
  - Crop injury: 17, 19, 25, 50, and 53% respective to the rate from lowest to highest at 27 DAA
  - Crop injury dropped to 0, 5, 13, 14, and 21%, respectively, 50 DAA
  - 83 to 87% large crabgrass (*Digitaria sanguinalis*) control and
  - 85 to 97% control of Palmer amaranth (*Amaranthus palmeri*)
  - Yield data ranged from 19.42 to 24.73 ton/A but did not correlate well with herbicide rate and injury.

## Discussion and summary

In summary, the Authority MTZ pre-packaged herbicide mix does have a fit in transplanted processing tomato production. However, the higher use rates might cause crop injury in certain soil types and under certain environmental conditions. The benefit of this herbicide product will be its ability to control certain difficult to control weeds such as eastern black nightshade, common lambsquarters, pigweed species, and likely annual morningglory that can be common in tomato crops. Also, the sulfentrazone portion of the product provides a unique herbicide mode of action (group 14) usually not used in tomato and can also help manage herbicide-resistant weed biotypes. Additional testing of this herbicide would be useful to get a better understanding of its utility in this crop. Furthermore, crop injury might possibly be decreased if the herbicide was not incorporated.

**Table 1. Treatments for field trial.** All Authority MTZ + Dual, and Devrinol + metribuzin were mechanically incorporated prior to transplanting.

Herbicide*	Rate / A	As needed
Untreated	0	+ POST
Authority MTZ + Dual	6 oz wt + 1.25 pt	+ POST
Authority MTZ + Dual	8 oz wt + 1.25 pt	+ POST
Authority MTZ + Dual	10 oz wt + 1.25 pt	+ POST
Authority MTZ + Dual	12 oz wt + 1.25 pt	+ POST
Authority MTZ + Dual	16 oz wt + 1.25 pt	+ POST
Devrinol + metribuzin	2 qt + 4 oz wt	+ POST

\*POST: Matrix (2 oz wt) + metribuzin (3 oz wt) + NIS (1 qt/100 gal)

**Table 2. Effect of herbicides on tomato (% injury and yield), 2017**

Herbicide (rate)*	PA 27 DAA	PA 68 DAA	DE 27 DAA	DE 50 DAA	DE Yield tons/A (total fruit; green and red)	DE Yield tons/A (mature red fruit only)**
Untreated	0	0	0	0	19.68	3.72
Authority MTZ (6 oz)	25	12	17	0	24.73	3.27
Authority MTZ (8 oz)	27	15	19	5	23.90	4.33
Authority MTZ (10 oz)	32	18	25	13	19.42	3.12
Authority MTZ (12 oz)	52	24	50	14	19.16	1.87
Authority MTZ (16 oz)	58	27	53	21	22.42	2.29
Devrinol (2 qt) + metribuzin (4 oz)	0	0	3	0	23.96	3.78
LSD (P=0.05)	12	6	12	6	6.72	2.36

\*All Authority MTZ treatments were tank-mixed with Dual Magnum (1.25 pt/A)

\*\*Harvested when 25% of total fruits were mature (red)

**Table 3. Effect of herbicides on weed control (%) in tomato at Centre Co., PA, 2017**

Herbicide (rate)*	Large crabgrass	Lambs- quarters	Rr pig- weed	Purslane	E. black Night- shade
Untreated	0	0	0	0	0
Authority MTZ (6 oz)	92	88	84	88	93
Authority MTZ (8 oz)	94	92	95	96	95
Authority MTZ (10 oz)	93	93	92	93	95
Authority MTZ (12 oz)	93	95	96	95	96
Authority MTZ (16 oz)	92	94	94	93	98
Devrinol (2 qt) + metribuzin (4 oz)	86	83	83	89	60
LSD (P=0.05)	5	7	9	6	9

\*All Authority MTZ treatments were tank-mixed with Dual Magnum (1.25 pt/A)

Ratings taken 7/7/2017

**Table 4. Effect of herbicides on weed control (%) in tomato at Sussex Co., DE, 2017**

Herbicide (rate)*	Large crabgrass	Palmer amaranth
Untreated	0	0
Authority MTZ (6 oz)	85	89
Authority MTZ (8 oz)	84	87
Authority MTZ (10 oz)	89	85
Authority MTZ (12 oz)	83	97
Authority MTZ (16 oz)	87	97
Devrinol (2 qt) + metribuzin (4 oz)	77	91
LSD (P=0.05)	14	9

\*All Authority MTZ treatments were tank-mixed with Dual Magnum (1.25 pt/A)  
Ratings taken 6/27/2017



**Signature:**

Dwight D. Lingenfelter

Pictures from the study at Rock Springs.



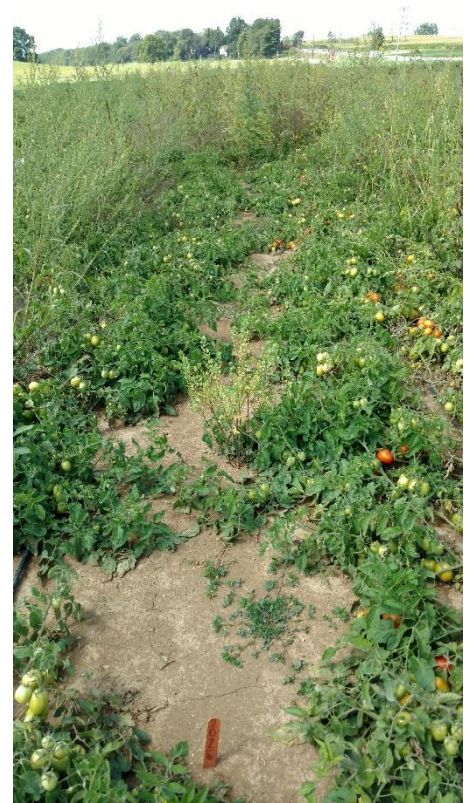
Overview of plots 3 weeks after planting (WAP); notice middle plots in foreground with herbicide injury



Check plot (3WAP)



Authority MTZ 16 oz (3WAP)



Authority MTZ 16 oz (14WAP)

Pictures from the study at Delaware



Check plot after Matrix + metribuzin application  
(Both images were taken mid-season)



Authority MTZ 16 oz fb Matrix + metribuzin