

THE EFFECTS OF NEONICOTINOID INSECTICIDES ON YIELD OF TOMATOES WITH AND WITHOUT NUTRIENT STRESS

William Terry Kelley
Extension Horticulturist
University of Georgia
P.O. Box 1209
Tifton, GA 31793
wtkelley@uga.edu

Introduction

The debate over whether Admire (imidacloprid, Bayer Crop Science) causes a growth response in the absence of insect pressure has been addressed in several crops. Tomatoe has been one such crop. The claim that Admire can overcome some stresses on the plant with its enhancement on growth has yet to be tested, however. Fresh market tomatoes are one of the largest vegetable crops in terms of value in Georgia. The value of the Georgia crop often exceeds \$80 million although there are only about 7,000 acres of tomatoes in the state. The purpose of this experiment was to determine if Admire has any growth enhancement properties on tomatoes and specifically on tomatoes that are placed under stress.

Methods

Tomato plants (variety “Sebring”, Syngenta Seed Co.) were produced in a greenhouse by a commercial transplant grower. Plots were established at the Coastal Plain Experiment Station (elev. 382 feet) in Tifton, GA. Plot land was tilled and preplant fertilizer applications were made according to recommendations and incorporated. Plastic was installed and the plots were fumigated with methyl bromide (134 lb. a.i./A) simultaneously. Tomatoes were transplanted on April 29, 2004 into a Tifton sandy loam (fine-loamy siliceous thermic Plinthic Kandiuults) soil. Plots consisted of a single row of tomatoes planted on beds that were spaced six feet apart (from center to center). In-row spacing was 24 inches per plant. Plots were each 20 feet long and were replicated four times. The experiment was arranged in a Randomized Complete Block Design.

Treatments consisted of 1) an untreated, unstressed check; 2) Admire at 16 oz/A, unstressed; 3) Admire at 16 oz/A with stress applied; 4) Admire at 24 oz/A with stress applied; 5) Platinum (thiamethoxam, Syngenta Crop Protection, Inc.) at 8 oz/A with stress applied; 6) untreated with stress applied. The nutrient stress was applied by withholding fertilizer from the treatments. The unstressed treatments received a total of 160 pounds of N & K per acre while the stressed plants received a total of 120 pounds of N & K per acre.

Tomatoes were harvested on June 24 and July 21, 2004 and data collected on yield by size and fruit size. Other than fertilizer stress treatments and insecticide treatments, normal cultural and pest control practices were used.

Results and Discussion

Results are presented in Table 1. There were really no meaningful significant differences in the study. However, there were some interesting trends to point out. The number of boxes per acre of extra large fruit, large fruit and the total marketable (combination of large and extra large) boxes per acre all followed the same pattern. In each case, those treated with Admire at the 16 oz rate with no stress and Platinum had the greatest yields. Those treated with Admire at either rate that were stressed had slightly lower yields than the first group, but were noticeably better than the untreated plots whether they were stressed or not. There were really no differences among treatments for percent marketable tomatoes or the average fruit weight of extra large. For some reason, the untreated stress did produced significantly larger tomatoes than other treatments, but this could be due to there being lower fruit numbers and the fruit that were produced were then larger. It is scientifically unclear that there is any benefit from using Admire as a growth enhancer. However, there does seem to be indications that Admire will increase tomato yield above that where there is no treatment. Although there was some Tomato Spotted Wilt Virus present in this field, it was a late infection and had little impact on yield as far as could be determined. Platinum seemed to perform equally as well as Admire in the situations that were evaluated.

Table 1. Yield by size, percent marketability and average fruit weight of tomatoes treated with various rates of Admire, one rate of Platinum and untreated

with and without nutrient stress at Tifton, Georgia in 2004.

Treatment	Yield (20 # boxes)					Percent Marketable (%)	Average Fruit Wt. (g)
	Ex. Large Boxes/A	Large Boxes/s/A	No. 2 Boxes/s/A	Total Boxes/s/A	Marketable Boxes/A		
Untreated Check	135 a	124 a	89 b	348 a	259 a	59.8 ab	194.2 b
Admire 16 oz. No Stress	273 a	266 a	96 b	635 a	539 a	68.5 ab	221.6 ab
Admire 16 oz. Stressed	248 a	179 a	298 a	725 a	427 a	52.0 b	229.9 ab
Admire 24 oz. Stressed	216 a	182 a	98 b	496 a	398 a	75.8 a	229.7 ab
Platinum 8 oz. Stressed	315 a	241 a	169 b	725 a	556 a	64.1 ab	203.5 ab
Untreated Stressed	169 a	136 a	124 b	429 a	305 a	64.4 ab	240.0 a
Mean of Test	226	188	146	560	414	64.1	219.8
L.S.D. (0.1)	207.7	215.3	118.9	474.2	402.1	21.7	44.2
C.V. (%)	61.0	75.9	54.2	56.2	64.4	22.5	13.3

¹Plots consisted of one row 20 feet in length with plants spaced 24 inches apart in the row. Stressed plants were stressed with reduced fertility.