

Defoliant Effect on Melons

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Abstract

Sodium chlorate exhibited the fastest developing crop phytotoxicity symptoms within 3 days after treatment (DAT). Within three days of application, significant crop injury at 40 and 80% was observed on cantaloupes for sodium chlorate applied at 1.0 and 4.0 lb AI/A, respectively. Thidiazuron/diuron (Ginstar⁷) caused injury that was slightly slower to develop and the crop declined severely during the next 10 days. Ginstar at 8.0 or 12.0 oz product/A initially caused 20% crop injury. Thidiazuron (Dropp⁷) caused the least injury on cantaloupes and injury reached unacceptable levels at 1 WAT. Dropp at 0.1 and 0.4 lb AI/A initially showed less than 10% crop injury. Dropp at the rates tested caused minimal defoliation.

defoliants, thidiazuron/diuron (Ginstar), sodium chlorate, thidiazuron (Dropp)

Introduction

The diversity of crops that are interplanted and grown adjacent to each other in Arizona offers challenges in making chemical applications specifically on to a target crop. Chemical drift could occur if weather conditions are windy or conducive for inversions and air movement. Spray tanks could also contain residues of a previous spray mixture that could cause crop injury on sensitive crops. Vegetable crops may be sensitive to cotton defoliants during the fall season. Fall melons, lettuce, and cole crops are examples of vegetables that may be growing adjacent to cotton. The potential exists for off-target effects of cotton defoliants on vegetable crops if caution is not exercised during applications. This study was conducted to evaluate a simulated application of cotton defoliants on cantaloupes and determine the effects on the crop.

Materials and Methods

A small plot study was established at the University of Arizona Maricopa Agricultural Center, Maricopa, AZ. Cantaloupes were planted on a single 40-inch bed and furrow irrigated. The cantaloupes were mature with developing fruit when the test was initiated. The test was set up as a randomized complete block design with four replicates. The treatment plots were a single bed measuring 17 ft in length. The defoliants were applied using a hand-held boom with two flat fan 8002 nozzle tips spaced 20-inches apart. The sprays were applied with a CO₂ backpack sprayer pressurized to 35 psi and delivering 20 gpa water. The weather conditions at the time of applications were clear with no wind and air temperature at 96°F. At intervals following the application, visual observations of crop injury were recorded.

Results and Discussion

Within three days of application, significant crop injury at 40 and 80% was observed on cantaloupes for sodium chlorate applied at 1.0 and 4.0 lb AI/A, respectively (Table). Ginstar at 8.0 or 12.0 oz product/A caused 20% crop injury and Dropp at 0.1 and 0.4 lb AI/A showed less than 10% crop injury. Sodium chlorate did not cause further crop injury at subsequent rating dates and the crop did not exhibit any recovery from the initial injury observed at 3 days after treatment (DAT). Injury caused by sodium chlorate was initial bronzing of the foliage followed by necrosis of the treated leaves. Ginstar demonstrated progressively increased crop injury at 7 and 13 DAT. For Ginstar at 12.0 oz product/A, the cantaloupes were nearly decimated at 13 DAT. Ginstar caused a foliar chlorosis or leaf burning on the leaf edges that rapidly progressed throughout the remainder of the leaf resulting in defoliation of the vines. Dropp at the rates tested caused minimal defoliation and crop injury was exhibited as leaf-edge burning on treated foliage.

Sodium chlorate exhibited the fastest developing crop phytotoxicity symptoms within 3 DAT. Ginstar caused injury that was slightly slower to develop and the crop declined severely during the next 10 days. Dropp caused the least injury on cantaloupes and injury reached unacceptable levels at 1 WAT.

These results demonstrate the effects of a direct application of different rates of defoliant on to cantaloupes and the injury and damage that occur. Unintentional spray drift from an application for cotton may move on to non-target cantaloupes and similar injury may occur but the degree of crop phytotoxicity may vary due to the amount of the defoliant that ultimately lands on the crop.

Table. Defoliant effect on melons study. (Umeda)

Treatment	Rate	<u>Melon Injury (%)</u>		
		3 DAT	7 DAT	13 DAT
Untreated check		0	0	0
Sodium chlorate	1.0 lb AI/A	40	40	39
Sodium chlorate	4.0 lb AI/A	81	84	81
Dropp	0.1 lb AI/A	5	16	19
Dropp	0.4 lb AI/A	9	16	25
Ginstar	8.0 oz/A	20	66	78
Ginstar	12.0 oz/A	20	89	92
LSD (p=0.05)		8.1	19.9	18.0

Defoliant applied on 02 October 1998