

# Effect of Messenger® on Chile Pepper Production and Bacterial Spot in 2001

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## Abstract

*Messenger is based on naturally occurring proteins called harpins that trigger natural plant defense systems to protect against disease and pest damage as well as activating plant growth pathways for potential improvements in crop yield and quality. An experiment was established in a commercial chile pepper field in Cochise County to evaluate the effect of Messenger on chile pepper production and bacterial spot. Bacterial spot of pepper occurs wherever this crop is exposed to moisture due to rainfall or overhead irrigation. Foliar application of Messenger, Kocide 2000 + Maneb 75DF (a standard bacterial spot treatment) or Messenger + Kocide + Maneb was performed June 5, 19 and 28; July 16; and August 8 and 22. A foliar defoliation (bacterial spot) rating was performed September 5 and yield (weight and number of chile peppers) was determined September 20 and 21. Compared to nontreated plants, the mean weight of chile peppers harvested from plants treated with Messenger, Kocide + Maneb and Messenger + Kocide + Maneb increased 11, 15 and 24%, respectively, whereas the number of peppers increased 14, 15 and 21%, respectively. The severity of bacterial spot symptoms was numerically (but not significantly) lower on plants treated with Messenger, Kocide + Maneb and Messenger + Kocide + Maneb compared to nontreated plants.*

## Introduction

Bacterial spot of pepper occurs wherever this crop is grown in the presence of rainfall or overhead irrigation. Leaves, fruit and stems are affected. Leaf lesions begin as circular, water-soaked spots that become necrotic with brown centers and thin chlorotic borders. Enlarged spots may develop tan-colored centers. Severely spotted leaves turn yellow and drop from the plant, resulting in varying degrees of plant defoliation depending on disease severity. Fruit symptoms consist of raised brown lesions that are wart-like in appearance. On stems, elongated lesions or streaks may appear. Copper sprays, alone or with Maneb fungicide, can reduce the rate of disease development.

A recently introduced product called Messenger has the ability to trigger natural plant defense systems to protect against disease and pest damage as well as activate plant growth systems for potential improvements in crop yield and quality. The purpose of this field study was to conduct an initial evaluation of Messenger with respect to its effect on chile pepper yield and the development of bacterial spot.

## Materials and Methods

This study was conducted at Curry Farms in Pearce (Cochise County), AZ in a Grabe sandy loam soil. Chile peppers "AZ20" were seeded and watered March 17, 2001 in double rows, 14 in. apart on beds with 40 inches between bed centers. Treatments were replicated five times in a randomized complete block design with each replicate plot consisting of four 25 ft. long rows. Within rows, a 5-ft buffer of nontreated plants separated treatment plots. Between rows, one nontreated bed (2 rows of pepper plants) separated each block of treatments. Foliar application of Messenger (4 oz of product/acre), Kocide 2000 + Maneb 75DF (2.25 + 1.5 lb of product/acre) or Messenger + Kocide + Maneb (same rates as described earlier) was performed June 5, 19 and 28; July 16; and August 8 and 22. In the Messenger + Kocide + Maneb treatment, Messenger was applied first, followed by Kocide + Maneb. Messenger was mixed in distilled water before application to plants. Chemicals were applied with a CO<sub>2</sub> backpack sprayer with a flat-fan nozzle at a rate of 20 gal/acre at 40 psi. Plants were at the three-true-leaf stage (June 5) at the first application of Messenger and nearing maturity by the last application of the compound (August 22). Plants received water by center-pivot sprinkler irrigation. A foliar defoliation (bacterial spot) rating was performed September 5 by rating 20 plants per replicate using the following rating scale: 0 = no disease, healthy canopy; 1 = few diseased leaves, no defoliation; 2 = several diseased leaves, up to 25% defoliation; 3 = moderate disease severity, from 26 to 50% defoliation; 4 = high disease severity, 51 to 75% defoliation; 5 = 76 to 100% defoliation. Yield (weight and number of chile peppers) was determined September 20 and 21. Sixty plants were harvested from each of four replicate plots per treatment (one of the original five blocks of treatments was accidentally harvested earlier by the grower's crew). Chile peppers were at the mature red stage when harvested. Natural dehydration of peppers was beginning to occur, due to pepper age as well as damage caused by an earlier hailstorm.

## Results and Discussion

The data collected during this trial is summarized in the Table. Compared to nontreated plants, the mean weight of chile peppers harvested from plants treated with Messenger, Kocide + Maneb and Messenger + Kocide + Maneb increased 11, 15 and 24%, respectively, whereas the number of peppers increased 14, 15 and 21%, respectively. Bacterial spot, caused by *Xanthomonas campestris pv. vesicatoria*, appeared between the August 8 and 22 application of treatments. The foliar defoliation (bacterial spot) rating was numerically (but not significantly) lower on plants treated with Messenger, Kocide + Maneb and Messenger + Kocide + Maneb compared to nontreated plants. Further evaluation of Messenger with respect to chile pepper production and disease development is planned for 2002.

**Effect of Messenger on chile pepper production and bacterial spot in 2001.**

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Treatment	Final disease and pepper yield		
	Disease rating <sup>1</sup>	Yield (lb) per plant	Peppers per pant
Nontreated control	4.0 a	1.64 a	13.21 b
Messenger (4 oz of product/acre)	3.5 a	1.82 a	15.10 ab
Kocide 2000 + Maneb 75DF (2.25 + 1.5 lb of product/acre)	3.6 a	1.89 a	15.18 ab
Messenger + Kocide + Maneb (same rates as above)	3.5 a	2.03 a	16.04 a
1	Rating scale described in text.		
2	Values in each column followed by a different letter are significantly different ( $P=0.05$ ) according to the Duncan-Waller $k$ -ratio (LSD) test.		