

Managing Septoria Leaf Spot of Pistachio in Arizona With Fungicides

Robert E. Call and Michael E. Matheron

Abstract

Septoria leaf spot was detected in the United States for the first time in 1964 within an experimental pistachio planting at Brownwood, Texas. The first observation of the same disease in Arizona pistachio trees did not occur until 1986. In 1988, a survey of the 2,000 acres of pistachio orchards in southeastern Arizona revealed a widespread incidence of the disease. Since the initial discovery of the disease, Septoria leaf spot has appeared annually in some Arizona pistachio orchards. The onset and severity of the disease is influenced by summer rainfall that occurs in this region. Pistachio trees infected with Septoria leaf spot and not treated with an effective fungicide can defoliate in the autumn up to 2 months prematurely. The objective of this field study was to evaluate the efficacy of several different fungicides against this disease. All fungicides were applied to tree foliage on June 26 and July 31, 2001. Disease severity was lowest on trees treated with Flint (trifloxystrobin) and Abound (azoxystrobin). Other materials that significantly reduced the final level of disease compared to nontreated trees included Break (propiconazole), Procop R (copper hydroxide) and Elite (tebuconazole).

Introduction

The first pistachio plantings were established in North America around 1890 in Fresno, California (Maas et al., 1971). Since then, pistachio trees also have been grown in Arizona, Nevada, Utah and Texas. Septoria leaf spot, caused by the pathogenic fungus *Septoria pistaciarum*, has been reported in various Mediterranean countries where pistachios are grown commercially. The disease was first detected in the United States in 1964 within an experimental pistachio planting at Brownwood, Texas (Maas, et al., 1971). From 1965 to 1967, the first symptoms were observed during mid-May in this Texas planting of pistachios, with the disease remaining mild during the remainder of the growing season. In contrast, the spring seasons from 1968 to 1970 were very moist, followed by relatively dry summers. Under these environmental conditions, leaf spots were observed as early as late April with subsequent disease development leading to defoliation of trees during these years. Disease ratings in Texas revealed that leaves of *Pistacia vera* and all budded trees of the Kerman variety were severely infected, whereas a more moderate level of disease was recorded on leaves of *P. chinensis*, *P. atlantica* and *P. terebinthus*. A moderate level of Septoria leaf spot was first observed on leaves of pistachio trees in Arizona in 1986 (Young and Michailides, 1989). A 1988 survey of the approximately 2,000 acres of pistachios in Arizona revealed that the disease was widespread. Adequate control of Septoria leaf spot has been reported in some Mediterranean countries with applications of copper sulfate (Hallage, 1927; Pupillo and Di Caro, 1952; Sarjanni, 1935). The objective of this study was to evaluate several fungicides for their ability to inhibit development of Septoria leaf spot in a commercial pistachio orchard.

Materials and Methods

This experiment was established in a 18-yr-old commercial pistachio orchard in Cochise County, Arizona, during the summer of 2001. Treatments were replicated five times in a randomized complete block design, with each replicate consisting of one tree. Replicate trees were separated by nontreated trees. Tree spacing within the orchard was 16 x 16 ft. Fungicides were applied to the foliage of the trees June 26 and July 31 with a Rear's Pak-Blast 50 sprayer that delivered 204 gal/acre. Monthly maximum and minimum ranges in air temperature (EF) for the duration of this study were as follows: May, 75-97, 30-68; Jun, 90-100, 44-77; Jul, 84-100, 57-72; Aug, 84-102, 55-62; Sep, 80-97, 44-64. Rainfall (in.) during the same period of time was as follows: May, 0.53; Jun, 0.05; Jul, 3.62; Aug, 0.65; Sep, 1.11. Disease severity was determined September 19 by counting the number of leaf spots caused by *Septoria pistaciarum* on 10 leaves collected at random from each of the five replicate trees of each treatment.

Results and Discussion

Among the fungicides tested in 2001, the highest level of disease control was recorded on trees treated with Flint (trifloxystrobin) and Abound (azoxystrobin). Other materials that provided lower but still significant disease control, compared to no treatment, included Break (propiconazole), Procop R (copper hydroxide) and Elite (tebuconazole). Single-tree replicates were too small to detect any apparent effect of fungicide treatment on yield; however, nontreated infected trees can begin to drop infected leaves at least 6 weeks earlier than normal. Severe premature defoliation of trees likely would result in yield and quality reduction of the pistachio nut crop.

These studies have demonstrated that several different chemistries applied during July and August can significantly reduce the severity of *Septoria* leaf spot on pistachio in Arizona. *Septoria* leaf spot typically appears on pistachio trees in southeastern Arizona during the month of August. It is interesting to note that on average, August is the wettest month of the year in this region, with an average recorded rainfall of 4.0 inches during 1992 to 1996.

Literature Cited

- Hallage, M.R. 1927. Fungus diseases of the pistachio tree in Syria. *Internat. Bull. Plant Prot.* 1(3):38-39.
- Maas, J.L., van der Zwet, T., and Madden, G. 1971. A severe *Septoria* leaf spot of pistachio nut trees new to the United States. *Plant Dis. Repr.* 55:72-76.
- Pupillo, M., and Di Caro, S. 1952. Alcune osservazioni sulle *Septoria* del Pistachio. *Ann. Sper. Agr. N.S.* 6(3):623-634.
- Sarjanni, J.A. 1935. Notes phytopathologiques; les septorioses du Pistachier. *Ann. Inst. Phytopath. Benaki* 1(3):67-76.
- Young, D.J., and Michailides, T.J. 1989. First report of *Septoria* leaf spot of pistachio in Arizona. *Plant Dis.* 73:775.

Table 1. 2001 Septoria leaf spot of pistachio fungicide trial.

Robert E. Call and Michael E. Matheron, University of Arizona, Cooperative Extension

Treatment *	Rate of product/acre	Average number of leaf spots per leaf
Flint 50WG (trifloxystrobin)	0.125 lb	3
Abound 25 SC (azoxystrobin)	15.4 fl oz	12
Procop R (copper hydroxide)	8.0 lb	30
Break EC (propiconazole)	6.0 fl oz	50
Elite 45DF (tebuconazole)	0.5 lb	63
Nontreated control	-----	118
LSD ($P = 0.05$) **		19
* Treatments were applied June 26 and July 31.		
** Least Significant Difference at $P = 0.05$. Values differing by more than the least significant difference are significantly different from each other according to the Duncan-Waller K-ratio test.		