

Excessive Summer Rains Trigger Outbreaks of Two Fungal Leaf Spot Diseases “New” to Pistachio in New Mexico

J. M. French, R. J. Heerema, N. P. Goldberg

Department of Extension Plant Sciences, New Mexico State University,
Las Cruces, NM 88003

Abstract

Two fungal leaf diseases of pistachio, *Septoria* leaf spot (*Septoria pistaciarum*) and *Alternaria* late blight (*Alternaria* sp.), were confirmed for the first time in New Mexico in the fall of 2008. A survey of pistachio orchards revealed that trees in Otero, Hidalgo, Luna, Sierra and Doña Ana Counties were infected. Results indicated a high incidence of both diseases; 89% of the surveyed orchards were infested with *Septoria* and 100% were infested with *Alternaria*. The widespread occurrence of these diseases suggests that the pathogens have been present in NM orchards for several years. We believe that drier than average conditions in previous years limited the severity of these diseases. Average total rainfall in Otero County, the primary pistachio growing county in NM, in July and August is 8.64 cm (3.4”; 94 year average). In July and August of 2003-2005 the total average rainfall was only 6.83 cm (2.69”). These drought conditions were followed by above-average rainfall in 2006-2008, when the total average rainfall during July and August was 18.06 cm (7.11”). This excessive moisture provided excellent conditions for widespread infection and disease development. The high level of inoculum currently present in NM orchards presents a concern that these diseases may become a recurring problem for NM pistachio producers. Further research is planned to investigate the effect of these diseases on yield and tree vigor, and to develop management strategies.

Symptomology⁽¹⁾

Septoria Leaf Spot

The first symptom of the disease is the development of round to irregular, brown, necrotic spots, 1-2 mm in diameter, which form in between small veins on both sides of the leaf (Figure 1). These spots may increase slightly in size with time, but generally remain small and isolated from one another. Hundreds of spots may develop on each infected leaf. Over time, large sections of the leaf turn tan in color (Figure 2). In severe cases, trees defoliate prematurely which reduces the amount of carbohydrates produced and stored by the tree, likely decreasing vigor (Figure 3).

Alternaria Late Blight

The first symptom of the disease is the development of dark brown to black, round or angular lesions, 3-7 mm in diameter. Lesions can develop anywhere on the leaf. As the lesions age, they enlarge and merge together to form larger areas of blighted tissue (Figure 4). Late in the season, the blighted areas turn black. Severe leaf blighting results in premature defoliation and decreased vigor (Figure 5). *Alternaria* also infects the fruit resulting in reduced yield and quality. On immature fruit, small, black spots approximately 1 mm in diameter develop in association with lenticels. On mature hulls, lesions are black, 1-5 mm in diameter, and may be surrounded by a reddish purple margin. In severe cases, the entire hull turns black. Infections are more severe in early-split fruit and cracked fruit (Figure 6).

Survey Results

Septoria leaf spot and *Alternaria* late blight, fungal diseases of pistachio, were confirmed in September 2008 on trees grown in Otero County. A survey of pistachio orchards revealed that trees grown in Hidalgo, Luna, Sierra and Dona Ana Counties were also infected (2). This survey consisted of 35 different orchards in the five pistachio growing counties in the state (Figure 7). Survey results indicated a high incidence of both diseases; 89% of the surveyed orchards were infested with *Septoria* and 100% were infested with *Alternaria*. Many, if not all, of the trees that were infected with *Septoria* were also infected with *Alternaria* (Figure 8).

We would like to thank Elizabeth Gordon, Otero County Extension Agent, for her thoughtful insight and organization of our orchard visits. We would also like to thank the New Mexico pistachio growers for their willingness to participate in our survey.



Figure 1: Early symptoms of *Septoria* leaf spot



Figure 2: Advanced symptoms of *Septoria* leaf spot



Figure 3: Premature defoliation often associated with *Septoria* leaf spot



Figure 4: *Alternaria* late blight foliar symptoms



Figure 5: Severe case of *Alternaria* late blight leading to premature defoliation



Figure 6: *Alternaria* late blight fruit infection (early, middle and late)

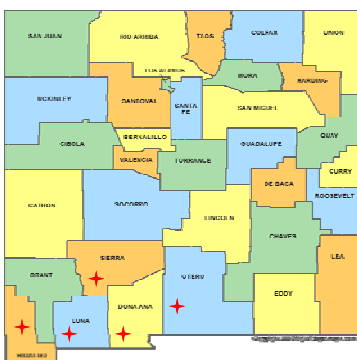


Figure 7: Five pistachio growing counties in New Mexico



Figure 8: Pistachio tree infected with *Septoria* leaf spot & *Alternaria* late blight

Weather Conditions

The widespread occurrence of both *Septoria* and *Alternaria* in 2008 suggests that these pathogens have been present in New Mexico orchards for several years. We believe that drier than average conditions in previous years limited the severity of these diseases. Otero County, the primary pistachio growing county in NM has an average total rainfall in July and August of 8.64 cm (3.4 inches; 94 year average). In July and August of 2003-2005 the total average rainfall was only 6.83 cm (2.69 inches). These drought conditions were followed by above average rainfall in 2006-2008, when the total average rainfall during July and August was 18.06 cm (7.11 inches) (Figure 9). The average relative humidity was 13% higher than average during July and August of 2006 – 2008 (Figure 10). These foliar diseases are favored by high moisture and the above-average moisture received during July and August of 2006 to 2008 provided excellent conditions for disease development and widespread infection.

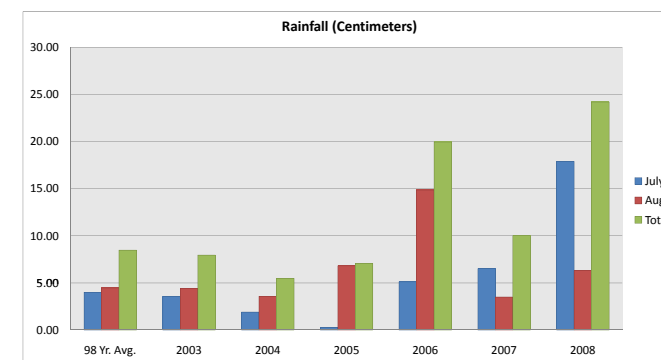


Figure 9: Otero County (Tularosa, NM)

Source: Western Regional Climate Center (<http://www.wrcc.dri.edu>)

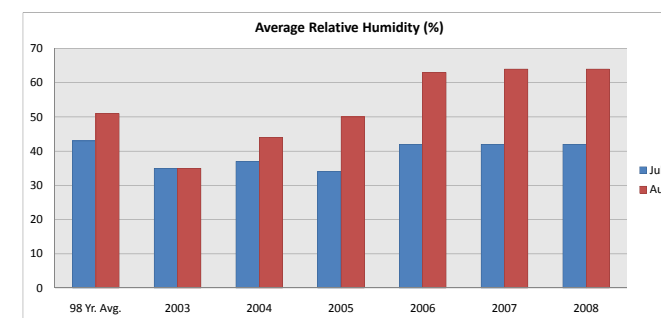


Figure 10: Otero County (Tularosa, NM)

Sources: Western Regional Climate Center (<http://www.wrcc.dri.edu>)
New Mexico Climate Center (weather.nmsu.edu)

Conclusions

Septoria and *Alternaria* diseases are favored by high moisture. New Mexico's typically arid climate may help to limit serious outbreaks of these diseases on a yearly basis. Higher than average rainfall in recent years provided excellent conditions for disease development and widespread infection. The high level of inoculum currently present in New Mexico orchards presents a concern that the disease may become a perennial problem for NM pistachio producers. Further research is planned to investigate the effect of these diseases on yield and tree vigor, and to develop management strategies.

References

1. Teviotdale, B.L., Michailides, T.J., Pscheidt, J.W. 2002. Compendium of Nut Crop Diseases in Temperate Zones. 1st ed. pg 71-72
2. French, J. M., Heerema, R. J., Gordon, E. A. and Goldberg, N. P. 2009. First Report of *Septoria* Leaf Spot of Pistachio in New Mexico. Plant Dis. 93:762