

# Anthracnose Infestation

## Leaf Wetness, Temperature, and Spore Concentration

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In 1993 three researchers, J. M. Vargas and A. L. Jones of MSU and T.K. Dannenberger of OSU released the results of their research on the relationship between leaf wetness, temperature and spore concentration on anthracnose infection of annual bluegrass. This research offers dramatic insight into under what conditions this disease develops, how its occurrence might be anticipated, and how cultural practices might be altered to reduce infection.

### The Research

Four different concentrations of spores (1,000, 10,000, 100,000 and 1,000,000 spores per milliliter) were applied to samples of annual bluegrass that were being raised in growth chambers. The experiments were conducted at four temperatures (59° F [15 C], 68° F [20 C], 77° F [25 C] and 86° F [30 C]) for five leaf wetness periods (0, 12, 24, 48, 72 hours). After the predetermined period in the growth chamber, the samples were removed and a sample of 200 spores from each were checked to see if they had germinated.

When the results were tabulated, it was found that no significant germination occurred at 0 hours, 59° F (15 C), or at a concentration of 1,000 spores/ml. But as the two graphs at right illustrate, germination for the other temperatures, wetness periods and concentrations was significant.

At all temperatures and hours of leaf wetness, germination at the 10,000 spores/ml concentration was less than 20%.

At the two highest concentrations and temperatures, significant germination that might lead to symptoms (at or > 40% began to appear after only 24 hours of leaf wetness. At 48 hours, the two highest concen-

trations were all > 40% and averaged ~83%. At 72 hours, the average germination for the two highest concentrations was ~ 94%.

### What the results mean

Although the research cited here measured germination and not symptomology, depending on the site history, it can be used as an excellent gauge to the eventual expression of symptoms.

Leaf wetness periods of greater than 48 hours pose the highest level of risk for the development of an active anthracnose infestation for any site that has vulnerable cultivars, particularly at those sites with the greatest population concentrations.

Close behind in risk is a wetness period of greater than 24 hours at any site that has a significant history of anthracnose infestation.

### Recommendations

Since those states identified on the Climate Favorability Map on page 3 as having moderate to high risk for anthracnose each have a period of months each year with significant climatic favorability (15 to 66% of the year based on normal climate conditions), managers in these states need to be aware that anthracnose may be active from ~ 2 to 8 months per year on vulnerable cultivars and sites with a history of this disease.

Culturally, it is very important that irrigation be flexible enough so that, during or just after periods of prolonged precipitation, leaf wetness is not extended by unnecessary watering. Increasing air flow and site drainage in humid or wet season climates may help shorten leaf wetness periods and thereby reduce disease incidence. Where

possible changing or introducing cultivars with more resistance may also reduce symptom expression. And, the use of materials like wetting agents applied to foliar surfaces to reduce leaf wetness may have some beneficial effects.

Finally, since populations of this disease are so readily identifiable and quantifiable (by examining grab samples to look for acervuli with or without setae), fungicide treatments can be timed for maximum results.

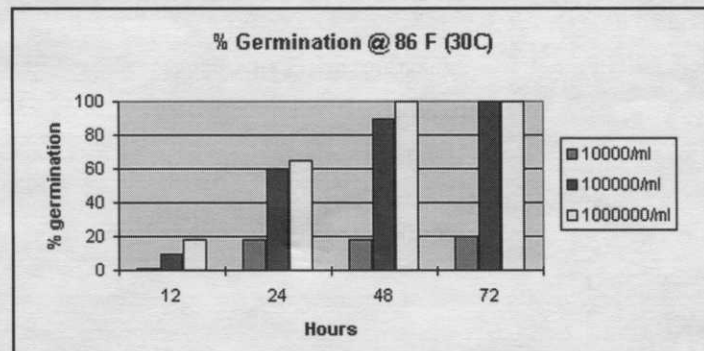
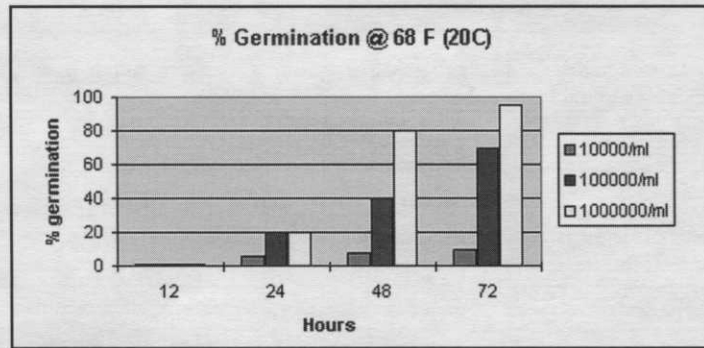
## Fungicide strategies

At vulnerable sites in states with multiple months of climatic favorability, systemic fungicides alternated or augmented with contact fungicide materials and with applications commencing at the first sign of acervuli activity (the formation of setae) is probably the best overall strategy.

In states with only several months of potential activity, several applications of contact fungicide materials applied at the earliest sign of acervuli activity may be sufficient to minimize pathogen activity.

At all locations, periodic grab samples of leaves and thatch or duff should be taken to monitor acervuli populations. Low acervuli numbers or low densities when compared to leaves should always be maintained because extended periods of leaf wetness comprising 24 to 72 hours are very

common throughout the disease's active growth range of 51° F to 93° F. Management strategies should be designed and implemented to minimize the chances that high acervuli populations develop, because as the research shows, germination and infection under high spore concentrations may be a foregone conclusion.



Percent germination of spores in a growth chamber at 68° (top) and 86° (bottom).

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