

Disease Management Program to Reduce Pesticide Use on Bentgrass Greens

North Carolina State University

Jack Bailey

Start Date: 1998

Number of Years: 3

Total Funding: \$74,752

Objectives:

1. *Verify the utility of using microclimate information for scheduling the use of fans, irrigation and fungicides for disease management.*
2. *Develop the system, hardware and software, to monitor and analyze the microenvironment on golf courses.*
3. *Determine if unnecessary fungicide applications can be reduced by using microclimate-based information for disease management.*

Weather-based advisory models, which key fungicide application during periods of favorable conditions, have not been widely used on golf courses due to the lack of evidence that they are accurate. Turf managers often rely upon calendar-based spray schedules. An ideal fungicide program would consider all environmental factors associated with disease activity, and treatments applied only when conditions were most favorable for disease outbreak. Therefore, determining specific environmental conditions most critical for disease outbreak, and improving cultural practices and environmental conditions before these outbreaks, could aid in reducing the number of chemical applications. The use of electric fans has grown rapidly for use around 'pocket greens' because of increases turf quality. The objectives of this study were to: a) determine how wind velocities affect the turf microclimate, turf quality, and brown patch incidence, and, b) verify the relationship between weather-based advisories and disease progress. In our studies, brown patch was dramatically reduced in the areas of greatest wind velocity. Where the fans were left on and irrigation was inadequate, dollar spot was more severe. Soil moisture, algae, leaf wetness, and canopy temperatures were all less in the area of greatest wind velocity. Turf quality was highest in the same area. A regression equation was generated to define the relationship between wind velocity and brown patch (disease incidence = $0.816608 - 0.314186 * \text{wind velocity (m/s)}$). This equation describes the effect wind has on decreasing the incidence of brown patch.

A weather-based model (Fidanza model) will be modified with the new equation to help correct some of the problems it has in predicting disease. In the 2000 growing season, several versions of the 66 wind modified Fidanza model will be tested to see if they can be used to accurately predict the need for fungicide applications. Several commercially available fans will be characterized to determine the wind movement profiles so that the appropriate selection and placement of these fans can be made to complement the natural airflow over greens. A radio-controlled aircraft will be used to document the geometric

effects of wind flow over greens to verify the accuracy of these predictions. It is anticipated that this project will reduce the use of fungicides on golf course greens by changing the microclimate to be less conducive to disease.