NATIONAL PEANUT BOARD/SOUTHEAST PEANUT RESEARCH INITIATIVE FINAL REPORT FOR WORK DONE UNDER RESEARCH AGREEMENT	FINAL REPORT March 31, 2010
Institution: University of Georgia	
Project Title: Impact of Climate Variability and Weather Conditions on the Severity of White Mold in Peanut	
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Introduction

White mold (caused by *Sclerotium rolfsi*) is likely to occur in most peanut fields in Georgia. Losses caused by white mold can be severe. In Georgia, crop damage due to white mold was approximately $16.9 million in 2005, the second highest since 1998 when more than $30 million worth of damage was recorded. Variation in disease severity and the level of damage associated with white mold can be attributed in part to changing weather patterns during the growing season, and perhaps annual climate variability. Under hot and wet conditions, the *S. rolfsi* sclerotia germination would result in disease development on the host crops. A better understanding of climate variability and the effect of weather patterns on the incidence and severity of white mold in peanuts is important and will be necessary for developing a comprehensive integrated management strategy. A risk assessment tool for white mold that is developed based on accurate and reliable climate and weather information and forecasts could aid growers in managing the white mold in Georgia peanut.

Objective

The specific objectives are to, (1) Examine the effects of ENSO phase and the incidence of white mold in peanut, (2) Identify specific weather variables that correlate with white mold, and (3) Develop a procedure to predict the severity of white mold by using weather and climate information

Results

The favorable infection day during the growing season was evaluated based on when different combinations of three favorable conditions were met:

(i) Average air temperature ($25^{\circ}C < T < 32^{\circ}C$),
(ii) Average soil temperature ($27^{\circ}C < T < 32^{\circ}C$), and
(iii) Relative humidity ($RH > 85$)

Weather data were obtained from the nearest Georgia Automated Environmental Monitoring Network (AEMN: www.GeorgiaWeather.net) weather station to field location in Tifton. The accumulated favorable infection condition was evaluated with the field observations of white mold from in "Georgia Green" peanut variety from 1995 to 2007. Results from monthly

accumulated infection days indicated that the average air temperature in May and July, and the average soil temperature (5 cm) in June had a significant effect on the annual incidence of Stem rot in Tifton, based on available data (Figure 1). Data from recent field observations in Tifton, GA will be used for further evaluation and optimization of identified parameters. Additional analyses will be conducted to evaluate various combinations of weather parameters for predicting the level of white mold incidence. Favorable infection conditions in mid-June have been reported to result in early epidemic of white mold in other studies. We are currently investigating the influence of rainfall patterns during the growing season on the level of white mold incidence in peanut later in the season. We presented some of our results at the 2009 annual meeting of American Phytopathological Society (APS), and the annual meeting of the American Peanut Research and Education Society (APRES).

Accumulated Infection Days

Date	Air Temp 25 < T < 32	Soil Temp 27 < T < 32	RH > 85%	Infection Day	Acc. Infection Days
June 1	Yes	Yes	Yes	1	1
June 2	Yes	No	Yes	0	1
June 3	Yes	Yes	Yes	1	2

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	91.82	32.64	2.81	0.0203*
Condition (i) in May	1.73	0.55	3.16	0.0116*
Condition (ii) in June	1.11	0.34	3.29	0.0094*
Condition (i) in July	-2.79	1.30	-2.14	0.0608

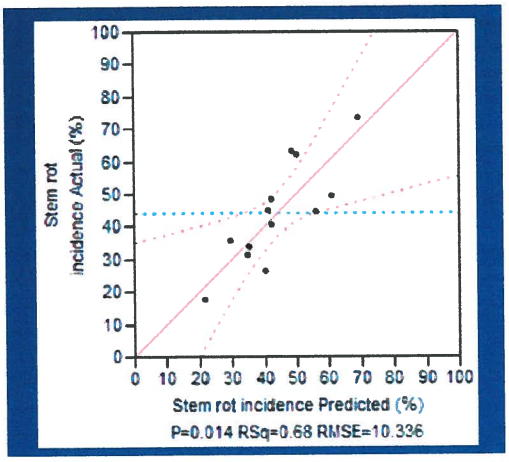
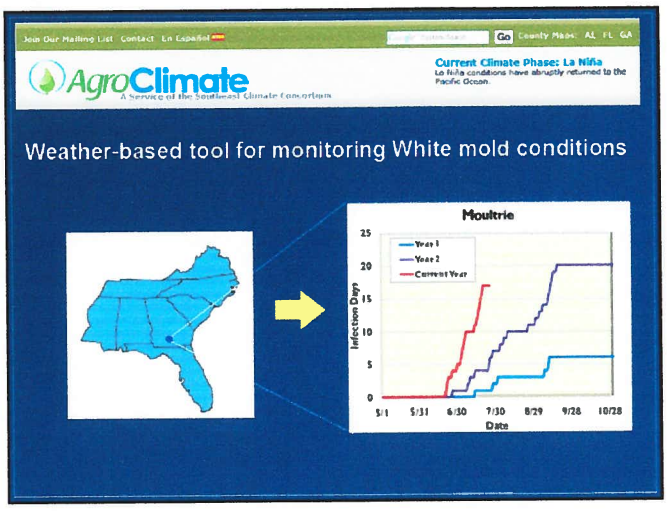


Figure 1. Regression analysis of monthly-accumulated favorable conditions and the incidence of stem rot (white mold) at the end of the growing season in Tifton.



We are exploring the effect of the prevailing ENSO phase during the growing season on subsequent incidence of white mold in peanut. We are also making progress on the development of a location-specific weather-based online management tool (Figure 2). The tool will assist peanut growers in assessing and monitoring the progression of favorable conditions for white mold incidence. An accessible web-based tool will help growers mitigate the risk of yield loss associated with white mold in peanut.

Figure 2. Outline of a weather-based tool under development for monitoring infection conditions.