NATIONAL PEANUT BOARD/SOUTHEAST PEANUT RESEARCH INITIATIVE

QUARTERLY PROGRESS REPORT FOR WORK DONE UNDER RESEARCH AGREEMENT

THE UNIVERSITY OF GEORGIA

QUARTER ENDING DECEMBER 31, 2007

PROJECT TITLE: Understanding Climate and Weather Impacts on the Prevalence of Tomato Spotted Wilt Virus in Peanut

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Objectives

The objectives of this project are to examine the effects of El Niño-Southern Oscillation (ENSO) phase on the of prevalence of tomato spotted wilt virus (TSWV) in peanut, and to integrate a weather-based model with the TSWV risk index that will assist peanut growers in effectively managing spotted wilt disease.

Progress

TSWV severity data

Dr. Albert Culbreath, University of Georgia, Tifton and Dr. Barry Tillman, University of Florida, Marianna, have provided experimental data in additional to the multi-year survey data initially provided by Dr. Steve L. Brown for 1998, 1999, 2002, 2004 and 2005. The data is currently being processed for analysis.

Climate

Analyses thus far using the five-year data set showed a varying level of interactions between the ENSO phases and different components of spotted wilt risk index. Results indicate that the severity of spotted wilt in peanut was consistently lower in a La Niña compared to El Niño or Neutral. Severity during Neutral phase was lower than in El Niño, but the differences were not significant. Deviation from the mean severity during different ENSO phases showed similar trend, with lower than average severity during the La Niña (Figure 1). Significant interactions were between ENSO phases and individual risk component. Available data indicate that climate played a significant role in spotted wilt severity of peanut. Climate might indirectly affect spotted wilt severity through varying weather patterns and weather parameters, including temperature and accumulated rainfall.

Weather

In addition to the risk index component, the average daily air temperature in April, the mean daily minimum air temperature in March and April, the number of rain day in March, the total rainfall in April, and amount of water balance in April, provided

significant contributions in predicting the severity of spotted wilt in peanut. A nonlinear regression analysis of the interaction between TSWV risk index point (excluding herbicide and plant population) and Rain Day in March showed (Figure 2) an additive effect by the two variables on spotted wilt severity. Additional statistical analysis will be conducted and application of the new data sets will be used for model optimization and validation.

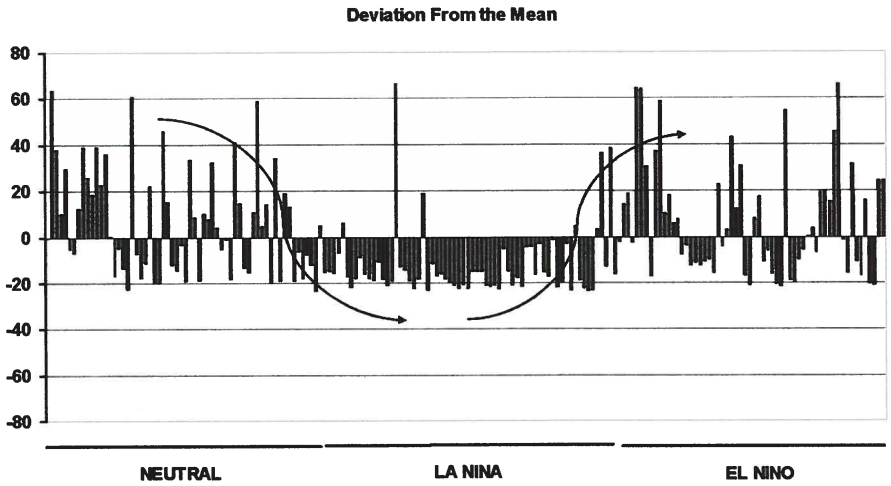

Fig. 1. Impact of climate on in spotted with severity based on El Niño-Southern Oscillation (ENSO) phase.

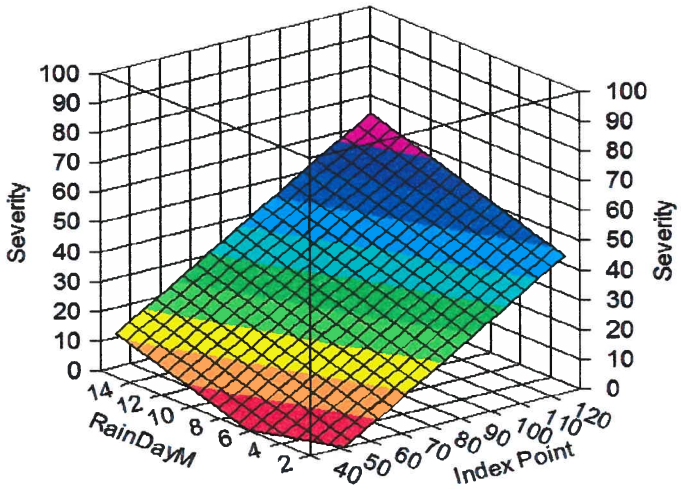

Fig. 2. The interactions between TSWV risk index point (excluding herbicide and plant population) and number of rain day in March.

References

1. Brown, S. L., Culbreath, A. K., Todd, J. W., Gorbet, D. W., Baldwin, J. A., and Beasley, J. P. 2005. Development of a Method of Risk Assessment to Facilitate Integrated Management of Spotted Wilt of Peanut. *Plant Disease* 89(4): 348-356.