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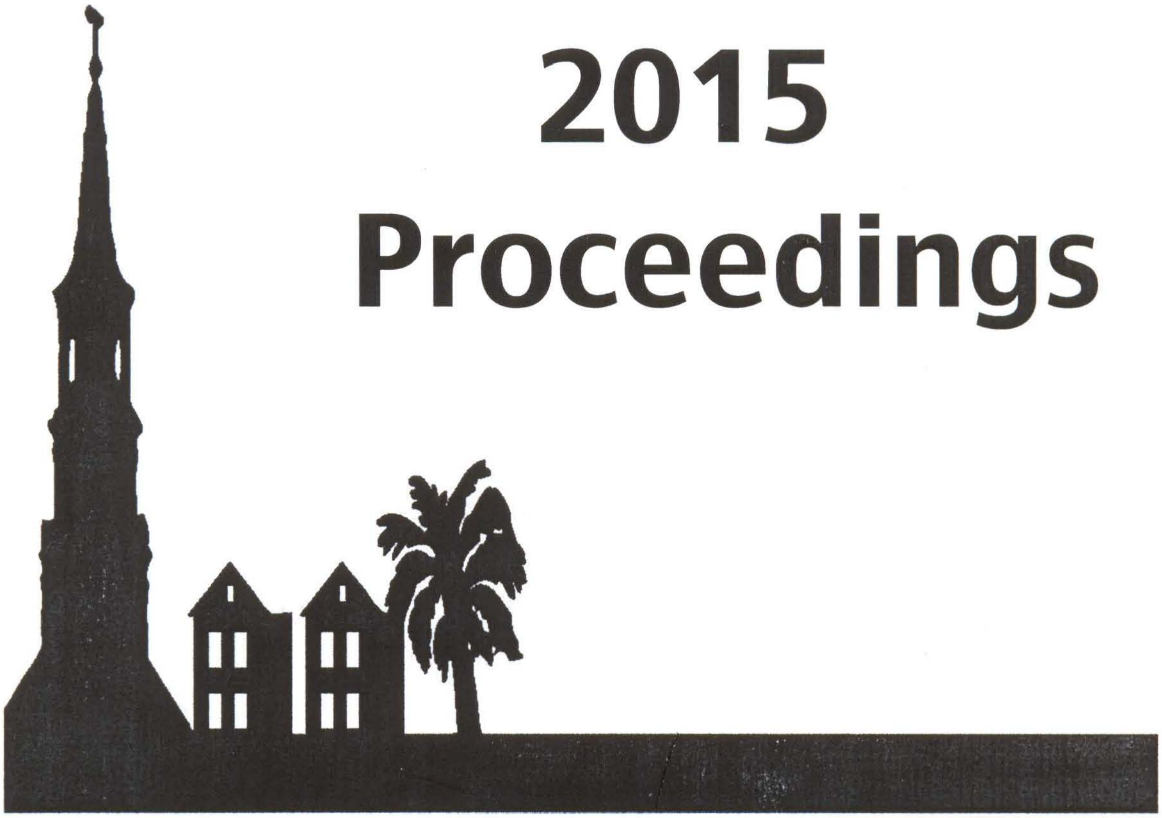

Yield Loss Modeling for Late Leafspot and Rust in Groundnut

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Late leafspot and rust diseases occur together and cause considerable yield loss in groundnut. Cultivation of resistant varieties is the best strategy to stabilize productivity under disease epidemics. Several varieties resistant or moderately resistant to LLS and rust have been developed in groundnut, but most of them differ in yield loss even at the same level of disease due to complex interrelationships between disease and yield loss. Crop loss models have been employed to gain insight into these relations and to plan sound breeding strategies. In the present study, different empirical models were tested for their explanatory value for yield loss among 10 groundnut genotypes with varying level of resistance to late leafspot and/or rust. Towards yield loss modeling, disease severity at different growth stages and physiological traits viz., leaf area index (LAI), harvest index (HI), healthy leaf area duration (HAD), crop and pod growth rates(CGR and PGR) and partitioning coefficient (PC) were considered as independent variables, while yield loss as dependent variable in regression models.

Single point models based on disease did not explain the variation in loss completely, but revealed pod filling as the critical stage in determining yield loss. Multiple point models using disease at different stages marginally improved the explanatory value; Inclusion of physiological traits in stepwise regression models improved the R^2 considerably, revealing their relevance to yield loss. Yield loss varied significantly among the genotypes resistant to both LLS and rust (9-17%), moderately resistant to LLS or rust (18-26%) and susceptible to LLS and rust (30-42%). Resistant genotype, GPBD-4 had high yield potential with minimum yield reduction due to its high partitioning efficiency and pod growth rate. Though highly susceptible, TAG-24 showed tolerance by early cessation of vegetative growth and efficient translocation of photosynthates to pods leading to high harvest index.