

Estimation of red tip disease severity in pineapple using a non-contact sensor approach.

ABSTRACT

Red tip disease on pineapple (*Ananas comosus*) was first recognized about 20 years ago in a commercial pineapple stand located in Simpang Renggam, Johor, Peninsular Malaysia. Since its discovery, there has been no confirmation on the causal agent of red tip disease. The epidemiology of red tip disease is still not fully understood. However, based on disease symptoms and field transmission mode, red tip disease seems to be strongly associated with viral infection. The aim of this work was to assess the feasibility of using an optical sensor to estimate red tip disease severity. This work was performed in a commercial pineapple plantation located in Simpang Renggam, Johor. Four observation plots bearing pineapple variety SR36 were demarcated based on crop growth stage. Each plot comprised a total of eighty corresponding measurements of percent Disease Severity (% DS) and Normalized Difference Vegetation Index (NDVI). Our data showed a strong correlation between % DS and NDVI. The 7- and 11-month plantings registered a correlation coefficient (r) of -0.83 and -0.88, respectively. The negative correlation infers that NDVI increases when disease severity is low. This is expected since healthy leaves reflect more near-infrared light and less visible light which results in a higher NDVI. The regression of NDVI on % DS for the 7-month planting was explained by: $\% DS = 181.6 - 185.6 \cdot NDVI$. Meanwhile, the regression of NDVI on % DS for the 11-month planting was explained by: $\% DS = 213.2 - 219.8 \cdot NDVI$. The linear fit between measured % DS and estimated % DS from the 7-month and 11-month plantings was relatively strong. This work has demonstrated that NDVI is a reliable predictor of % DS in pineapple.

Keyword: Pineapple; Red tip disease; Optical sensor.