

**EARLY DETECTION OF PANAMA DISEASE (FUSARIUM WILT)  
SYMPTOMS IN BANANA (*Musa* spp.) USING MOBILE PHONE**

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## ABSTRACT

**GEROLIA, ENRICO PAOLO G. AND PUNO, JOHN VER B.**, Department of Agricultural and Biosystems Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **June 2023, EARLY DETECTION OF PANAMA DISEASE (FUSARIUM WILT) SYMPTOMS IN BANANA (*Musa spp.*) USING MOBILE PHONE.**

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Panama disease is considered one of the most destructive diseases of bananas in modern times (PHA, 2021). Symptoms of Panama disease are closely similar to other banana diseases. In the early stages of Panama disease, it can be mistaken for nutritional problems or water stress. The most common method for Panama disease detection is through naked-eye observation. Since human perception and judgments vary from each other, inconsistencies may occur.

Moreover, it will take between ten to eighteen months for a banana tree to fully mature. During this period, farmers invest in pesticides, fertilizer, and labor costs to increase crop yield. If the disease had been detected in the early stage, the plant may be removed or eliminated, preventing resource waste on the part of the farmers. Thus, this study was conducted to develop a system that utilized mobile phones to aid banana farmers in the early detection of Panama disease. The machine learning system used a total of 10,000 images to gain the desired accuracy for detection.

Using a confusion matrix, the accuracy and efficiency of the system in identifying Panama Disease Symptoms were evaluated. After the actual test analysis, the system has 90.33% accuracy in the early detection of Panama disease, while in terms of incorrect predictions, the misclassification rate is 0.0967, indicating that the model's overall

incorrectness rate across all classes is 9.67%. A total investment cost of about Php 13,500 is estimated to be needed to develop the system for the early detection of symptoms of Panama disease.

**Keywords:** *Panama disease; early detection; machine learning; mobile phone*

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