

**DETEKSI BENIH UMBI KATAK PORANG (*Amorphophallus muelleri*)
TERINFEKSI CENDAWAN MENGGUNAKAN COMPUTER VISION
SYSTEM DAN ANALISIS PERTUMBUHAN TANAMAN PORANG PADA
FASE VEGETATIF**

INTISARI

Oleh:

NOVERIA ANGGI NURRAHMAH
18/429118/TP/12154

Porang (*Amorphophallus muelleri*) merupakan tanaman umbi-umbian yang digunakan industri sebagai bahan baku glukomanan. Porang dapat dibudidayakan menggunakan benih berupa umbi katak (bulbil). Kondisi pemanenan dan penyimpanan tertentu dapat menyebabkan bulbil terserang jamur dan kutu kebul yang berdampak pada penurunan kualitas benih dan hasil tanamannya. Penelitian ini bertujuan untuk mengevaluasi kualitas benih umbi katak porang (*Amorphophallus muelleri*) menggunakan *computer vision system*. Sebanyak 90 sampel digunakan dan diuji pada tiga posisi yang berbeda untuk parameter gambar yang meliputi warna (*RGB* dan *HSI*), tekstur (*contrast*, *correlation*, *homogeneity*, *entropy*, dan *energy*), dan dimensi (*width*, *height*, dan *area*). Sifat fisik benih yang diukur meliputi kadar air, *spherical volume*, dan berat. Validasi viabilitas benih dianalisis dengan mengukur pertumbuhan tanaman yaitu berat basah, berat kering, panjang akar, volume akar, panjang batang, *crown cover*, jumlah daun, dan warna daun. Analisis regresi dan korelasi berganda digunakan untuk menganalisis hubungan antara parameter gambar terhadap parameter pertumbuhan tanaman, dan analisis diskriminan digunakan untuk mengelompokkan umbi porang sehat dan terinfeksi cendawan. Hasil penelitian menunjukkan bahwa variabel gambar memberikan korelasi yang lemah hingga sedang (21,76 - 51,04%) terhadap variabel pertumbuhan. Hal tersebut menunjukkan bahwa *computer vision system* belum mampu memprediksi pertumbuhan tanaman porang karena korelasinya rendah sampai sedang. Analisis diskriminan berdasarkan variabel gambar dapat digunakan untuk mengklasifikasikan umbi katak porang tidak terinfeksi dan terinfeksi cendawan dengan nilai akurasi model dan *root mean square error (RMSE)* 97,4% dan 0,16%. Performa model yang dihasilkan menunjukkan hasil yang baik ditandai dengan nilai *FPR* dan *FNR* dibawah 0,05 serta nilai *sensitivity*, *specificity* dan *reliability* diatas 0,95. Akurasi yang tinggi dan performa model yang baik menunjukkan bahwa model diskriminan layak digunakan untuk mendeteksi infeksi cendawan pada umbi katak porang berdasarkan parameter gambar.

Kata kunci: Kualitas Benih, Pengolahan Citra, Evaluasi Visual, Diskriminan.

DETECTION OF SEEDS OF KATAK PORANG (*Amorphophallus muelleri*) MOLD INFECTED USING COMPUTER VISION SYSTEM AND GROWTH ANALYSIS OF PORANG IN THE VEGETATIVE PHASE

ABSTRACT

By:

NOVERIA ANGGI NURRAHMAH

18/429118/TP/12154

Porang (*Amorphophallus muelleri*) is a tuber plant used in the industrial production of glucomannan. Porang can be cultivated with bulbil (katak tubers). Under certain harvesting and storage conditions, bulbil can be infected by fungi and whitefly, resulting in a decrease in seed quality and crop yields. This study aimed to evaluate the quality of the bulbil of porang using a computer vision system. A total of 90 samples were used and measured in three different positions for image parameters such as color (RGB and HSI), texture (contrast, correlation, homogeneity, entropy, and energy), and dimensions (width, height, and area). The physical properties of seeds were measured such as moisture content, spherical volume, and weight. Validation of viability of seeds was analyzed with measurement of plant growth such as wet weight, dry weight, root length, root volume, stem length, number of leaves, crown cover, and leaf color was also analyzed to determine plant yields. Multiple regression and correlation analysis were used to analyze the relationship between image parameters and plant growth parameters, and discriminant analysis was used to classify healthy and fungal porang tubers. The results showed that the image variable gave a weak to moderate correlation (21,76% to 51,04%) to the growth variable. This indicates that computer vision systems can't predict the growth of porang plants because the correlation is low to moderate. Discriminant analysis based on image variables can be used to classify non-infected and fungus-infected katak porang tubers with model accuracy values and root means square error (RMSE) of 97.4% and 0.16%, respectively. The performance of the model shows good results, indicated by the FPR and FNR values below 0.05 and the sensitivity, specificity, and reliability values above 0.95. The

high accuracy and good model performance indicate that the discriminant model is suitable to be used to detect fungal infection in katak porang tubers based on image parameters.

Keywords: Seed Quality, Image Processing, Visual Evaluation, Discriminant.