

### ABSTRACT

*This objective of research were 1) to determine the impact of copper (Cu) stress on the growth and the appearance of hybrid of oil palm seedlings, 2) to determine the critical threshold of Cu which may affect the anatomical structure of the vegetative organ of oil palm seedlings, and 3) to determine the anatomical response of the vegetative organ of oil palm seedlings to Cu stress. The research was arranged in a single factor of Randomized Complete Block Design (RCBD), with three blocks as replications. The factor was Cu stress, which consisted of three concentrations of Cu, namely 0, 600, and 1200 ppm. The observations were made on several variables of micro-climate, root and leaf anatomy, and growth of oil palm seedlings. Duncan Multiple Range Test (DMRT) if there were significance differences among the treatments. The Cu concentrations that started poisoning the oil palm seedlings were determined with regression analysis. The results showed that Cu stress was decreased number leaves, stem diameter, plant height, and caused leaf chlorosis and necrosis. The critical threshold of Cu that changed the anatomical structure of roots and leaves was 228 ppm. The available Cu concentrations in the planting medium with the range of 27-453 ppm were decreased root hypodermic thickness, cortical cells length and width, endodermic thickness, and leaf floem diameter at 11 weeks after transplanting. Meanwhile, the available Cu concentrations in the planting medium with the range of 27-453 ppm were decreased root sclerenchyma thickness, cortex length, leaf epidermal cell length and width, xylem and floem diameter, and width of stomatal and stomatal opening at 19 weeks after transplanting.*

*Keywords: copper, oil palm, anatomy, growth.*

## INTISARI

Penelitian bertujuan untuk 1) menentukan dampak cekaman tembaga (Cu) terhadap pertumbuhan dan kenampakan bibit hibrida kelapa sawit, 2) menentukan ambang kritis cekaman Cu yang dapat mempengaruhi struktur anatomi organ vegetatif bibit hibrida kelapa sawit, dan 3) menentukan tanggapan anatomis organ vegetatif bibit hibrida kelapa sawit terhadap cekaman Cu. Percobaan lapangan disusun dalam Rancangan Acak Kelompok Lengkap (RAKL) faktor tunggal dengan tiga blok sebagai ulangan. Perlakuan yang diuji yaitu cekaman Cu, terdiri dari tiga konsentrasi yaitu 0, 600, dan 1200 ppm. Variabel yang diamati meliputi karakter iklim mikro, anatomi akar dan daun, dan pertumbuhan bibit kelapa sawit. Data yang diperoleh dianalisis varian (ANOVA) pada level 5%, dan dilanjutkan dengan Uji Jarak Berganda Duncan (DMRT) jika terdapat beda nyata antar perlakuan. Konsentrasi Cu yang mulai meracunan bagi tanaman kelapa sawit ditentukan menggunakan analisis regresi. Hasil penelitian memberikan informasi bahwa cekaman Cu menyebabkan penurunan jumlah daun, diameter batang, tinggi tanaman, dan klorosis dan nekrosis daun. Ambang kritis konsentrasi Cu yang menyebabkan perubahan struktur anatomi akar dan daun adalah 228 ppm. Konsentrasi Cu tersedia pada media tanam sebesar 27 – 453 ppm menyebabkan penurunan tebal hypodermis akar, penurunan panjang dan lebar sel korteks akar, penurunan tebal endodermis akar, dan penurunan diameter floem daun pada 11 msp. Sedangkan pada 19 msp, konsentrasi Cu tersedia pada media tanam sebesar 27 – 453 ppm menyebabkan penurunan tebal sklerenkim akar, penurunan panjang korteks akar, penurunan panjang dan lebar sel epidermis atas daun, penurunan diameter xilem dan floem daun, dan penurunan lebar stomata dan lebar bukaan stomata daun.

Kata kunci : tembaga, kelapa sawit, anatomi, pertumbuhan.