

INTISARI

Kalsium (Ca) merupakan unsur penting dalam pertumbuhan dan perkembangan tanaman. Kekurangan maupun kelebihan Ca pada tanaman dapat berpengaruh terhadap morfologis maupun anatomis pada tanaman, sehingga kajian mengenai kontribusi Ca pada karakter anatomis t.tanaman kakao perlu dilakukan. Penelitian bertujuan untuk a) Mengidentifikasi pengaruh Ca terhadap keragaan anatomis dan hasil kakao, b) Menentukan dosis Ca yang optimal bagi karakter anatomis jaringan dan hasil kakao. Penelitian dilaksanakan di perkebunan kakao milik PT. Pagilaran di Unit Produksi Segayung Utara, Kecamatan Tulis, Kabupaten Batang, Jawa Tengah pada Agustus 2020 – Februari 2021. Percobaan lapangan disusun menggunakan rancangan acak kelompok lengkap (RAKL) faktor tunggal dengan tiga blok sebagai ulangan. Perlakuan yang diuji yaitu dosis pupuk Ca, terdiri dari lima dosis yaitu tanpa pupuk (C0), pemberian pupuk Ca 100 g/pohon/tahun (C1), 200 g/pohon/tahun (C2), 300 g/pohon/tahun (C3), dan 400 g/pohon/tahun (C4). Klon kakao yang menjadi obyek kajian yaitu RCC 71 karena cukup dominan ditanam oleh para pekebun. Variabel yang diamati berupa karakter iklim mikro, kimia tanah, anatomis organ akar, batang, daun dan buah dan komponen hasil dan hasil tanaman kakao. Data yang diperoleh selanjutnya dianalisis varians (ANOVA) pada α 5%. Jika terdapat beda nyata kemudian diuji lanjut dengan *polynomial orthogonal*. Untuk menentukan karakter anatomis organ-organ tanaman yang pengaruhnya dominan terhadap hasil pengujian dilakukan menggunakan regresi berganda. Hasil penelitian memberikan informasi bahwa dosis pupuk Ca 300 g/pohon/tahun dapat memaksimalkan diameter xilem dan Floem akar, peningkatan diameter stele akar, penebalan lapisan gabus dan kulit skunder akar, panjang dan lebar sel epidermis batang, diameter xilem dan floem batang, panjang sel korteks batang, lebar empelur (*pith*) batang, penebalan skelerenkim batang, diameter stele batang, panjang dan lebar sel epidermis atas dan bawah daun, diameter xilem dan floem daun, panjang dan lebar sel seludang berkas pengangkut daun, kerapatan stomata daun, lebar bukaan stomata daun, panjang dan lebar stomata daun, panjang dan lebar sel penjaga daun, tebal eksokarp luar dan dalam, tebal endokarp, tebal perikarp dan diameter mukus. Dosis pupuk Ca 300 g/pohon/tahun optimal untuk memaksimalkan ukuran panjang buah, diameter buah, berat buah per pod, berat segar biji, jumlah biji, berat kering biji, berat 100 biji kering, *beancount*, rendemen dan berat biji kering per pohon.

Kata Kunci : Anatomi, Kakao, Kalsium, dan Komponen Hasil

ABSTRACT

Calcium (Ca) is an important element in plant growth and development. The disadvantages and advantages of Ca in plants can affect morphology and anatomy in plants, so studies of Ca's contribution to the anatomical character of cocoa plants need to be done. The objectives of research were to a) determine effects of Ca fertilizer on anatomical traits and yield of cocoa, b) determine optimal dose of Ca fertilizer to maximized anatomical traits, yield components and yields of cocoa. The field research was carried out in a cocoa plantation owned by PT. Pagilaran at Segayung Utara Production Unit, Tulis District, Batang Regency, Central Java Province, on August 2020 – February 2021. The field experiment was arranged in a single factor of Completely Randomized Block Design (RCBD) with three blocks as replications. The treatments tested were doses of Ca fertilizer, consisting of five doses, namely without Ca fertilizer, 100 g/tree/year of Ca fertilizer, 200 g/tree/year of Ca fertilizer, 300 g/tree/year of Ca fertilizer, and 400 g/tree/year of Ca fertilizer. Cocoa clone that became object of research was RCC 71 because it was quite dominantly planted by the planters. The variables observed were some characters of microclimate, soil chemistry, anatomical organs of roots, stems, leaves and fruits, and yield components and yields of cocoa. Data obtained were then analyzed with analysis of variance (ANOVA) at 5% levels. If there were significant differences among treatments then further tested with orthogonal polynomials. To determine anatomical characters which have dominant influence on cocoa yields, multiple regression was used. The results provided information that a dose of Ca fertilizer 300 g/tree/year could maximize diameter of roots xylem and phloem, roots stele diameter, root cork layer and secondary bark thickness, length and width of stem epidermal cells, diameter of stem xylem and phloem, length of stem cortex, stem pith width, stem sclerenchyma thickness, stem stele diameter, length and width of leaf upper and lower epidermal cells, leaf xylem and phloem diameter, length and width of leaf bundle sheath cells, leaf stomatas density, length and width of leaf stomatal opening, length and width of leaf guard cells, outer and inner exocarp thickness of fruits, endocarp and pericarp thickness of fruits, and fruits mucus diameter. The optimal dose of Ca fertilizer was 300 g/tree/year. This dose was maximized fruits length, fruits diameter, fruits weight per pod, fresh seed weight per pod, number of seeds per pod, dry weight of seed per pod, dry weight of 100 seeds, bean count, and dry weight of seeds per tree per year.

Keywords: Anatomy, Cocoa, Calcium, and Yield Components