

Intensitas Penutup Tanah *Arachis pinto* dan Inokulasi Rhizobium serta Penambahan Fosfor dan Pengaruhnya Terhadap Pertumbuhan Tanaman Kakao dan Status Hara di Lapangan

*Intensity of Ground Cover Crop *Arachis pinto*, Rhizobium Inoculation and Phosphorus Application and Their Effects on Field Growth and Nutrient Status of Cocoa Plants*

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Ringkasan

Arachis pinto berpotensi sebagai tanaman penutup tanah pada perkebunan kakao, namun informasi perihal pengaruhnya terhadap pertumbuhan tanaman kakao (*Theobroma cacao*) pada kondisi di lapangan sangat terbatas. Tujuan penelitian ini adalah untuk mempelajari kombinasi pengaruh tanaman penutup tanah *A. pinto*, inokulasi bakteri rhizobium dan pemupukan fosfor (P) terhadap pertumbuhan dan status nitrogen (N) tanaman kakao di lapangan. Penelitian menggunakan rancangan petak-petak terbagi (*split-split plot*) dengan perlakuan tiga aras tanaman penutup tanah (tanpa, *A. pinto* dan *Calopogonium caeruleum*), dua aras inokulasi rhizobium (tanpa dan diinokulasi) serta dua aras pupuk fosfor (tanpa dan dipupuk P). Hasil penelitian menunjukkan bahwa pada kondisi lapangan, adanya tanaman penutup tanah *A. pinto* tidak mempengaruhi pertumbuhan tanaman kakao, sebaliknya *C. caeruleum* sebagai tanaman penutup tanah cenderung lebih menghambat pertumbuhan tanaman kakao dibandingkan *A. pinto*. Penambahan fosfor meningkatkan jumlah daun tanaman kakao. Produksi biomassa *A. pinto* 40% lebih banyak dibandingkan *C. caeruleum*. Kadar N dan C organik tanah tidak dipengaruhi oleh tanaman penutup tanah, namun nilai tertinggi (0,235% N dan 1,63% C) diperoleh pada perlakuan kombinasi inokulasi dan pemupukan P atau sama sekali tanpa inokulasi maupun pupuk P. Pada kondisi tanpa rhizobium, kadar N tanah pada pertanaman kakao berpenutup tanah *A. pinto* lebih rendah dari pada tanpa penutup tanah ataupun dengan *C. caeruleum*. Tanaman penutup tanah meningkatkan kadar N jaringan tanaman kakao bila tidak diinokulasi dengan rhizobium, sebaliknya bila dilakukan inokulasi rhizobium maka kandungan N jaringan menurun. Kadar P jaringan tanaman kakao tidak dipengaruhi oleh adanya tanaman penutup tanah *A. pinto* ataupun rhizobium, kecuali bahwa kadar P jaringan tanaman kakao lebih tinggi 28% bila berpenutup tanah *C. caeruleum* dan diinokulasi rhizobium.

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Summary

Arachis pintoi is potentially as a cover crop for cocoa (*Theobroma cacao* L.) farm, however information regarding its effect on the growth of cocoa plants in the field is very limited. The objective of this experiment is to investigate the combined influence of ground cover crop *A. pintoi*, rhizobial bacterial inoculation and phosphorus (P) fertilizer on the growth of cocoa in the field and nutrient status. This experiment laid out in split-split plot design consisted of three levels of cover crop (without, *A. pintoi* and *Calopogonium caeruleum*), two levels of rhizobium inoculation (not inoculated and inoculated) and two levels of phosphorus application (no P added and P added). The results showed that in field condition the presence of *A. pintoi* as cover crop did not affect the growth of cocoa. On the other hand, *C. caeruleum* as cover crop tended to restrict cocoa growth compared to *A. pintoi*. Application of P increased leaf number of cocoa plant. Biomass production of *A. pintoi* was 40% higher than *C. caeruleum*. Soil organic carbon and nitrogen contents were not affected by ground cover crops, though higher value (0.235% N and 1.63% organic C) was obtained from combined treatments of inoculation and P addition or neither inoculation nor P addition. In the case of no rhizobium inoculation, soil N content in cocoa farm with *A. pintoi* cover crop was lower than that of without cover crop or with *C. caeruleum*. Cover crop increased plant N content when there was no inoculation, on the other hand rhizobium inoculation decreased N content of cocoa tissue. Tissue P content of cocoa plant was not influenced by *A. pintoi* cover crop or by rhizobium inoculation, except that the P tissue content of cocoa was 28% higher when the cover crop was *C. caeruleum* and inoculated.

Key words : *Arachis pintoi*, *Theobroma cacao*, *Calopogonium caeruleum*, rhizobium, nitrogen, phosphorus.