RELATIONSHIP BETWEEN CHLOROPHYLL CONTENT, VEGETATIVE TRAITS AND YIELD - RELATED TRAITS IN SELECTED COWPEA VARIETIES.

(*Vigna unguiculata*)

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ABSTRACT

The selection of cowpea varieties with desirable physiological and yield related traits is essential for improving productivity and developing high performing cultivars. This study examined the relationships among chlorophyll content, vegetative growth parameters and yield-related traits in six cowpea varieties (*MICP1, MI35, ANKCP1, WARUNI, DHAWALA* and *BOMBAY)* grown under field conditions using a Randomized Complete Block Design (RCBD) with three replications. Chlorophyll content was quantified using both SPAD meter readings and spectrophotometric assays while vegetative traits and yield components were recorded at 5 and 7 weeks after planting. Results revealed clear varietal differences in both physiological and yield traits. *BOMBAY* recorded the highest Chlorophyll values. *DHAWALA* exhibited the greatest plant height and canopy spread whereas *MICP1* showed the smallest stature but possessed the largest leaf area. Yield performance also differed significantly with *ANKCP1* achieving the highest grain yield per plant (39.31 ± 0.53 g) associated with a superior harvest index despite not having the highest vegetative vigor. Correlation analysis indicated a weak and negative association between chlorophyll content and grain yield ($r = -0.04$) demonstrating that higher chlorophyll content did not predict final productivity. Stomatal observations further showed varietal differences in gas exchange capacity with *WARUNI* having higher stomatal density and larger guard cells compared to the more conservative water-use strategy of *ANKCP1*. These findings exhibit substantial physiological and yield diversity among the tested cowpea varieties and identify *ANKCP1, DHAWALA and BOMBAY* as lines of particular interest for future breeding. The findings emphasize that balanced vegetative growth and efficient biomass allocation rather than maximum chlorophyll content alone is the key determinants of cowpea yield under field conditions in Sri Lanka.

Keywords: Analysis, Chlorophyll content, Correlation, Physiological diversity, Pigment content, Stomata, Photosynthetic capacity

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