# YIELD COMPONENTS AND PHYSIOLOGICAL FACTORS DETERMINING THE YIELD OF COWPEA IN *ANURADHAPURA*, SRI LANKA

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Cowpea (*Vigna unguiculata* L.) is an important component in rain-fed cropping systems in the dry zone of Sri Lanka. Cowpea grows well in marginal conditions giving an approximate yield of 1.7 $MTha^{-1}$. Most of the legume crops in the world are adversely affected by high temperature resulting in low yield. The main aim of the study was to evaluate the effect of temperature on agronomical and physiological parameters among five cowpea varieties cultivated in *Anuradhapura*, Sri Lanka. The study was conducted in the Research Unit of the Faculty of Agriculture, Rajarata University of Sri Lanka, *Anuradhapura* during the *Maha* season 2019/2020. Five cowpea varieties namely: MI35, *Waruni, Dhawala, Bombay* and ANKCP01, with four replicates were tested in a one-way ANOVA. Management practices were done according to the recommendations of the Department of Agriculture, Sri Lanka. Physiological parameters: net photosynthetic rate ($A_{sat}$), maximum photosynthetic rate ($A_{max}$), dark respiration ($R_D$) parameters derived from the light response and ACi curves; and agronomical parameters: leaf area, number of seeds per pods, number of pods per plant, 100 seed weight at harvesting, and 12% moisture content were measured. Yield showed a strong positive relationship with the number of pods per plant ($p$=0.043) and seeds per pod ($p$=0.014) in *Bombay*, but not with physiological parameters. The maximum rate of carboxylation ($V_{cmax}$) and electron transport capacity ($J_{max}$) increased with increasing temperature. Five varieties achieved $V_{cmax}$ and $J_{max}$ at different temperatures (30–42 °C). Physiological parameters: $A_{sat}$ and $A_{max}$ were not different among the varieties. $R_D$ was significant ($p$=0.048) with the highest being in MI35 and the lowest other varieties. Among light response curve parameters: apparent quantum yield, light compensation point, light respiration, dark respiration and degree of light inhibition were not significant. In conclusion, agronomic traits were correlated with yield and thermal responses on physiological traits, vary among varieties.

**Keywords**: Cowpea, Light response, Net photosynthesis, Thermal response