MORPHOLOGICAL AND PHYSIOLOGICAL CHARACTERIZATION OF RECOMMENDED COWPEA (Vigna unguiculata L.) VARIETIES IN RELATION WITH MOISTURE STRESS

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ABSTRACT

Cowpea (Vigna unguiculata) is an important legume crop in dry zones of Sri Lanka. As such study was to evaluate the physiological, morphological and yield characteristics of five cowpea varieties namely Bombay, Dhawala, Waruni, ANKCP 01, and MICP 01 performed under different moisture levels (100%, 75%, 50% and 25%) at FCRDI (Field Crops Research and Development Institute), Mahailluppallama. The morphological, physiological, and yield characteristics of the cowpea varieties were investigated in a field experiment, using a Randomized Complete Block Design (RCBD) with three replicates. Analysis of Variance (ANOVA) showed significant variations among the varieties and moisture levels for the traits such as number of leaves after 6 weeks, number of branches 6WAP, leaflet width 6WAP, leaf area, number of days to flowering, number of partially opened stomata, number of fully closed stomata, pod length, seed length, seed width, seed thickness, and yield. The interaction effects between varieties and moisture stress were significant for the trait, number of branches after six weeks of planting, indicate the importance of considering these traits in the selection process of new variety development. Dhawala (V2) was the most promising and it outperformed others in terms of plant height, leaf size, number of branches, grain yield and root length under moisture stress even under 50% moisture condition. ANKCP 01 showed least number of days to germination (3 days) even in 25% moisture condition.

At early stages (2WAP and 4WAP) Bombay showed highest plant height among varieties and also Bombay showed good seed characteristics and leaf characteristics above 50% moisture stress condition. Dhawala showed highest number of leaves at all stages and concluded that the high rate of photosynthesis resulted in a very important trait of highest average yield of 5.08g even in 50% moisture condition. At 25% moisture level only Dhawala produced flowers. Among five varieties MICP 01 showed poor characterization for considered traits including lowest yield per plant (3.41g) under 25% moisture condition. Waruni showed highest stomata activity with longest pod (12.33cm) even in 50% moisture condition. Results of this study revealed that Dhawala is more suitable for even 50% of moisture, will contribute to ensure sustainable cowpea production in water-scarce environments, enhanced food security and agricultural sustainability.

KEYWORDS: Cowpea, Morphological, Physiological, Characterization, Moisture stress.

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