

**COMPARISON OF THE PHYSIOLOGICAL AND AGRONOMIC  
RESPONSES OF MOISTURE STRESS IN SELECTED COWPEA  
(*Vigna unguiculata* L. Walp) CULTIVARS DURING THE FLOWERING  
STAGE**



**BY**

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**SRI LANKA**

**2011**

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## ABSTRACT

A study was conducted in the Agronomy farm of the Eastern University, Sri Lanka to determine the Physiological and Agronomic responses of cowpea (*Vigna unguiculata* L. Walp) cultivars namely 'Arlington', 'Vijaya' and 'Waruni' to moisture stress at the flowering stage. The experiment was laid out in the Randomized Complete Block Design (RCBD) with six treatments and four replications. Moisture stress was imposed for the selected cowpea cultivars for a period of 12 days during the flowering stage. The control plants were watered to Field Capacity at three days interval. Moisture stress significantly increased the stomatal resistance (RS) and proline content of all the stressed plants during the flowering stage. The 'Arlington' cultivar stressed during the flowering stage showed the highest RS value compared to the rest of the cowpea cultivars.

The cultivar 'Waruni' stressed during the flowering stage showed the highest free proline content than those of 'Arlington' and 'Vijaya'. It was found that there were significant reduction in the transpiration rate (TR) and relative water content (RWC) of all the cowpea cultivars owing to moisture stress. The 'Vijaya' cultivar stressed during the flowering stage showed the highest TR value than those of 'Arlington' and 'Waruni'. The 'Waruni' cultivar stressed during the flowering stage showed the highest RWC than those of 'Arlington' and 'Vijaya' during the flowering stage.

Moisture stress reduced the pod size, 1000 grain weight and yield of cowpea cultivars. The cultivar 'Vijaya' stressed during the flowering stage showed the

highest pod length compared to 'Arlington' and 'Waruni' during the flowering stage.

The plants which were subjected to soil moisture stress showed lower 1000 grain weight than those which received regular watering. The cultivar 'Waruni' stressed during the flowering stage showed the highest 1000 grain weight than those of 'Vijaya' and 'Arlington'. The plants which were subjected to moisture stress showed lower yield than those which received regular watering. The 'Waruni' cultivar stressed during the flowering stage showed the highest yield compared to 'Vijaya' and 'Arlington'.

Hence, considering the above responses of cowpea cultivars to moisture stress, it could be stated that 'Waruni' cultivar of cowpea resisted drought more than those of 'Arlington' and 'Vijaya'. As indicated by the highest RWC value during the stress period, 'Waruni' cultivar was able to conserve more moisture in the cells of tissues followed by increased turgor. Thereby, it was able to proceed with the normal growth and development. This would have been the reason for the highest yield in 'Waruni' cultivar of cowpea under moisture stress condition.

**Key words** - Stomatal Resistance, Transpiration Rate, Relative Water Content, Proline, Pod length, 1000 grain weight, Yield

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