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Short Communication

A comparative study on the field performance of selected cowpea(*Vigna unguiculata*) cultivars in the sandy regosols of Batticaloa district

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Cowpea (*Vigna unguiculata*) is a leguminous species of pulse crop grown principally for its protein rich edible seeds. It is one of the economically important legumes grown in Sri Lanka. Batticaloa is one of the cowpea cultivating districts situated in the Eastern Province of Sri Lanka. Farmers give special attention to cowpea cultivation owing to its drought tolerance features, high protein content, nitrogen fixing ability, amenability to varying cropping patterns and wide adaptability. Cowpea cultivation is undertaken to a large extent but, the production is very low [1]. The productivity of cowpea depends on several factors. Among these, suitable cultivar plays a major role. Farmers in the Batticaloa district are cultivating local varieties of cowpea. This is one of the reasons for the low yield per unit area of land in this district. Growing suitable and high yielding cowpea cultivars is a way to increase the yield. Selection of suitable such cultivars requires an understanding of the agronomic and physiological processes which determine the yield. This study was focused on the field performance of selected cowpea cultivars in the sandy regosols of Batticaloa district in order to obtain better yield. Hence, an experiment was conducted with the objectives of;

1. Comparing the growth and yield of selected cowpea cultivars in the sandy regosols of Batticaloa district and
2. To determine the most suitable cultivar for this type of soil.

This experiment was conducted in the agronomy farm of the Eastern University, Sri Lanka from May to July 2006. The type of soil of this area is sandy regosols which is the dominant soil type of Batticaloa district.

There were three treatments for this experiment and each one was replicated six times. The treatments were as follows:

- T_1-'MI-35' cultivar of cowpea
- T_2- 'Dhawala' cultivar of cowpea
- T_3-'Waruni' cultivar of cowpea

These treatments were arranged in a randomized complete block design (RCBD).

Cowpea seeds were treated with Captan (Fungicide) at the rate of 3g kg^{-1} seeds for half an hour prior to dibbling then these seeds were sown at the rate of 40 kg ha^{-1}. Three seeds were dibbled in a planting hole. Thinning out was done 10 days after the emergence of the seedlings. One vigorous plant was allowed to grow in each hole. The depth of planting hole was 2.5 cm. These plants were maintained at a spacing of 45cm between rows and 15cm within a row [1]. Urea (35 $kgha^{-1}$), Triple Super Phosphate (100 $kgha^{-1}$) and Muriate of Potash (75 $kgha^{-1}$) were applied as basal fertilizers before sowing. Urea (30 $kgha^{-1}$) was incorporated with the soil as top dressing during the flowering stage (30 days after sowing) [1]. Weeding was done manually at 7 days interval. The plants were kept away from insect pests and diseases. Watering was done daily in the morning until germination and it was applied to Field Capacity at 3 days interval from the seedling stage. The leaf area (LA), the root length density (RLD), the number of branches at 100% flowering and the yield were measured from the treatments during the experimental period and were analyzed statistically.

From the results, it was found that the cv. 'MI-35' showed the highest LA compared to the other two cvs. at all three stages of growth (Table 1). LA is closely related to yield. The cv. 'MI-35' showed quick growth during the vegetative stage and attained the maximum LA during the flowering stage. Attainment of higher leaf area could be a good sign for future growth and yield of 'MI-35'.

Table 1: Leaf area (LA) (cm^2) and root length density (RLD) (cm.cm3) of cowpea cultivars

Treatment	Stages of growth					
	Vegetative		Flowering		Pod-filling	
	LA	RLD	LA	RLD	LA	RLD
T_1	**2576.60* a**	**0.061* a**	**2723.77 a**	0.080 b	**2710.10 a**	**0.082 a**
T_2	1691.10 b	**0.064 a**	1922.93 b	**0.086 a**	2073.66 c	**0.085 a**
T_3	1410.07 c	0.051 b	2047.31 b	0.071 c	2327.03 b	0.076 b

Means with the same letters do not differ significantly ($p < 0.05$).
*Values are the means of 6 plants in 6 replications.

The cowpea cv. 'Dhawala' showed the highest RLD compared to the other two cvs. during the flowering stage. It was also found that there were no significant differences in the RLD of 'MI-35' and 'Dhawala' cvs. during the vegetative and pod-filling stages (Table 1).

The cv. 'Dhawala' would have had the characteristic feature of producing the highest length of roots during the flowering stage which would have helped to absorb sufficient amount of water and nutrients from the soil. During the vegetative stage, the length of roots produced by the cvs. 'Dhawala' and 'MI-35' would have remained the same. This shows that the rate of root growth of these two cvs. would have been approximately same. In sandy soils vigorous early growth enables greater root development [2]. There were no significant differences in the RLD of cvs. 'Dhawala' and 'MI-35' during the pod filling stage. In the cv. 'MI-35' new roots would have formed compared to the cv. 'Dhawala'. Development and maintenance of root length and root distribution during later growth stages favor drought avoidance mechanism in sandy soils.

It was found that there were significant differences between treatments in the number of branches. The highest number of branches was observed in the cv. 'MI-35' and the lowest number was found in the cv. 'Waruni' (Table2).

Table 2: The number of branches of cowpea cultivars during the flowering stage

Treatments	Number of branches
T_1	4.38* a
T_2	3.87 a
T_3	1.60 b

Means with the same letters do not differ significantly ($p < 0.05$).
*Values are the means of 18 plants in 6 replications.

The number of branches at flowering stage is directly related to the number of flower produced in mungbean [3]. From the table 3 it could be stated that cowpea cv. 'MI-35' would be the best with regard to the production of number of branches per plant which in turn can contribute to the yield.

It was found that there were significant differences between the treatments in the yield of cowpea. The highest yield was obtained in the cv. 'MI-35' followed by 'Waruni' (Fig. 1). In this experiment as stated before, cv. 'MI-35' reached the highest LA during the flowering stage and this was maintained until the pod-filling stage. Increase in leaf area would have increased the photosynthesis of this cv. and thereby contributed for the highest yield produced by this cv. The number of branches produced by this cv. during the flowering stage was also high. This may also be the reason for the highest yield shown by this cv.

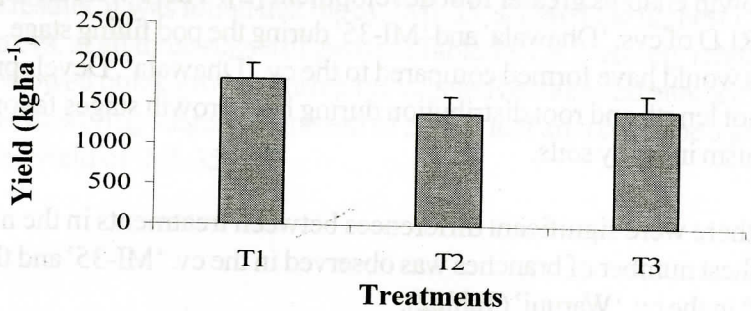

Figure 1: The yield of different cowpea cultivars.

From this study it was found that the cv. 'MI-35' would be the best suited cv. for the sandy regosol of this district. The cv. 'MI-35' showed the highest LA irrespective of the stages of growth. This cultivar showed rapid root development during the vegetative stage and it maintained a high RLD during the pod filling stage. The number of branches produced by

this cv. was also high during the flowering stage. In addition, the highest yield was obtained by this cultivar. Hence, cv. 'MI-35' could be adapted by the cowpea growing farmers of the Batticaloa district. The cv. 'Dhawala' could also be grown in the sandy regosols under the prevailing conditions next to 'MI-35'.

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