OPENING MINDS:
RESEARCH FOR SUSTAINABLE
DEVELOPMENT

Growth and Yield Performance of Newly Introduced Chilli Variety (*Capsicum annum* L. var. MI 1) Grown under Basin Irrigation System in Jaffna District of Sri Lanka

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1 INTRODUCTION

In Sri Lanka, the average extent of Chilli cultivation in 2014 is about 14,294 ha and the production is about 60,269 Mt of green Chilli. Currently the Department of Agriculture recommended Chilli varieties are not sufficient to give a higher yield combating the major pest and disease out breaks, especially the Chilli leaf curl complex and viruses. The situation has been further aggravated by the factors such as high cost of production due to high cost for labour and agro-chemicals and unavailability of quality seeds of high yielding varieties. Since 1962 the DOA has developed few open pollinated Chilli varieties having the yield potential of 2.5-3.5 Mt/ha and 8-15 Mt/ha of dry Chilli and green Chilli respectively, the average farmer yield remains below 1.0 t/ha of dry Chilli. Dry Chilli production within the country is not enough to supply domestic demand for dry Chilli. Therefore a large amount of dry Chilli is imported from other countries. Chilli leaf curl complex (CLCC) is the major problem resulting in heavy yield losses up to 53% more especially during *yala* season. CLCC is caused by several factors (Thrips, mites and viruses) of which thrips are the most important.

Most of the hybrid Chilli varieties which are produced by the Asian countries are imported by private seed handlers because of the unavailability of quality seeds of high yielding varieties. In the recent years, these exotic Chilli hybrids are also becoming popular among Sri Lankan farmers due to their high yield potential, uniform growth, early maturity and eye catching appearance. The price of these hybrid seeds is very high and these exotic hybrids show less adaptability under local conditions. Most of the exotic Chilli hybrids are highly susceptible to major pest and diseases in Chilli.

The Department of Agriculture has recommended 8 Chilli varieties up to now namely MI-1, MI-2, KA_2, Arunalu and MI-hot. 1. The potential yields of these varieties are 10–12 ton / ha. But the national average yields are as 8–10 ton / ha. Such low yields are mainly due to high incidences of pest and diseases, moisture stress, use of poor crop management and high input costs. But now the Department has introduced the first hybrid Varity as a MI Hybrid 1 to increase the yield and enhance cropping intensity.

Most of the Jaffna farmers cultivate KA 2 and CIMI hybrid in field in small and medium holding level. Even the small holding has been expensive because of the cost of cultivation. Based on these facts, a study was carried out during May to September 2016 to test the adaptability of Department of Agriculture newly

introduced MI hybrid variety with other local varieties KA2, MI Green and CIMI Hybrid under local conditions.

2 METHODOLOGY

2.1 Check variety and the specific characters

MI I Hybrid is the newly introduced check variety. This variety has medium size leaves and it is grown up to 60 cm with a vertical growth pattern. Large size pods with 10-15 cm length are suitable for both green Chilli and dried Chilli. The yield is more than 3 t/ha of dried chilli and 12 t/ha of green Chilli.

A relatively higher level of resistance is shown to fungal diseases and leaf curling. This experimental hybrid has attractive green shiny pods.

2.2 Experimental design

A field experiment was carried out in Chilli crops to evaluate the different variety practice during Yala in Jaffna. Most of the Jaffna farmers cultivated local varieties such as KA2, MI green and CIMI hybrid.

The experiment had to be conducted in randomized completely block design with 3 replicates. The distance between both blocks and plots were 0.5 m. The recommended KA2, MI- Hybrid 1, MI Green and CIMI hybrid were planted. Each plot (28.8m2) consisted of ten rows of plants at the spacing of 60cm x 60cm and 1 plant per hill.

Eighty plants were contained in each plot and each replicate contained 320 experimental units. The following treatments were tested in this experiment, each treatment has 3 replicates.

- T1- KA2 Variety
- T2- MI Green
- T3-CIMI Hybrid
- T4-MI Hybrid

2.3 Field planting

The 35 days old seedlings were transplanted at 60 cm×60 cm spacing. (1pts. / hill) Healthy, disease free and good quality seedlings were selected from nursery as shown in Figure 4. Seedlings were irrigated immediately after transplanting by hand and basin.

2.4 Cultural practices

2.4.1 Watering

Watering was done 2 times / day after transplanting by hand up to 2 weeks as shown in (Figure 1). Then at initial stage irrigation was given at 3 days interval to maintain continuous moisture to ensure better establishment of plants. After that, irrigation frequency was increased to 4–5 days (basin irrigation system) and there after irrigation was done depending on the soil moisture status.

2.4.2 Fertilizer application

Fertilizer application was done according to the Department of Agriculture recommendation. The following recommended fertilizer mixture was given with compost as basal application and irrigation was provided one day early.
TSP (Triple superphosphate)–100 kg / ha,
MOP (Muriate of potash)–50 kg / ha.
Basel fertilizer application was applied to twelve plots.

Site selection, Nursery management, pest and disease control and all the other cultural practices were carried out according to the Department of Agriculture recommendations.

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Figure 1: Irrigation methods used in the study (a) Manual Watering (b) Basin irrigation

3 RESULTS AND DISCUSSION

3.1 Growth Parameters

3.1.1 Germination of Chilli seeds

The germination percentage in each treatment was above 95% which shows that the Chilli seeds planted are in good quality (Figure 2). The highest germination percentage was observed in T4 and T3 treatments.

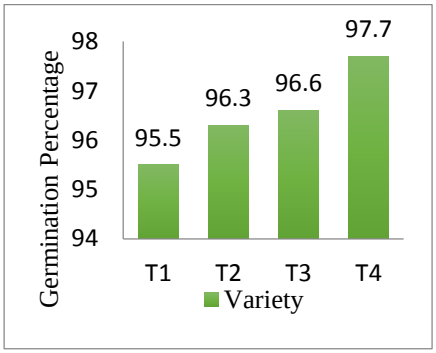

Figure 2: Germination percentage

3.1.2 Plant Height

The results of influence of cultivars on plant height are shown in Figure 3. Cultivar had a significant ($P < 0.05$) effect on plant height. Cultivar MI 1 Hybrid had the highest mean plant height (78.71 cm) while cultivar KA2 had the lowest magnitude of plant height (43.29cm). There is a significant difference among varieties for plant height.

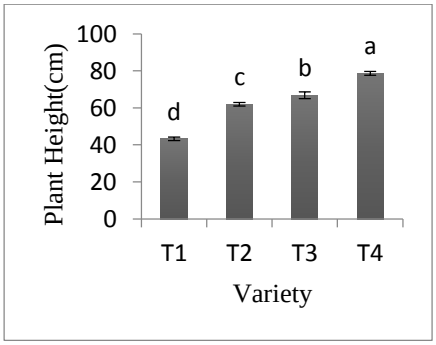

Figure 3: Mean plant height

3.1.3 Canopy Diameter

Mean values of canopy width of all the tested entries range from 53.5 cm – 74.04 cm (Figure 4). Canopy width was significantly different among varieties, and MI 1 Hybrid had the highest canopy width. KA2 local variety had significantly lower canopy width than other varieties.

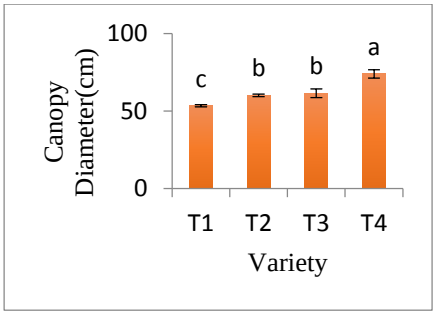

Figure 4: Mean canopy diameter

3.2 Yield Parameters

3.2.1 Number of pods per plant

The number of pods is an important yield component of Chilli to achieve highest yield. Pod numbers of the experimental varieties were significantly different and varied from 56 to 213cm (Figure 5, 6 and 7). Highest number of pods was obtained from MI 1 Hybrid (Figure 8). However, MI Green, the local variety had significantly lower pod number than other varieties.

Figure 5: KA2 variety chilli cultivation

Figure 6: CIMI Hybrid variety chilli cultivation.

Figure 7: MI 1 Hybrid variety Chilli

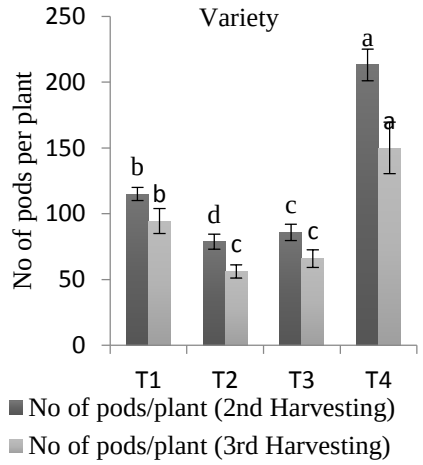

Figure 8: Number of pods per plant

3.2.2 Pod length

The average pod length was also statistically different among varieties (Figure 9). The pod length varied from 6-11 cm. The shortest length was recorded from KA2 while the longest were from MI 1 Hybrid. There is a significant difference among varieties in the case of fruit length.

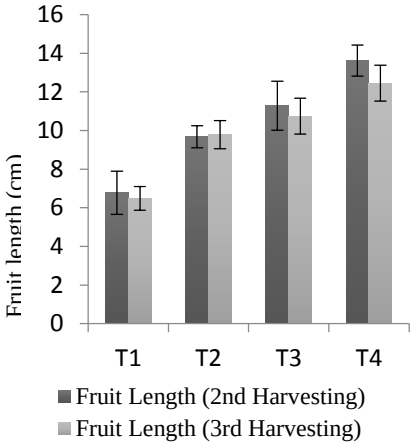

Figure 9: Mean pod/fruit length

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3.2.3 Pod weight per plant

The pod weight is an important yield component of Chilli to achieve highest yield. Pod weight of the experimental cultivars varied from 167.6g to 793.93g (Figure 10).

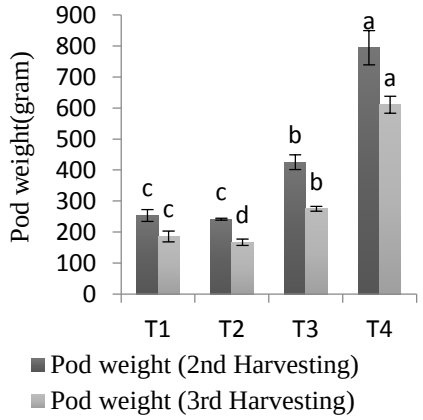

Figure 10: Mean Pod weight per plant chilli for 2nd and 3rd

3.3.4 Yield

Mean yield of green chilli of all the tested treatments for 2nd and 3rd harvesting range from 1.60t/ha to 10.07t/ha (Figure 11).

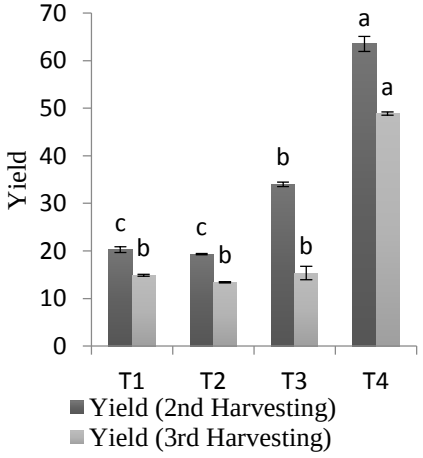

Figure 11: Mean yield of harvesting in treatment

The highest mean green chilli yield was attained in variety MI I Hybrid and the difference in yield with the other varieties was highly significant at P=0.05. Pod weight was highest for cultivar of MI I hybrid. It had good pod size with high pod numbers to obtain a good yield. Second and third green chilli yield was attained in varieties CIMI, KA2 respectively.

4 CONCLUSIONS AND RECOMMEDATIONS

MI I hybrid is the best Chilli variety based on the yield performance of this study, it showed the highest yield. Therefore farmers in Jaffna District could be advised to cultivate as MI 1 hybrid compare to other the other local varieties such as KA2 what they are cultivating at present.

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