

SHORT COMMUNICATION

RATOON CROP MANAGEMENT TOWARDS YIELD IMPROVEMENT OF BRINJAL (*Solanum melongena* L.)

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INTRODUCTION

Brinjal (*Solanum melongena* L.) is a popular annual crop in Sri Lanka and South Asian countries (Rajapaksha, 1998). It is one of the nutritious food crops for humans and heals many disorders such as diabetes, high blood pressure, cough and loss of appetite (Choudhury and Kalda 1960) and diversified colour and shape of the fruit helps to fetch good market demand (Tomar *et al.*, 1996). It is a hardy plant compared to other vegetables grown in Sri Lanka. It can therefore be successfully grown in very dry areas under rainfed or with minimum irrigation facilities. The plant can be kept more than one year in productive manner by pruning. At present every farmer has to consider the economics of crop production because of increased cost of inputs and higher demands for the produce in the market (Stansel, 1977). There are various practices to reduce cost of cultivation and ratoon crop management is one of the possible ways to reduce cost of cultivation and maximize economic yield (Tindall, 1983). Therefore, the present experiment was designed to investigate the management of branches in ratoon brinjal plants with mulch and without mulch in relation to maximizing yield from unit land.

MATERIALS AND METHODS

The experiment was conducted at the School of Agriculture, Kundasale from September 2003 to August 2004 (*maha* 2003/04 to *yala* 2004). The soil at experimental site was immature brown loam (Panaboke, 1996). The maximum mean daily temperature of site was 32.8°C and a total of 879.8 mm rainfall was received during the experimental period. Brinjal cultivar *Lena iri* seedlings were planted. They were cut back after first crop was completed and allowed to develop second crop. The cutting was done 15 to 20 cm above soil level and arranged the following treatments: Two branches (T1), Three branches (T2), Natural branch growth (Control-T3), Two branches with mulch (T4), Three branches with mulch (T5) and Control with mulch (T6). They were managed as recommended by Department of Agriculture (DOA, 1990). The experimental design was 3 x 2 factorial arrangement in Randomized Complete Block Design (RCBD) with four replicates. Economically important parameters such as plant height at maturity (PH), number of fruits per plant (NF), leaf area index at the time of

50% flowering (LAI), fruit length (FL), fruit diameter (FD), fruit weight (FW) and yield per hectare (YD) were recorded from both fresh and ratoon crops. The data were analyzed by using the statistical package SAS and correlation analysis was also performed.

RESULTS AND DISCUSSION

Table 1. Correlation matrix of observations.

| | LA | LAI | YD | FW | PH | FD | FL |
|-----|--------|--------|-------|-------|-------|-------|-------|
| NF | 0.95** | 0.96** | 0.36* | -0.73 | -0.75 | -0.22 | -0.19 |
| FL | -0.16 | -0.16 | -0.09 | 0.15 | 0.36 | 0.31 | |
| FD | -0.25 | -0.25 | 0.016 | 0.25 | 0.61 | | |
| PH | -0.65 | -0.65 | 0.18 | 0.9 | | | |
| FW | -0.58* | 0.57* | 0.36* | | | | |
| YD | 0.56* | 0.56* | | | | | |
| LAI | 0.99** | | | | | | |

*, ** ; significant at $p=0.05$ and 0.01 level, respectively

The correlation coefficients between studied parameters are presented in Table 1. The leaf area (LA), Leaf area index (LAI), Number of fruits (NF) and Fruit weight (FW) had positive and significant association with yield (YD).

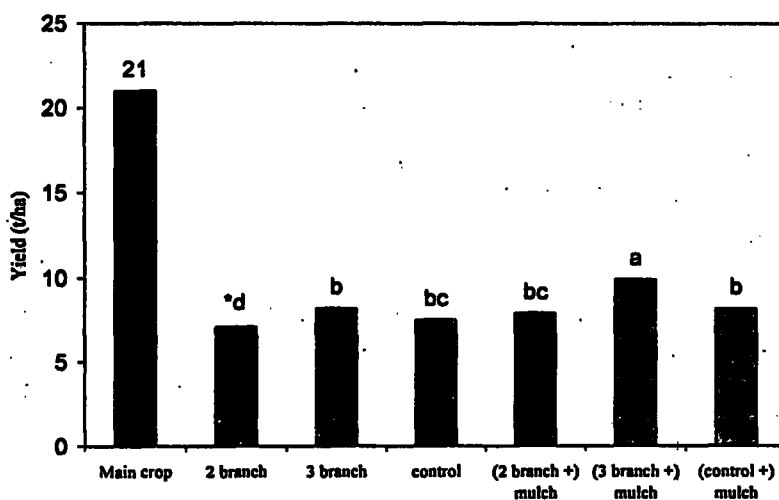


Figure 1. Mean yield (t/ha) of main and ratoon crops. (* Duncan multiple range test (DMRT) results; Columns with same letters are not significantly different at $p=0.05$).

Number of branches had direct effect on yield of ratoon crop, increasing number of branches from two to three in ratoon mulched crop led to yield increase from 7.9 to 9.9 t/ha (Fig. 1). Non-branch managed ratoon crop in control treatment with mulch and without mulch produced 7.5 and 8.2 t/ha,

respectively. The fresh crop produced 21 t/ha. This was about three times higher than ratoon crop.

Leaf area, leaf area index and fruit characteristics

The leaf area of ratoon crops significantly varied among treatments at $p=0.05$. Among ratoon crops, control treatment with mulching produced the highest leaf area of 11830 cm^2 . This was less than the leaf area of fresh crop.

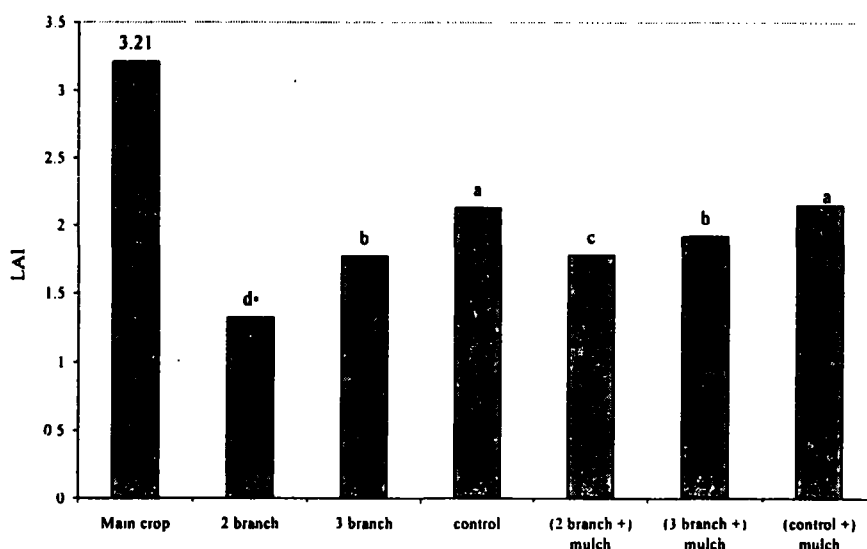


Figure 2. Mean leaf area index (LAI) of main and ratoon crops. (*DMRT results; Columns with same letters are not significantly different at $p=0.05$).

Table 2. The mean value of fruit length, diameter, weight and leaf area of main and Ratoon crop.

| Treatment | Fruit length (cm) | Fruit diameter (cm) | Avg. fruit weight (grams) | Leaf area per plant (cm^2) |
|-----------|-------------------|---------------------|---------------------------|---------------------------------------|
| Main crop | 21.9 | 6.3 | 132.8 | 17365 |
| T1 | 13.8 ab | 3.7 a | 75 c | 7134 c |
| T2 | 14.2 a | 3.4 bc | 80.8 a | 9588 b |
| T3 | 12.3 c | 3.4 bc | 58.1 d | 11514 a |
| T4 | 13.4 ab | 3.3 c | 84.5 b | 9646 b |
| T5 | 12.6 c | 3.6 a | 86.4 b | 10374 b |
| T6 | 13.9 ab | 3.6 a | 61.5 d | 11830 a |

Values in a column with same letters are not significantly different at $p=0.05$

Increasing branch number from 2 to 3 led to increasing leaf area in both mulched and non-mulched plants (Fig. 2). Mulching had direct positive effect on leaf area. Optimum leaf area of plant balanced

photosynthesis and led to enhanced yield (Yadav *et al.*, 1974). Plants with three branches and mulching produced optimum leaf area and gave the highest yield level of 9.9 t/ha. Mean number of days required to 50 percent flowering was 58 days in fresh crop and 31 days in ratoon crop. Leaf area (LA), leaf area index (LAI), average fruit length (FL) and diameter, and average fruit weight (FW) are presented in the Table 2.

CONCLUSIONS

It can be concluded that on the average ratoon crop provided 1/3 yield of main crop (Stansel, 1977). The management of ratoon crop enhanced yield level more than non-branch managed ratoon crops. Management of 3 branches with mulch produced optimum leaf area and dominated over 2 branch managed and control ratoon crops in respect of yield. The low yield in ratoon crop may be due to physiological aging of plants. The beneficial advantages of ratoon crops are coming to flowering early and providing considerable yield without doing much effort on land. Further, physiological study of ratoon crop with cost-benefit analysis would reveal more information about cultivation of ratoon crop.

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