

PERFORMANCE OF TOMATO VARIETIES IN REGOSOL UNDER MULCHING DURING YALA (DRY) SEASON

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ABSTRACT

Tomato varietal experiment was carried out under mulching and non-mulching conditions during yala, various parameters were measured such as market yield, fruit size and weight, fruit set %, cracking, plant vigour, days to first flower and days to first ripe fruit in order to find out the performance of the selected tomato varieties *viz* Marglobe, T-146, KC-1 and Super Roma under mulching and non-mulching conditions in regosol during yala (dry) season of the year 2000, using the split plot design with four replicates for the view of selecting the variety which can withstand the dry and water stress conditions. Among these tested varieties KC-1 produced significantly higher marketable yield and showed high level of fruit set compared to the other varieties under both mulching and non-mulching conditions ($P < 0.05$). Mulching practice significantly improved the horticultural characters such as fruit set %, fruit weight and plant vigour in all the varieties tested. This research study revealed that the tomato variety KC-1 exhibited the best performance among the varieties tested for yield and fruit set with mulching when grown in regosol during yala season.

Key words: Horticultural characters, market yield, mulching, split plot design and varietal experiment

INTRODUCTION

Tomato is the one of the most common vegetable crop. It can be grown up to an elevation of 4000 feet (Crop Recommendation Technoguide, 1990). The main problem encountered in tomato cultivation during yala season in the dry zone loss of pollen viability due to drying and the subsequent effect of lower drops as a result of high temperature and fluctuation in the soil moisture (Tindall, 1993 and Bose et al, 1993).

Maintaining adequate soil moisture continuously throughout the cropping season by way of mulching would help to prevent pollen drying and flower drop in tomato during dry season, which would in turn increase fruit set and yield (1st International symposium on tropical tomato, 1978).

With this view it was planned to carry out the field experiment to study the performance of different tomato varieties during yals (dry) season and the effect of mulching in reducing the flower drop.

MATERIALS AND METHODS

Location:

This experiment was conducted at the Agronomy farm of Eastern University, Sri Lanka, during the period of march to June 2000. Altitude of this area is about 7.8m above mean sea level, it falls in the low country dry zone of Sri Lanka. The soil at the experimental site belongs to the great soil group regosol (Intraya matakalappu, 1993)

Varieties:

Four varieties mostly cultivated in the low country dry zone such as T-146, KC-1, Super Roma and Marglobe were selected.

Experimental design:

This experiment was carried out in the split plot design (Gomez and Gomez, 1984) with four (04) replicates. The mulch treatment was included in the main plots and varieties in the sub plots with the view of more precision for the variety treatment.

Mulching material:

Mulching was done with paddy straw and it was treated with elsan to prevent termites and ants damage to the crop (RRISL Advisory circular, 1995)

Plot dimension:

Main plots consist of two (02), 7.9 m long and 3.2 m wide beds spaced 1m apart. Sub plots consist of four (04), 2.6m long and 1.3m wide beds spaced 30cm apart. The spacing between rows was 100cm and within row was 50 cm.

Hypothetical layout of a split plot design for testing four (04) tomato varieties (sub plots) with mulching and non-mulching (main plot) in four replicates is given in Fig. 1.

Field Planting:

Seedling with four fully expanded leaves were selected from the nursery for transplanting (Crop Recommendation Technoguide, 1990). Transplanting was done in the evening to avoid mid-day, wilt, seedlings were provided with shade until they establish.

Fertilizer application:

- a) Basal: Formulation of fertilizer and rates.
 - Urea 225 kg/ha
 - TSP 275 kg/ha
 - MOP 125 kg/ha (Crop Recommendation Technoguide, 1990)
- b) Top dressing: Applied at the rate of 125 kg/ha of urea, 6 weeks after planting (Crop Recommendation Technoguide, 1990)

Irrigation:

Two times per day.

Weed Control:

Hand weeding 3-6 weeks after planting.

Insect control:

Sulphur dust was sprayed to control mites during this experiment.

RESULTS AND DISCUSSION

The performance of tomato varieties tested under mulching and non-mulching conditions during yala showed variation in characters of agronomic importance at the significant level statistically and each of which is discussed.

Market yield

The yield represents the ultimate performance of tomato varieties tested. The summary of the results of different varieties under mulching and non-mulching conditions are shown in Fig. 2 KC-1 showed significantly higher yield (5t/ha) at consumable maturity and comparable to other varieties in yield, at $P < 0.05$. But among the other varieties the yield was not significantly different under mulching condition ($P < 0.05$), in non-mulching also the variety KC-1 gave higher yield but it was less than the mulching practice Fig.2. The yield of KC-1 under mulching was good than non-mulching condition which was attributed by moisture conservation during fruit set and fruit development.

Fruit weight

Considering the fruit size and fruit weight both mulching and non-mulching conditions KC-1 showed significantly good results than other varieties. Marglobe showed lower fruit size Fig.3. It was observed that fruits of KC-1 under non-mulching condition was smaller in size and lesser in weight. Fruit size and the fruit

weight is influenced by the available water content during fruit development. In mulching practice the fruit size and weight was significantly different in all the varieties tested than non-mulching practice at 5% significant level.

Fruit set %

Fruit set % in T-146 and KC-1 were significantly different from Super Roma and Marglobe at 5% significant level. Marglobe showed poor or lower fruit set % under mulching conditions Fig. 4. During the experimental period the environmental temperature went upto 31-35°C, but higher number of fruits per plant was observed in KC-1. Since the mulching materials provide a good organic matter to the soil in addition to the soil moisture conservation which could be utilized by the plants. Which improve the fruit set %. Mulching practice was comparable with the non-mulching practice especially in fruit set % statistically at 5% significant level.

Morphological attributes

Exposure of tomato plants to high temperature during yala season the growth and productivity is less, conserving soil moisture by way of mulching would improve the morphological attributes especially plant vigour and plant height. According to this experiment excellent branch type and plant vigour were observed in varieties KC-1 and T-146 and they performed good under mulching condition. Table. 1, which was comparable to non-mulching condition.

Other Characters

Early flowering was observed in KC-1 both mulching and non-mulching conditions which was significantly different. Other varieties tested showed comparatively longer period for flowering Fig. 5. KC-1 showed flowering 10 days before other varieties.

Ripening period for KC-1 was earlier compared to other tomato varieties it took 44-45 days to ripe and this was comparable to the other varieties tested Table. 1.

More crack resistance was observed in KC-1 than other varieties which was observed both in mulching and non-mulching conditions. KC-1 showed superior in fruit firmness, crack resistance and plant vigour especially compared to Super Roma and Marglobe, which are shown in Table. 1.

CONCLUSIONS

When comparing the mulching and non-mulching practices, generally the mulching practice significantly increase the horticultural characters in all the varieties tested. KC-1 exhibits well compared to other varieties during yala season of the year 2000 and in regosol.

From this experiment we were able to suggest that mulching practice in tomato cultivation during yala could be practiced in regosol and among the varieties tested the bet performer was KC-1. Varietal recommendation for yala cultivation can be met with more precision when cultivating during maha season and subsequent yala season and the results should be compared for the recommendation.

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MI	Mo
V2	V1
V1	V4
V3	V2
V4	V3

Block I

MI	Mo
V3	V1
V2	V4
V4	V2
V1	V3

Block II

MI	Mo
V3	V2
V3	V1
V4	V3
V1	V4

Block III

MI	Mo
V4	V3
V3	V4
V1	V2
V2	V1

Block IV

M1 - Mulching Mo - Non-Mulching
 V1-T-146; V2-KC-1; V3- Super Roma; V4-Marglobe

Fig 1: Hypothetical layout of split plot design for testing tomato varieties (sub plots) in mulching and non-mulching (main plots)

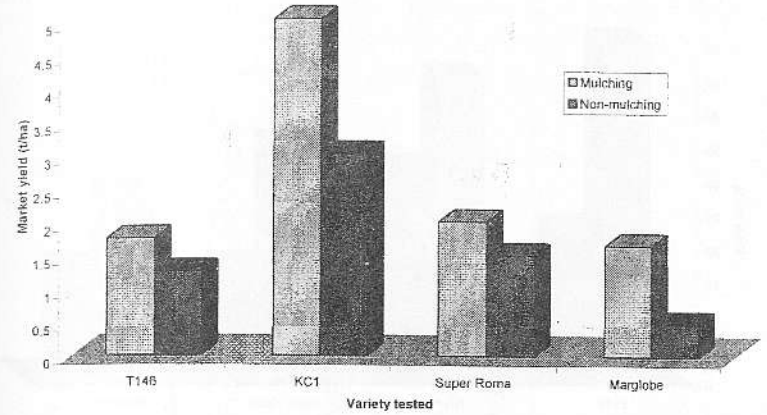


Fig 2: Comparison of yield under mulching and non-mulching

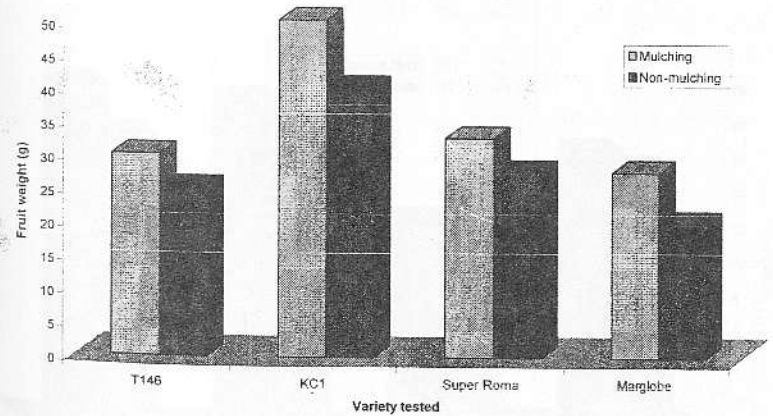


Fig 3: Comparison of fruit weight under mulching and non-mulching

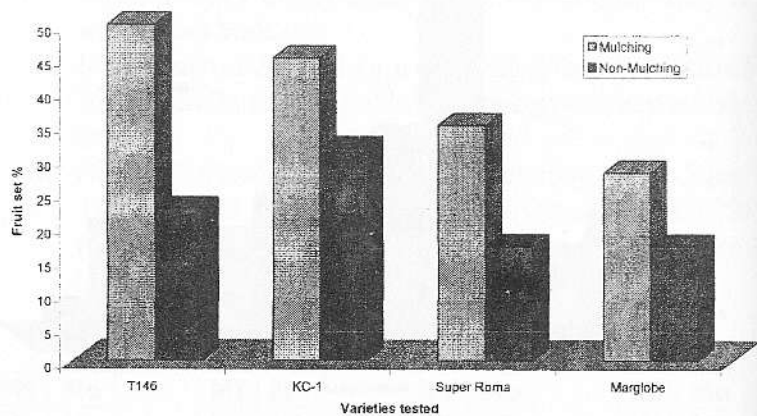


Fig 4: Comparison of fruit set % under mulching and non-mulching

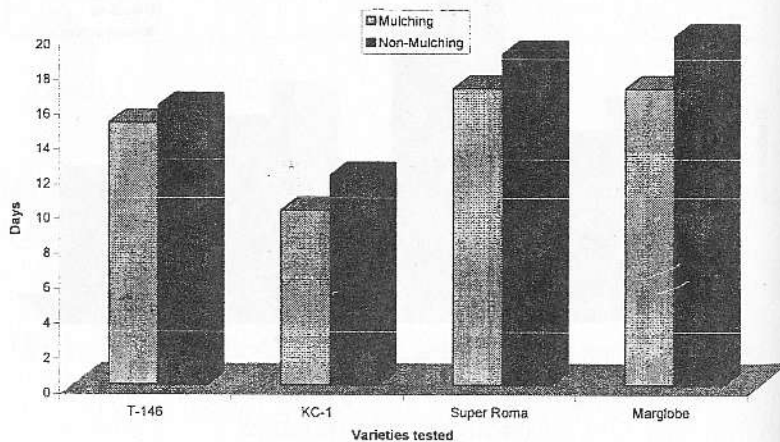


Fig 5: Comparison of days to first flowering under mulching and non-mulching

Table 1: Yield and other horticultural characteristics of selected four tomato varieties under mulching and non-mulching

Variety	Days to first		Cracking	Firmness	Plant Vigour
	Flowering	Ripe fruit			
T-146	15	16	SLR	MF MS	G F
KC-1	10	12	SL/A	F MF	E G
Super Roma	17	19	MC/R	MS MS	F F
Marglobe	17	20	MC/R	MF MS	F F

SL/A: Slight superficial Abrasion;
 SLR: Slight Radial Cracking
 MC/R: Moderate Concentric and Radial Cracking
 MS: Moderately Soft MF: Moderately Firm
 F: Firm Fair
 G: Good Excellent
 Italic indicates the mulching.