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# THE PERFORMANCE OF PARENTS AND THEIR $F_5$, $BC_2$ AND $BC_3$ PROGENIES IN BRINJAL (*Solanum melongena* L.)

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## ABSTRACT

Brinjal (*Solanum melongena* L.) is an important vegetable in Sri Lanka in general and particularly in the Eastern Sri Lanka. However, the unavailability of high yielding cultivars with acceptable fruit quality is a limitation in the expansion of the cultivation of this crop. A pot experiment was carried out with two inbred parents SM 6-6 and Palugamam Purple and their progenies of $F_5$ generation, $BC_2$ ( Back cross 2) and $BC_3$ (Back cross 3). All the progenies showed a significant increase in yield compared to the adapted parent ' Palugamam Purple ' and the yield related characters of $BC_3$ progenies were better than those of $F_5$. Further, the overall effects of girth , number of fruits per plant, fruit length and fruit weight were positively correlated to fruit yield. The results of this experiment reveal that the back cross with adapted parent facilitates an yield increase in early generations. The genetic advancement is more effectively achieved by using back cross method than by pedigree method, however, selection of the recurrent parent is an important aspect in a back cross programme.

**Key words** : SM 6-6, Palugamam purple, $F_5$ generation, $BC_2$, $BC_3$.

## INTRODUCTION

Brinjal ( *Solanum melongena*) belongs to the family Solanaceae. It is an important vegetable and widely cultivated in all parts of the country. The cultivated brinjal undoubtedly





is of Indian origin and has been in cultivation for long-time (Thompsdon and Kelly, 1957). Asia was the largest eggplant producer which occupied more than 90% of the world production area and covered 86% of the world production (AVRDC Report, 1994).

Brinjal has been a stable vegetable in our diet since ancient times. It is quite high in nutritive value and well compared with tomato (Chaudhury, 1976A). Bajaj *et al.* (1979) reported that on average the oblong fruited brinjal cultivars are rich in total water soluble sugars whereas the long fruited cultivars contain large amounts of free reducing sugars, anthocyanin and amide proteins.

In Batticaloa district most of the farmers cultivate brinjal in large extent throughout the year. Variety named Palugamam purple is popular in this area and has high consumer acceptability and produce high yield; however , with the application of pesticides against shoot and fruit borer.

In this study the alien genes were transferred from an Indian origin brinjal "SM 6-6" to the Palugamam purple variety. The two varieties were crossed and $F_5$, $BC_3$ and $BC_3$ were obtained. The genetic differences between the parents and their progenies were studied.

## MATERIALS AND METHODS

A pot experiment was conducted in Yala season 2001 at Agronomy farm of Eastern University, which comes under the low country dry zone ($DL_2$).

Seeds were sown in cement pots and the plants were grown under the recommended practices (Anon., 1990). Treatments were arranged in RCBD with five replicates. Single plant was allowed to grow in each pot.

| No | Treatment |
|---|---|
| $T_1$ | $BC_2$ ( Back Cross 2 ) |
| $T_2$ | Palugamam Purple (Parent) |
| $T_3$ | $F_5$ generation |
| $T_4$ | SM 6-6 (Parent) |
| $T_5$ | $BC_3$ ( Back Cross 3) |

Data were collected on yield and yield related characters.

**Fruit weight**
Total fruit yield was recorded and from these measure the average weight of fruit was calculated.

**Fruit girth size**
The girth of randomly selected five fruits, were measured at the center portion of each fruit. Fruits from each variety was used for this measurement.

**Fruit length**
The length of fruit was measured from the base of the fruit to the tip. The same fruits in the above were used to determine this parameter.

**No of fruits / plant**
The number of fruits in each treatment was obtained from all the harvest. Then average number of fruits per plant was computed.

**Total yield of plant**
At consumable maturity , the fruits were harvested separately and total yield was estimated.

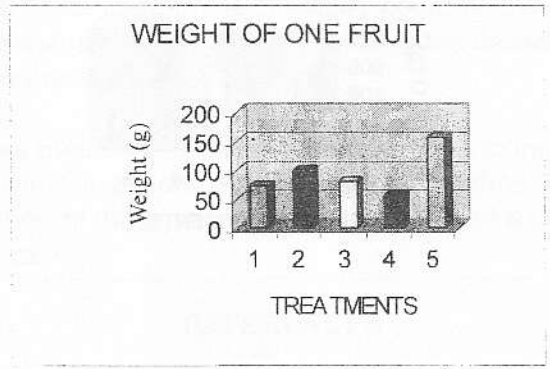


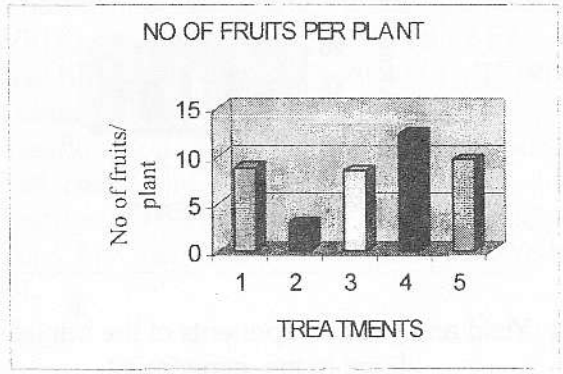


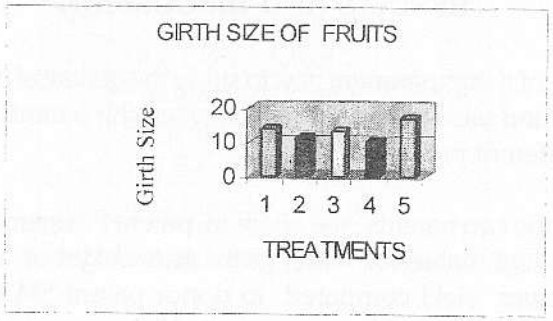
## RESULTS AND DISCUSSION

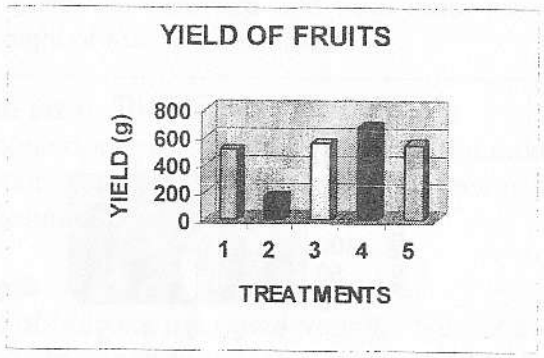
The aim of this experiment was to study the genetical differences in yield and yield related traits between the parents and their three different progenies.

Among the two parents , the adapted parent Palugamam purple showed high value for size, girth and weight of fruit but it gave lower yield compared to donor parent SM 6-6 which had larger number of fruits per plant. All the progenies showed higher fruit yield than the adapted parent Palugamam purple (Fig. 1).





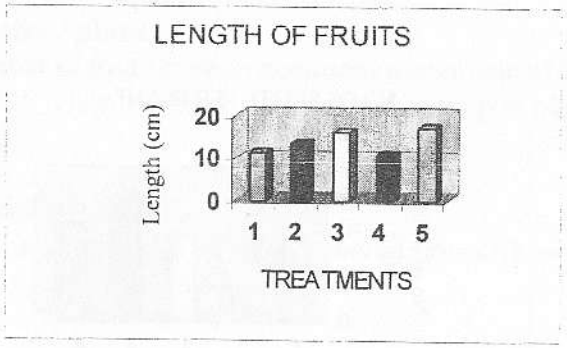




Fig 1. Yield and yield components of the brinjal varieties listed in the experiment





Among the progenies the $BC_3$ showed higher values for yield related characters than the $F_5$ progenies. This indicates that back cross method is more efficient than pedigree method in crop improvement in brinjal. Due to the repeated crossing with the adapted parent the $BC_3$ generation received more desirable genes from the adapted parent. This was clearly shown in weight of the fruit. Meanwhile this generation showed the higher number of fruits per plant which is the character received from the donor parent SM 6-6.

## CONCLUSION

The adapted parent Palugamam purple has good yield related characters but it gives low yield because of low number fruits per plant. This undesirable character could be overcome by changing the genotypes by incorporating the desirable genes from the other parent SM 6-6.

Back cross method is a more suitable method to improve the character in brinjal compared to pedigree method. However, the selection of the appropriate recurrent parent is vital in this programme.

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