

Effect of bunch bagging on fruit quality of banana cv. SABRI

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ABSTRACT

Banana (*Musa sapientum*) is an important tropical fruit crop in India. External appearance of is important factor which decides the market value of the product. Many banana growers suffer huge monetary loss due to pre harvest eating of insects especially scaring beetle, mechanical injury, damage of foxes etc. In Khowai district of Tripura, the infestation of insect was found to be very high. To address the problem an experiment was conducted in the instructional farm of KVK, Khowai, Tripura, India during the year 2016-17 and 2017-18. Ten numbers of bunches were random selected from an already existing banana cv. SABRI orchard. The experiment was comprises of two treatment- T_1 : bunches are covering with 6 per cent ventilated Polythene covers / sleeves of size 200 cm length x 150 cm width x 175 gauge thickness and T_2 : not covered or control. It was observed that the banana fruits matured under covered condition were more visually appealing as they were clean and had minimal bruises, especially more large-grade fruit with uniform fullness of fruit within the bunch compared to those grown uncovered. 11.45 per cent more finger length and 7.35 per cent more individual fruit weight was noticed in cover bunches compared to that uncovered. Bunch covering also had a positive on the TSS content of the fruit. Further, bagging helps in shorten the time from flowering to physiological maturity by 10. Thus bunch covering can be recommended for commercial banana orchards in Tripura to produce high quality fruits.

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INTRODUCTION

Banana (*Musa sapientum*) is an important tropical fruit crop in India. Bananas are grown in more than 150 countries, producing 105 MT of fruit per year. The global production of banana is around 102028,17 '000 tons of which India contributes 29.19 per cent (Santosh *et al.*, 2017). Nationally, banana is grown in 884 '000 ha with

an annual production of 30808 '000 MT with an average productivity of 34.86 t/ha. In Tripura, banana is grown in 10.29 '000 ha with an annual production of 109.40 '000 MT with an average productivity of 10.63 t/ha (Anonymous, 2018). External appearance, internal quality and market quality of bananas are influenced by several factors, including pre-harvest production practices. Many

banana growers suffer huge monetary loss due to pre harvest eating of insects, mechanical injury, damage of foxes etc. Especially the fruit scarring beetle (*Colaspis hypochlora*), is a common insect pest in most of the banana producing areas. Occurrence of this pest is usually high during the rainy season. Adult beetles feed on the fruit peel causing a localized scarring of the tissue in the damaged area. Considerable physical injury and damage to the fruit peels can also be caused by the blowing of adjacent leaves and rubbing leaf petioles onto the developing bunch (Anonymous, 2003). Growers in regions with a high population of peel feeding insects have great difficulty in producing blemish-free fruit. In Khowai district of Tripura, the infestation of insect was found to be very high. Farmers have been addressing these issues for some time with bunch cover or bag which protects the fruit from insect attacks and at the same time allows water, air to pass through, all at an affordable cost. These bags are mainly used to improve fruit production and quality, especially fruit intended for the export markets. Bunch covering is an ancient practice. Traditionally, old banana leaves have been wrapped around maturing bunches to avoid damage against winter chilling and to maintain the quality. Later, paper bags were used to a limited extent. Different types of bags were used for bunches developed during winter and summer. The use of non-perforated blue or white polyethylene bags with a thickness of 30-35 micron have increased temperatures inside the bag and shorten the development cycle of winter bunches (Robinson and Nel, 1984). White perforated bags have been used in summer and are ideal for hot humid conditions which reflect direct solar radiation, lower temperature inside the bunch, and resulted in better green life (Kutinyu, 2014).

In view of above fore-going points, the present experiment was conducted to assess the effect of bunch bagging on fruit quality of banana cv. SABRI.

MATERIAL AND METHODS

The experiment was conducted in the instructional farm of KVK, Khowai, Tripura, India during the year 2016-17 and 2017-18. This soil was medium in organic carbon content (0.67 %) and the available nutrient status was low in nitrogen, medium range of phosphorus and the potassium status was high with neutral to alkaline in soil reaction. Ten numbers of bunches were random selected from an already existing banana cv. SABRI

orchard. Within 15 days of last hand opening, bunches are covered with 6 per cent ventilated Polythene covers / sleeves of size 200 cm length x 150 cm width x 175 gauge thickness (T_1). And some bunches were not covered *i.e.* taken as control (T_2). During the experiments the observations were recorded on different parameter like individual fruit weight, finger length, days taken for maturity (flowering to maturity) and temperature inside and outside of the covered bunch, appearance (9 point hedonic scale) and total soluble solids (TSS). And were subjected to analyzed following analysis of variance (ANOVA) technique and mean differences were adjusted by the multiple comparison test (Gomez and Gomez, 1984).

RESULTS AND DISCUSSION

Results of the study showed that bunch cover had a significant effect on fruit weight, days to maturity, finger length, TSS and visual appearance. Result revealed that higher finger length of 14.6 cm was recorded in T_1 (Bunches are covered with 6 per cent ventilated Polythene covers) and lower (13.1 cm) in T_2 (Fig 1). The average fruit weight recorded in T_1 was 90.5 g and in T_2 (Control or not covered) was 84.3 g. Banana bunch covering helps in increasing yield, this is also supported by the findings of Sarkar *et al.* (2016). Total soluble solid (TSS) is an important parameter, there was significant differences among the TSS of fruits belonging to two different treatments. The maximum TSS content (22.3 °Brix) was found in bunches are covered with 6 per cent ventilated Polythene covers (T_1) as compared to control (T_2) (19.08 °Brix). The increase in TSS of fruit pulp could be due to the breakdown of starch into soluble sugars. Temperature triggers the climacteric stage in banana, in which the accumulated polysaccharides are rapidly converted in soluble sugars which forms large portion of TSS. The temperature difference between inside the banana bag and ambient condition was recorded 2° C. The studies of Shanmugavelu *et al.* (1992) and Cuneen and McEntyre (1988) also stated that warmer temperature during inside the bag increased the TSS of the fruits in covered bunches. Bunches treated with a polyethylene cover significantly reduces the time from flowering to physiological maturity in comparison with the untreated control (Fig. 2). In case, of T_1 (Bunches are covered with 6% ventilated Polythene covers) the recorded time from flowering to bunch maturity was 105.3

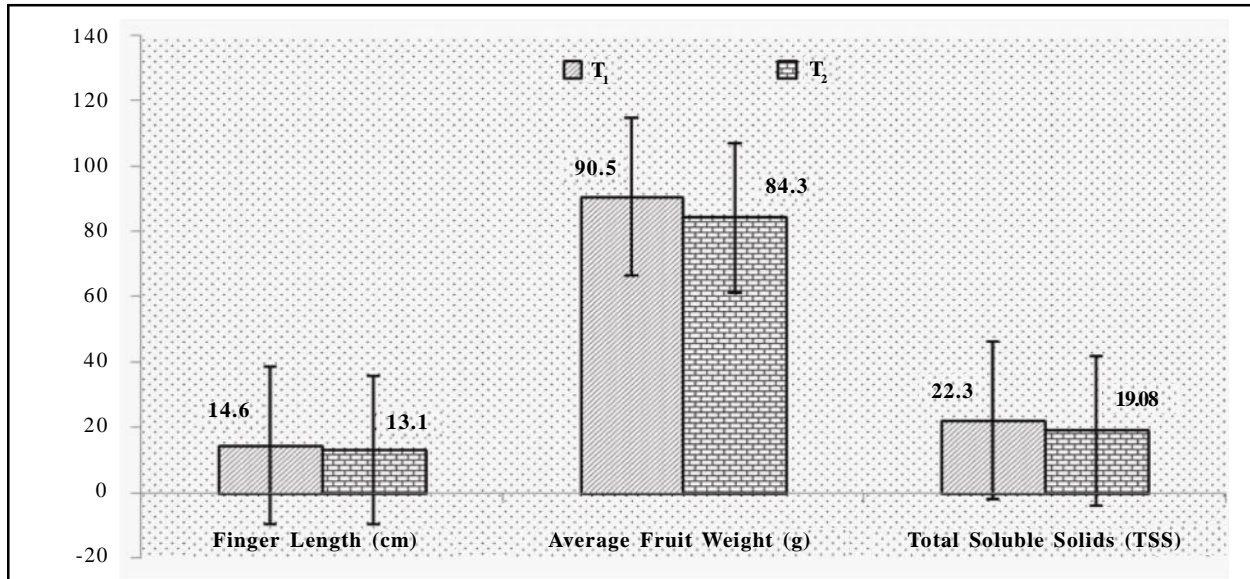


Fig. 1: Effect of treatment on fruit quality of banana cv. SABRI

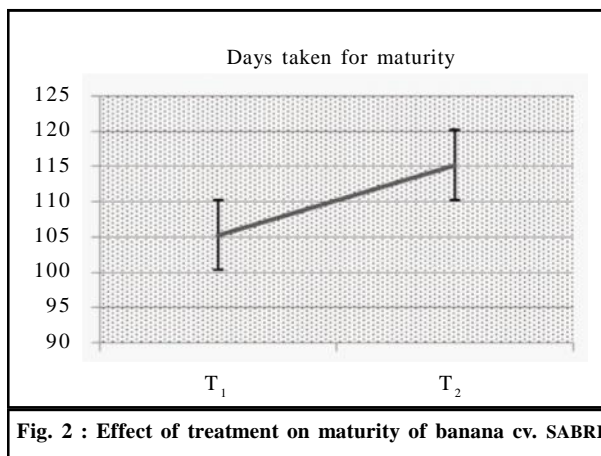


Fig. 2 : Effect of treatment on maturity of banana cv. SABRI

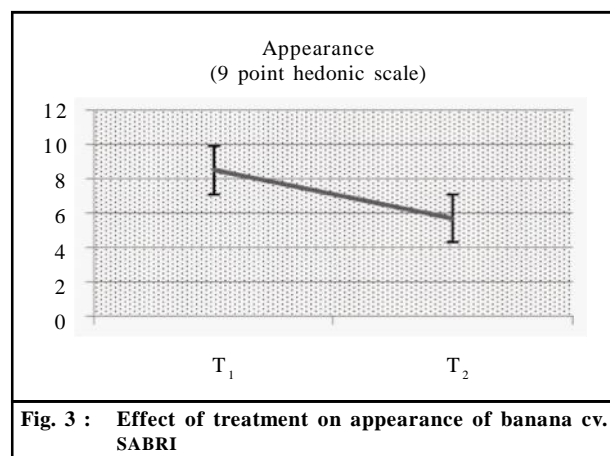


Fig. 3 : Effect of treatment on appearance of banana cv. SABRI

Note : T₁ Bunches are covered with 6% ventilated polythene covers, T₂ : Control or not covered

days and for T₂ (control) it was 115.2 days. Choudhury *et al.* (1996); Johns and Scott (1989) and Rodrigues *et al.* (2001) reported that bunch covering in banana influences the maturity and shorten the time of harvest in banana.

Moreover, the covered bunches produced fruit which was much better in appearance than the uncovered bunches. The fruit from covered bunches was more uniform in size and fullness from the front to the back and from the top to the bottom of the bunch, also free from dust, spider webs and bird droppings at harvest compared than that on uncovered bunches. The infestation of scarring beetle was also negligible. To measure the overall appearance 9 point hedonic scale

was developed. In this parameter T₁ (Bunches are covered with 6 per cent ventilated Polythene covers) scored 8.5 point and T₂ (Control or not covered) Scored 5.7 point (Fig. 3). Weerasinghe and Ruwaphirana (2002) also found that banana fruits grown under covers were more attractive to consumers.

Conclusion:

The fruits matured under covered condition were more visually appealing as they were clean and had minimal bruises, especially more large-grade fruit with uniform fullness of fruit within the bunch compared to those grown uncovered. Bunch covering also increases average yield reduces the infestation of scarring beetle

and also advances the maturity. Thus bunch covering can be recommended for commercial banana orchards in Tripura to produce high quality fruits.

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