

Effect of shoot pruning on yield and fruit quality of custard apple cv. Balanagar

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ABSTRACT

With a view to sustainable production of quality fruits in 7 years old custard apple plants cv. Balanagar grown in laterite soil at Jhargram, Paschim Medinipur, a pruning trial was conducted for two consecutive years. The treatments included viz.: T₁: Shoot pruning in February; T₂: Shoot pruning in March; T₃: Shoot pruning in April; T₄: Shoot pruning in May; T₅: Shoot pruning in June; T₆: Control (un-pruned) following randomized block design with five replications. Shoot pruning consisted of heading back of all secondary and tertiary branches at 50% of their length on 15th of each month as per treatment. Results indicated that fruit production was improved due to pruning practices. Significantly highest fruit number (45) and fruit weight (174g) was observed from May-pruned plants. Fruit quality was improved due to different pruning treatments and maximum TSS (21.6°B) and sugar content (19.5%) was obtained from May-pruned plants. Harvesting date did not varied due to pruning at different months.

Key words: Custard apple, pruning time, fruit yield, fruit quality,

INTRODUCTION

Custard apple (*Annona squamosa* L) is one of the important tropical fruit crops in India. It is mainly used as dessert fruit however both the pulp and seeds are also used for medicinal purposes. It is considered as one of the important minor fruits and possesses high nutritional properties like other underutilized fruits (Kalkame *et al.*, 2018) which are grown in waste land with least care. In laterite tract of West Bengal where the soil is porous and less fertile, in that Balanagar variety of custard apple found to perform well (Nandi *et al.*, 2018). The custard apple is generally planted at 3.0-5.0 m spacing depending on the soil fertility and economic orchard life of custard apple is declined after 15 years (Raut and Ghosh, 2017).

Among different management practices followed in different fruit crops, canopy management is considered is one of them. In custard apple, selective and mild removal of deadwood and very old branches is carried out to avoid congestion and encourage well spaced branching. Severe removal is detrimental for the plant growth (Raut and Ghosh, 2017). The custard apple and the other annonas bear mostly on the

current season's growth and to a lesser extent on old wood. Therefore, severe pruning of bearing branches will cause reduction in tree size, flowering, fruiting and yield. Moderate annual selective pruning, however, keeps the tree smaller without seriously affecting yield and increases the size of the fruits. Few reports are available suggesting removal of branches at different intensity in different months for sustainable production of custard apple (Choudhari, 2012; Dahapute *et al.*, 2018). Considering beneficial effect of pruning, an investigation was carried out to find out the best time of pruning for production of quality custard apple in laterite zone of West Bengal where such attempt did not made earlier.

MATERIALS AND METHODS

The experiment was conducted in a private orchard at the Jhargram, Paschim Medinipur, West Bengal on 7 years old custard apple plant cv. Balanagar which were planted at a spacing of 3 x 3 m for two consecutive years (2014 and 2015). Before pruning, the plants were over-crowded and had excessive growth of leaders and laterals. The pruning treatment comprised of: T₁: Shoot pruning in February; T₂: Shoot pruning in March; T₃: Shoot

Table 1. Effect of shoot pruning on yield and physic-chemical composition of fruit of custard apple cv. Balanagar (Average of two years)

Month of pruning	Number of fruits/plant	Number of fruits born on secondary shoots	Number of fruits born on tertiary shoots	Fruit weight (g)	Pulp content (%)	TSS (°Brix)	Acidity (%)	Total sugars (%)	Date of 1 st harvest	Date of last harvest
February	30	24	6	145	87.1	21.5	0.18	16.8	25/8	15/10
March	26	20	6	170	84.1	21.0	0.21	19.4	25/8	15/10
April	24	18	6	168	85.3	20.8	0.19	17.6	25/8	15/10
May	45	35	10	174	86.2	21.6	0.17	19.5	25/8	15/10
June	20	18	2	134	82.6	20.0	0.17	17.4	25/8	15/10
Control	22	20	2	140	85.0	19.2	0.14	16.4	25/8	15/10
C.D. at 5%	1.8	1.6	0.3	3.6	N.S.	0.3	N.S.	0.2	-	-

pruning in April; T₄: Shoot pruning in May; T₅: Shoot pruning in June; T₆: Control (un-pruned).

All root suckers, unproductive shoots and dried branches were removed as per treatment (at different months). Shoot pruning consisted of heading back of all secondary and tertiary branches at 50% of their length on 15th of each month as per treatment. The experiment was laid down in randomized block design, replicated five times taking two plants as a unit. The plants were fertilized with 15.0 kg FYM, 200 g Nitrogen, 200 g P₂O₅ and 200 g K₂O plant⁻¹ year⁻¹ in two splits viz., June and September. Observations on fruit yield (both by number and weight) were recorded in each year. Physico-chemical characteristics of mature fruits were observed in each year following standard method (A.O.A.C, 1990).

RESULTS AND DISCUSSION

Practised of shoot pruning in custard apple has been found beneficial as appeared from data in Table 1. Shoot pruning in different months resulted in different degree of fruit production with highest in May-pruned shoots (45) followed by February (30) and lowest in June pruned shoots (20). It is clear from the data that shoot pruning in May gave double production as compared to un-pruned plants (control). One interesting results was noted that pruning of secondary shoots produced highest number of fruits as compared to tertiary shoots irrespective of month of pruning. From this observation it is appeared that fruit production in custard apple is mainly happened on secondary shoots and there is little need to prune the tertiary shoots when we considered for management of big

orchard. There are several reports on beneficial effect of pruning on fruit production and quality improvement in custard apple (Choudhari, 2012; Dahapute *et al.* 2018; Choudhary and Dhakare, 2018) due to pruning but they did not mention the type of shoots to be pruned (secondary or tertiary) and the suitable month when pruning should be done. Most of the works was on severity of pruning and recommended 25% pruning intensity in all the cases. Highest fruit production in May-pruned shoots might be due to more number of new shoot growth which start flowering and fruiting when natural rain (monsoon is generally appeared from 10th June and onward in the zone) is started i.e., better availability of moisture and nutrients from June and onwards. Raut and Ghosh (2017) stated that high humidity and adequate nutrition results better fruit set and yield.

Better sizeable fruits always fetch higher market value. All the pruning treatments resulted better fruit size as compared to control except June-pruned shoots. Highest fruit weight was obtained from the tree with May-pruned shoots (174g) and lowest from June-pruned shoots (134 g) followed by control (140g). Improvement in fruit weight in custard apple due to pruning was also noted by Choudhary and Dhakare (2018) in custard apple, Ghosh and B. Bera (2014) in sweet orange, Mohamed *et al.* (2010) in custard apple.

Pulp content did not significantly varied due to different pruning treatment however; maximum pulp content (87.1%) was recorded from February pruned shoots followed by May pruned shoots(86.2%). Choudhary and Dhakare (2018)

observed maximum pulp percentage in fruits of custard apple from plants with pruning at 90cm.

Fruit quality in respect of TSS and total sugar content was significantly improved in all pruned treated plants as compared to control. Highest TSS (21.6^oB) and sugar content (19.5%) was measured from May-pruned plants and lowest in control (19.2^oB and 16.4% respectively). This finding was agreement with the results of Dahapute *et al.* (2018) in custard apple who found significantly maximum total soluble solids (TSS) from the fruits of plants with 30 cm pruning of shoots.

Regarding harvesting time i.e., 1st date of harvesting and last date of harvesting did not varied among different pruning treatments including control which indicated that time of pruning for the purpose of fruit production is more important in red laterite zone of West Bengal as compared to severity of pruning as reported by several workers from Maharashtra (Choudhari, 2012; Dahapute *et al.* 2018; Choudhary and Dhakare, 2018).

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