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PERFORMANCE OF FOUR BANANA CULTIVARS UNDER ARECANUT PLANTATION IN SUB-HIMALAYAN *TERAI* REGION OF WEST BENGAL

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ABSTRACT

Four banana cultivar of two groups were planted in interspace of arecanut plantation for their evaluation under arecanut shade at CPCRI, Research Centre, Mohitnagar, Jalpaiguri. All the banana variety differed significantly in all the parameters recorded. Among the varieties, maximum plant height was recorded in Champa. This variety also produced maximum bunch weight than the other varieties. Based on the study, this variety is suitable for its cultivation in arecanut plantation under sub Himalayan terai region of West Bengal.

Key words : Banana cultivars, Arecanut plantation, *Terai* region

INTRODUCTION

Arecanut is an important plantation crop grown in tropical and subtropical part of the World. India is leading country on area and production of this country in the world. This crop is mainly grown in Karnataka, Assam, Kerala, Tamilnadu, Maharastra, Goa, West Bengal and some states of India. Arecanut is mainly spaced at a distance of 2.7 m plant to plant and 2.7 m row to row for its better growth and better harvest for a long period. It has been noticed by the researchers that while the crop is spaced at this distance, considerable amount of natural resources like sun light and land is unutilized by this crop and allows to grow some other crops. Bhat and Leela (1969) reported that 61-67 per cent of all roots were concentrated within 50 cm radius of the arecanut palm and 80% of all roots were within depths of 85 cm radius. The 0-50 cm and 51-100 cm soil depth contained 66-67 per cent and 18-24 per cent off all roots, respectively. Hence there is a scope to grow some other crops in the inter space of arecanut plantation. Different types of crops like paddy, sorghum, cowpea, vegetables, yams, pineapple, banana, turmeric, ginger, arrowroot, medicinal and aromatic plants spices etc are grown in arecanut garden at initial and later stages of the palms (Abdul Khader and Antony, 1968; Abraham, 1974;

Muralidharan, 1980; Shama Bhat and Abdul Khader, 1970, Sujatha *et al.* 2006). Banana is an important intercrops grown under arecanut plantation. At initial stage, it provides shade to the palm preventing the young palms from the injury of direct sunlight. It also provides income to the

growers at early year of the plantation as the main crop starts to provide return from six to seven years of planting (Chinnappa, 2003). Cultivation of banana in arecanut plantation does not affect the yield of main crop (Roy, 1974). Long term experiments on banana as an intercrop in all arecanut growing areas showed beneficial effects (Shama Bhat, 1974; Singh *et al.* 1982). Though banana is an integral part of intercropping under arecanut plantation, but which type of banana is more profitable in terms of growth and yield is not studied at al. Hence, an experiment was started with four different type of banana of two groups under arecanut plantation in Sub Himalayan terai region of West Bengal.

MATERIALS AND METHODS

The experiment was conducted at Central Plantation Crops Research Institute Research Centre, Mohitnagar during 2008. Arecanut plantation of 35 years old age was selected for the experiment. The palms were spaced at a distance of 2.7 m x 2.7 m. The soil was predominantly sandy loam of Teesta alluvial tract. pH was 5.5-6. The area experienced more than 3000 mm rainfall per year. Maximum temperature ranged between and minimum temperature ranged between. Four type of locally available banana like Jahaji (AAA) of Dwarf Cavendish sub group and Amritsagar (AAA) and Chini Champa (AAB) Poovan (S) sub group and Malbhog (AAB) of Rastholi sub group were considered for the experiment. One month old sucker of each cultivar was planted at the middle of four arecanut palm in row leaving the alternate row. The suckers were spaced at a distance of 2.7 m x 5.4 m. The experiment was laid out in randomized block design with three replications. Each treatment consisted with six plants in each replication. Growth characters, like plant height at flowering, total number of leaf production, girth of pseudostem at the time of flower emergence, leaf length and width and leaf stock length and number of sucker production was measured. Flower and yield characters like, days to emergence of flower, days to first spathe opening after inflorescence emergence, days to last spathe opening after inflorescence emergence, days to fruit maturity after inflorescence emergence, total bunch length, length of fruit bearing portion, number of hands/bunch, number of fingers/hand, finger length and circumference, finger weight, hands weight and total bunch weight was recorded in all the plants of all replications. Plant height, girth of pseudostem, leaf length and width was recorded at the time flower initiation whereas, number of leaf was recorded from the first leaf to flower initiation. Average data was considered for statistical analysis (Panse and Sukhatme, 1995).

RESULTS AND DISCUSSION

The growth and yield performance of different banana types has been tabulated in Table 1. All the parameters studied varied significantly except number of leaf production/plant. Maximum plant height (7.3m) was recorded in Champa followed by Malbhog (6.4m) and the cultivar Champa was varied significantly with the other cultivar. The height of other cultivars Amritsagar and Jahaji of AAA type was statistically at par. Number of sucker production was also recorded and significant observation was noticed. Maximum number of sucker (4.4/yr) was produced by the cultivar Amritsagar and this was significantly different than the other cultivars. Sucker production by the other cultivars was at par. Number of leaf production was recorded maximum (26.1) in

Jahaji cultivar followed by Malbhog (25.4) whereas, minimum number of leaf (23.6) was produced by Amritsagar. Significant difference in girth of all the cultivar was recorded. Maximum girth (77.9 cm) was recorded in Malbhog and the girth of other two cultivars Jahaji (72.3 cm) and Champa (71.9 cm) was at per but the girth of cultivar Amritsagar (69.9 cm) was significantly different than the cultivar Malbhog. Leaf length and width of all the cultivars varied significantly. The longest leaf (349.5 cm) was recorded in Champa followed and this was significantly different than the leaf length of other cultivars. Leaf length of cultivar Amritsagar and Jahaji of AAA group was statistically at par. Leaf width of cultivar Champa was maximum (90.0 cm) among the other cultivars and it was statistically at par with the leaf width of cultivar Malbhog but leaf width of these two cultivars was statistically different than the other two cultivars Jahaji and Amritsagar. The leaf width of cultivars Jahaji and Amritsagar was statistically at par. This may be due to varietal characteristics of different groups. Leaf stock length of all the cultivars of two groups was varied significantly. Maximum leaf stock length (111.3cm) was recorded in Champa followed by Malbhog (100.3cm) and Amritsagar (82cm). Minimum leaf stock length (52cm) was noticed in Jahaji. More than thirteen months from planting was required for flower initiation for all the cultivars. Maximum days (424) required for flower initiation was noticed in Jahaji, whereas, minimum days (384) was required for Champa. All the cultivars varied significantly for this character. Days to first spathe opening was minimum (2.3 days) in Jahaji and this was varied significantly with the other cultivars. The performance of cultivars Champa and Malbhog for this parameter was statistically at par. Days to physiological maturity of fruits was minimum (40 days) in Jahaji and it was statistically differed with the other cultivars. Maximum day (68.2 days) for physiological maturity was required for Amritsagar. Maximum bunch length (104.5 cm) was recorded in Jahaji followed by Amritsagar (98.8 cm) and Champa (97.0 cm) and these three cultivars were statistically at par but its were statistically different with the other cultivar Malbhog (87.5cm). Though the bunch length of cultivar Jahaji was more but the number of hands/bunch was more (13.8) in Champa followed by Jahaji (11.7). Minimum number of hands/bunch (8.7) was recorded in Malbhog. Significant difference for number of fingers/hand was observed for all the cultivars. Maximum number of fingers/hand (21.5) was observed in Champa which was significantly different with the other cultivars. The performance of Jahaji, Amritsagar and Malbhog was almost at par for this character. Finger length was recorded maximum (16.2 cm) in Amritsagar followed by Jahaji (15.9 cm) and Malbhog (14.6 cm). Minimum finger length (12.5 cm) was recorded in Champa. Though the finger length of Amritsagar was the maximum but the girth of finger was minimum (12 cm) which was at par with Champa (11.9 cm). But the girth of finger of Malbhog (13 cm) was statistically significant with Amritsagar and Champa but it was at par with Jahaji (12.8 cm). Significant difference was observed in finger weight and hands weight. Maximum finger weight (110.2 g) was recorded in Amritsagar followed by Malbhog (109.7 g) and Jahaji (107.5 g) which were statistically different than the finger weight of Champa (82.0 g). Maximum bunch weight (22.59 kg) was recorded in Champa followed by Jahaji (Dwarf Cavendish-17.4 kg) and this cultivar was statistically different than the other cultivars. Minimum

Table 1. Morphology characters of four banana cultivars under arecanut plantation

Cultivar	Plant height (m)	No. of leaf	Girth (cm)	Leaf length (cm)	Leaf width (cm)	Leaf stock length (cm)	Days to emergence of inflorescence	Days to first spathe opening	Days to last spathe opening	No. of sucker produced/ clump
Amrit Sagar	3.0	26.3	72.9	224.5	79.7	82	400.3	3.0	10.3	4.4
Dwarf Cavendish	2.2	24.0	67.0	230.0	80.8	52	424.0	2.3	9.0	3.7
Malbhog	2.5	24.0	67.9	283.6	87.4	100.3	393.4	3.3	11.6	3.6
Champa	2.4	24.0	71.9	349.5	90.0	111.3	384.0	3.5	12.5	3.8
SEM±	0.04	0.72	1.95	2.63	1.80	1.09	6.23	0.67	0.55	0.10
CD	0.12	2.24	6.75*	9.09**	6.24*	3.78**	21.55*	0.23**	1.89*	0.35**
CV	2.68	5.63	4.69	1.67	3.69	2.19	2.69	3.82	8.73	4.47

Table 2. Yield and yield attributing characters of four banana cultivars under arecanut plantation

Cultivar	Days to maturity of fruits	Bunch weight (kg)	Bunch length (cm)	No. of hands/ bunch	Hand weight (g)	No. of finger/ hand	Finger length (cm)	Finger girth (cm)	Finger weight (g)
Amrit Sagar	68.2	16.2	63.3	10.5	1628.2	16.3	16.2	12.0	110.2
Dwarf Cavendish	40.0	17.4	61.8	11.7	1562.5	15.0	15.9	12.8	107.5
Malbhog	44.0	11.44	55.9	8.7	1373.6	13.0	14.6	13.0	109.7
Champa	54.0	22.59	59.5	13.8	1687.5	21.5	12.5	11.5	82.0
SEM±	0.47	0.55	0.75	0.29	8.05	1.04	0.73	0.17	0.97
CD	1.63**	1.90**	2.58**	1.00**	27.85**	3.60**	2.51*	0.58**	3.41**
CV	1.58	5.32	1.98	4.47	0.89	10.87	8.50	2.36	1.67

bunch weight (11.44 kg) was recorded in Malbhog.

Based on the above study, it is concluded that cultivation of banana as intercrop in arecanut garden is profitable. Different types of banana can be cultivated under partial shade of arecanut plantation but cultivar like Champa (AAB) group is most suitable in terms of growth, yield and yield attributing characters under partial shade of arecanut plantation under sub Himalayan terai region of West Bengal.

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