Effect of different planting systems and varieties on economics of banana production

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 Received: 26.9.2018/Accepted: 2.11.2018

ABSTRACT

A field study on high density planting and suckers arrangement in banana var Grand Naine and Basrai was conducted at Banana Research Station, Jalgaon, Maharashtra to find out a suitable high density planting system so as to maximize productivity with least cost of production. The best treatments proved were P_2V_1 (Planting of 3 suckers per hill at a distance of 1.8 x 3.6 m) and P_1V_1 (Planting of 3 suckers per hill at a distance of 2 x 3 m) with Grand Naine. The superiority was proved for the crop duration, bunch weight, yield, net monetary income, B-C ratio, sustainable yield index, sustainable value index and productivity index.

Keywords: Banana; planting systems; economics; productivity; sustainability; index

INTRODUCTION

Banana is most important fruit crop of Maharashtra having second rank after Tamil Nadu in respect of area under cultivation. It is cultivated in almost all the districts of Maharashtra except Nasik. Its large scale cultivation is found in Jalgaon, Nandurbar, Dhule, Parbhani, Nanded and Vardha districts. In other districts like Solapur, Kolhapur, Satara and Sangli the banana cultivation started just during last two decades where there is higher productivity than the north Maharashtra. In Maharashtra the area under banana is about 83000 ha with production of 58.2 MT (Anon 2015). It is a tropical crop and requires warm and humid climate during entire life span. In the state tropical climate occurs only during rainy season (July to September) every year followed by winter with low temperature and moderate humidity and by summer season (from March till mid of June). At present there are two main planting times for banana. One is June planting that has major share (>70%) followed by October planting (20-22%). The remaining planting time is March-April (5-8%).

The present study was undertaken to find out suitable planting system for two banana cultivars (Ground Naine and Basrai) for more production.

MATERIAL and METHODS

The present study was undertaken at Banana Research Station, Jalgaon, Maharashtra. The experiment was laid out in randomized block design comprising treatments of three planting systems P_1 [Planting of 3 suckers per hill spaced at 2 x 3 m (5001 plants/ha)], P_2 [Planting of 3 suckers per hill spaced at 1.8 x 3.6 m (4630 plants/ha)] and P_3 [Pair-row system spaced at 0.9 x 1.5 x 2.1 m (4444 plants/ha)]. The another factor was varieties V_1 (Grand Naine) and V_2 (Basrai). The treatments were replicated four times with plant unit of 16 per treatment. The normal suckers (soward) were used as planting material. The recommended cultural practices were uniformly applied to all the treatments.

Observations on crop duration and bunch weight were recorded. The data recorded for each parameter were subjected to statistical analysis as suggested by Panse and Sukhatme (1987). The per hectare yield for each treatment was computed by multiplying bunch weight with total plant population per hectare.

The sustainability yield index (SYI) and sustainability value index (SVI) were calculated as per the method given by Singh et al (1990) as under:

$$SYI = \frac{\bar{y} - SD}{Vmax}$$

where $\bar{y}$ = Estimated average yield value of economical produce, Vmax= Maximum net monetary income/ha, SD= Estimated standard deviation

$$SVI = \frac{V - SD}{Vmax}$$

where V= Net monetary income of each treatment, Vmax= Maximum net monetary income/ha, SD= Estimated standard deviation

The productivity index (PI) was calculated as under:

$$PI = \frac{\text{Bunch weight}}{\text{Cycling time period (total crop duration in days)}} \times 100$$

RESULTS and DISCUSSION

The data presented in Table 1 reveal that significantly shortest crop duration (389 days) was recorded in the treatment P_2V_1 (Planting of 3 suckers per hill spaced at 1.8 x 3.6 m + Grand Naine) which was at par with P_1V_1 (Planting of 3 suckers per hill spaced at 2 x 3 m + Grand Naine), P_3V_2 (Pair-row system spaced at 0.9 x 1.5 x 2.1 m + Basrai) and P_1V_2 (Planting of 3 suckers per hill spaced at 2 x 3 m + Basrai) with crop duration of 396, 397 and 399 days respectively. Bunch weight was recorded significantly maximum (15.87 kg/plant) in case of P_2V_1 (Planting of 3 suckers per hill spaced at 1.8 x 3.6 m + Grand Naine) and all other treatments were at par with one another. Thus yield was maximum (71.43 MT/ha) in case of P_1V_1 (Planting of 3 suckers per hill spaced at 2 x 3 m + Grand Naine) which was at par with P_2V_1 (Planting of 3 suckers per hill spaced at 1.8 x 3.6 m + Grand Naine) and P_2V_2 (Planting of 3 suckers per hill spaced at 1.8 x 3.6 m + Basrai) with yield of 70.54 and 66.38 MT/ha respectively.

The cost of cultivation ranged from Rs 144773 to Rs 135547 with highest in P_1V_1 (Planting of 3 suckers per hill spaced at 2 x 3 m + Grand Naine). Net monetary income (Rs 106899/ha), B-C ratio (1.76) and productivity index (4.08) were also observed maximum in case of P_2V_1 (Planting of 3 suckers per hill spaced at 1.8 x 3.6 m + Grand Naine). The sustainable yield index was recorded maximum (0.94) in P_1V_1 (Planting of 3 suckers per hill spaced at 2 x 3 m + Grand Naine) followed by P_2V_1 (Planting of 3 suckers per hill spaced at 1.8 x 3.6 m + Grand Naine) (0.92).

Sustainability value index was 0.98, 0.96 and 0.94 in case of P_1V_1 (Planting of 3 suckers per hill spaced at 2 x 3 m + Grand Naine), P_1V_2 (Planting of 3 suckers per hill spaced at 2 x 3 m + Basrai) and P_2V_1 (Planting of 3 suckers per hill spaced at 1.8 x 3.6 m + Grand Naine) respectively.

Hence planting of Grand Naine banana 3 suckers per hill at a spacing of 1.8 x 3.6 m and spacing of 2 x 3 m was found most suitable and sustainable. Similar results in respect of components of economics have been reported by Badgujar and Deshmukh (2013)

Table 1. Effect of planting system and varieties on economics of banana

Treatment	Crop duration (days)	Bunch weight/plant (kg)	Yield/ha (MT)	Cost of cultivation (Rs/ha)	Net monetary income/ha (Rs)	B-C ratio	SYI	SVI	PI
P_1V_1	396	14.28	71.43	144773	105232	1.73	0.94	0.98	3.61
P_1V_2	399	13.98	64.75	141615	85010	1.60	0.81	0.96	3.50
P_2V_1	389	15.87	70.54	139991	106899	1.76	0.92	0.94	4.08
P_2V_2	405	13.27	66.38	139772	92558	1.66	0.87	0.57	3.28
P_3V_1	410	13.00	60.17	136985	73610	1.54	0.78	0.88	3.17
P_3V_2	397	13.99	62.17	135547	82083	1.61	0.81	0.91	3.52
$CD_{0.05}$	11.24	1.28	6.05	-	-	-	-	-	-

P_1: Planting of 3 suckers per hill spaced at 2 x 3 m (5001 plants/ha), P_2: Planting of 3 suckers per hill spaced at 1.8 x 3.6 m (4630 plants/ha), P_3: Pair-row system spaced at 0.9 x 1.5 x 2.1 m (4444 plants/ha), V_1: Grand Naine, V_2: Basrai, SYI: Sustainable yield index, SVI: Sustainable value index, PI: Productivity index

in banana-based inter-cropping system, Badgujar et al (2018a) under crop regulation and fertilizer regimes studies and Badgujar et al (2018b) in banana time of planting studies.

It was concluded that the treatment of P_2V_1 (Planting of 3 suckers per hill at spacing of 1.8 x 3.6 m + Grand Naine) recorded its superiority for least crop duration, bunch weight, net monetary income, B-C ratio and productivity index whereas the treatment of P_1V_1 recorded its superiority for yield per hectare, sustainable yield index and sustainable value index.

REFERENCES

Anonymous 2015. Annual report 2014-15. National Horticulture Board, Horticulture Statistics Division, Ministry of Agriculture and Farmers Welfare, Government of India.

Badgujar CD and Deshmukh SS 2013. Productivity of banana-based intercropping system. Bioinfolet **10(4c):** 1557-1558.

Badgujar CD, Patil BB and Patil MS 2018a. Banana economics under different crop regulation treatments and fertilizer regimes. Trends in Biosciences **11(21):** 3018-3019.

Badgujar CD, Patil BB and Patil MS 2018b. Sustainability yield index and productivity index of Grand Naine banana as influenced by months of planting. Trends in Biosciences **11(21):** 2973-2975.

Panse VG and Sukhatme PV 1987. Statistical methods for agricultural workers. Indian Council of Agricultural Research, New Delhi, India.

Singh RP, Das SK, Bhaskara Rao UM and Narayana Reddy M 1990. Towards sustainable dryland agricultural practices. Technical Bulletin, Central Research Institute for Dryland Agriculture, Hyderabad, Andhra Pradesh, India, 106p.