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Banana economics: Under different bunch management practices

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Abstract
The field study was conducted for three years during 2014-15, 2015-16 and 2017-18 at Banana Research station, Jalgaon (M.S.) with objectives to know the influence of de handing and post shooting sprays of different chemicals on yield and economics of banana cv. Grand naine. The experiment was laid out in Factorial Randomized Block design with 12 treatment combinations and replicated thrice. First factor with de handing treatments comprising of retention of hands per bunch (no de handing, retention of 10 and 8 hands per bunch). The second factor comprising spraying twice each of water, 0.5% KH_2PO_4 + 1% Urea, 2% SOP and 1% 19:19:19. The results revealed that the treatment of retaining 8 hands, combined with two post shooting sprays of 0.5% KH_2PO_4 + 1% Urea or 2% SOP was found more economical than the rest of combinations studied. The highest net monetary return per ha. (Rs.634383), B: C ratio (2.79) and Sustainable Values Index (2.79) was recorded by treatment of retention of 8 hands + two post shooting spraying with 0.5% + 1% Urea.

Keywords: Grand naine, chemicals, bunch, post shooting, SVI, B:C ratio

Introduction
Banana is an important part of human fruit basket of modern culture and still being staple food for millions across the developing countries of the world. Banana is the fourth most important food crop among the developing countries after rice, wheat and Maize in terms of production and local consumption. Banana is cultivated in all most all districts of Maharashtra except Nasik. Its large scale cultivation is found in Jalgaon, Dhule, Nandurbar, Nanded, Parbhani, Vardha, Akola and Yawatmala districts of Maharashtra. The Pune, Solapur, Ahmednagar and Sangali are the new banana growing districts from past ten-fifteen years. Now a day, the consumers from domestic as well as export market are very keen to purchase the clean and quality banana fruits. For production of quality product the pre and post fruit care is must. Under optimum production management the fruits from very few hands per bunch meets the fruit quality standards for domestic as well as export market. We have developed the all production technologies. Very fewliterature is available on bunch management. Except the bunch management. The present study was undertaken to find out effective way to improve the fruit quality and to study its economical feasibility.

Material and Methods
The study was undertaken at Banana Research Station, MPKV, Jalgaon, Maharashtra. The experiment was laid out in Factorial Randomised Block Design with two sets of treatment consisting de handing treatments (D_1 : No de handing; D_2 : de handing at 10^{th} hands and D_3 : de handing at 8^{th} hand) and another set of treatments were post shooting bunch spraying (twice, one immediately after bunch opening and second at 15 days after first) and were S_1 : water spray ; S_2 : 0.5% KH_2PO_4 + 1% Urea ; S_3 : 2% SOP and S_4 : 1% 19:19:19 in all 12 treatment combinations replicated thrice. The crop was uniformly faded with 10 kg FYM + 25 g Azospirillum + 25 g PSB + 150:60:150 g NPK/plant through fertigation in 44 weeks. Other recommended practices were uniformly applied to all the treatments. Observations on bunch weight and from which yield per hectare was computed and recorded. The data recorded and calculated were subjected to statistical analysis as suggested by Panse and Sukhatme (1985) [4]. The cost of cultivation, Gross income, Net income per hectare and B:C ratio were calculated. The Sustainability Value Index (SVI) was calculated as per method given by Singh *et al* (1990) as under.

$$\text{Sustainability value index} = \frac{V - S.D.}{V_{max}}$$

Where V:- Net income per hectare of each treatment
V_{max}:- Highest Net income per ha.
S.D:- Standard Derivation (Estimated)

Result and Discussion

The observation on bunch weight was recorded for each treatments and from which yield/ha was computed, Cost of cultivation, Gross monetary income, net income, B:C ratio and Sustainable Value Index were calculated and presented in Table 1. He economics analysis for bunch improvement treatment revealed that. Higher banana yield/ha. (112.54 t) was recorded with treatment with retention of 8 hands /bunch. Among the spraying treatments it was higher (114.40 t) with two bunch sprays of 0.5% KH_2PO_4 + 1% Urea. The best treatment combination for this trait was D_3S_2 (retention of 8 hands/bunch + two sprays of 0.5% KH_2PO_4 + 1% Urea) produced (116.3 t/ha.) and found better than the rest of treatment combinations studied. The higher Rs.3, 55,033/- cost of cultivation was recorded with treatment combination of D_1S_3 (No de handing + two sprays of 1% 19:19:19), followed by D_2S_2 and D_3S_2 (Rs.3,54,167/). Among the de handing treatments, retention of 8 hands/bunch was recorded highest Gross monetary income of Rs.9,56,590/- followed by the treatment of retention of 10 hands/bunch with Rs.8,25,075/. Among the spraying treatments maximum Gross monetary income (Rs.8,58,000/) was recorded with the treatment of two spraying of 0.5% KH_2PO_4 + 1% Urea. The treatment combination of D_3S_2 (Retention of 8 hands/bunch + twp sprays of 0.5% KH_2PO_4 + 1% Urea recorded highest gross monetary income of Rs. 9,88,550/- followed by D_3S_4 (Retention of 8 hands/bunch + two sprays of 1% 19:19:19 (Rs.9,55,145/-) The net return was maximum of Rs. 6,03,590/- with treatment of retention of 8 hands/bunch followed by the treatment of retention of 10 hands per bunch (Rs.4,72,075/-) Among the spraying treatments, two sprayings of 0.5% KH_2PO_4 + 1% Urea was recorded its superiority over the rest of others studied and its net return of Rs. 5,04,166/-. The treatment of two post shooting bunch sprays with 2% SOP was found second best for this trait and recorded Rs 4,94,700/- net return. Among the treatment combination of D_3S_2 (Retention of 8 hands + two sprays of 0.5% KH_2PO_4 + 1% Urea) was recorded its superiority over rest of treatment combinations studied and earned net return of Rs.6,34,383/-. The second best treatments combination was D_3S_4 i.e. retention of 8 hands + two post shooting sprays with 1% 19:19:19 and it was Rs.6, 01,281/- Benefit cost ratio is an important economical tool to compare the treatments. The treatment of retaining 8 hands gave highest (2.70) B:C ratio than no de handing and treatment of retaining 10 hands per bunch. Among the spraying treatments, maximum B:C ratio of 2.42 was recorded with two post shooting sprays with 0.5% KH_2PO_4 + 1% Urea treatment. It was followed by two post shooting sprays of 2% Sulphate of potash and it was 2.39. The highest benefit cost ratio of 2.79 was recorded with treatment combination of D_3S_2 (Retention of 8 hands per bunch + two post shooting sprays of 0.5% KH_2PO_4 + 1% Urea treatment). The Sustainability Value Index (SVI) was also calculated and it was highest (0.81) for bunch trimming with retaining of 8 hands. Among the spraying treatments, the treatment with two post shooting sprays of 0.5% KH_2PO_4 + 1% Urea, it was recorded its superiority and it was 0.86 than the rest of treatment combinations studied. The second best treatment combination was relation of 8 hands + two post shooting sprays with 2% Sop or 1% 19:19:19. The results recorded in present study might be due to increased the values of yield parameters were influenced positively by different de handing and two post shooting bunch spraying resulted in increased yield and ultimately the economical parameters. The result recorded in present study in respect of yield per ha. And economical parameters are on the same line as reported by Mulagund *et al.* (2015) [3], Pradhan *et al.* (1988) [5], Badgujar *et al.* (2013 & 2018) [1-2] and Priya and pandian (2019) [6].

Table 1: Economics of different treatments under bunch management

Treatment	Yield t/ha	Gross monetary returns (Rs./ha)	Total cost of cultivation (Rs./ha)	Net income Rs./ha	B:C ratio	SVI
A) De-handing						
D_1 – No dehanding	110.30	705920	352000	353920	2.17	0.41
D_2 – 10 hands	110.01	825075	353000	472075	2.33	0.60
D_3 – 8 hands	112.54	956590	353000	603590	2.70	0.81
B) Spraying						
S_1 – Water spray	105.61	675904	353148	322756	1.91	0.36
S_2 – 0.5% KH_2PO_4 + 1% Urea	114.40	858000	353834	504166	2.42	0.65
S_3 – 2% SOP	113.12	848400	353700	494700	2.39	0.64
S_4 – 1% 19:19:19	110.68	830100	353531	476569	2.34	0.61
C) Interaction						
D_1S_1	103.36	661504	352000	309504	1.87	0.34
D_1S_2	114.30	857250	353167	504083	2.42	0.65
D_1S_3	114.12	85590	355033	500867	2.41	0.65
D_1S_4	109.41	820575	352000	468575	2.33	0.59
D_2S_1	104.22	781650	353481	428169	2.21	0.53
D_2S_2	112.60	844500	354167	490333	2.38	0.63
D_2S_3	112.98	847350	354033	493317	2.39	0.63
D_2S_4	110.25	826875	353864	473011	2.33	0.60
D_3S_1	109.25	928625	353148	575377	2.62	0.76
D_3S_2	116.30	988550	354167	634383	2.79	0.86
D_3S_3	112.25	954125	354033	600092	2.69	0.80
D_3S_4	112.37	955145	353864	601281	2.69	0.80

Selling price: Ist grade @ Rs. 8500/ton, IInd grade @Rs.7500/-and IIIrd grade @ Rs. 6400/-

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