Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
www.phytojournal.com
JPP 2020; 9(3): 1932-1934
Received: 22-03-2020
Accepted: 24-04-2020

PK Ray
Subject Matter Specialist Horticulture, Krishi Vigyan Kendra, Saharsa, Bihar, India

RN Singh
Associate Director Extension Education, BAU Sabour, Bhagalpur, Bihar, India

Binod Kumar
Associate Professor-cum-Senior Scientist, Department of Agronomy, MBAC, Saharsa, Bihar, India

Anjani Kumar
Director, ICAR-ATARI, Zone-IV, Patna, Bihar, India

RR Singh
Dean (Agriculture), Bihar Agricultural University, Sabour, Bhagalpur, Bihar, India

Corresponding Author:
Binod Kumar
Associate Professor-cum-Senior Scientist, Department of Agronomy, MBAC, Saharsa, Bihar, India

Impact of front-line demonstrations on productivity and profitability of banana (var. G-9) under Koshi zone of Bihar

PK Ray, RN Singh, Binod Kumar, Anjani Kumar and RR Singh

Abstract
The present study was carried out the evaluating the performance of improved cultivars with scientific package and practices on production, productivity and profitability of banana variety G-9. Frontline demonstrations were conducted during 2016-17, 2018-19 and 2019-20 with evaluation the performance of G-9 variety of banana in 3 different villages located in different blocks under KVK operational area and record the feedback information of farmer's. The results revealed that average yield of banana under frontline Demonstrations were 483, 489 and 503 q/ha as compare to 420, 424 and 431 q/ ha recorded in farmer's practice and average yield increase of 15.00, 15.33 and 16.70 per cent, respectively. It was observed that the benefit cost ratio (B: C) of recommended practice (FLD's) were 2.76, 2.73 and 2.78 as compared to 2.11, 2.19 and 2.13 in farmer's practice during consecutive years of study blocks. The average extension gap 63, 65 and 72 q/ ha were recorded. Therefore, the results clearly indicate that the use of improved varieties and package and practices with scientific intervention under frontline demonstration programme contribute to increase the productivity and profitability of banana in Bihar state.

Keywords: Front-line demonstrations, profitability, banana

Introduction
Banana (*Musa paradisiaca* L.) is a herbaceous, perennial, monocotyledonous and monocarpic crop belongs to the family Musaceae. It is known as "Apple of paradise". Its origin is tropical region of South-East Asia. Banana has nutritional, medicinal and industrial value. Owing to its multifaceted uses, it is referred as Kalpatharu (a plant of virtues). Banana is one of the most important tropical fruit crops of the world and many consider banana as one of man's first food. The ripe fruit is pureed, candied and preserved in various forms when not eaten fresh. Its extract is used in the manufacture of ketchup, vinegar and wine. The unripe fruit is powdered and chipped. In rural areas, the young leaves are pounded and applied to injuries to suppress bleeding. The leaves are also used widely as packing materials for fruits and vegetables in market centres. Banana fiber is woven into rope and mat. Sheets of paper and paper boards are also made from banana peel. Banana blossom is exported dried and usually added to meat recipes. (Anonymous, 2010c) [1].

Banana plant produces the parthenocarpic fruit of commercial importance is propagated vegetatively from underground storage organ rhizome and surface level is the meristematic region which gives rise to the leaves and finally to the inflorescence which produces the fruit. The leaves emerge in sequence with each rolled leaf pushing throughout the centre of an increasingly greater number of over lapping leaf sheath base which constitute a pseudostem. The pseudostem produces flowers only once and is cut off after fruiting. The fruits are called fingers, which are borne in hands.

The Grand Naine Bananas (also spelled Grande Naine) literally translates from French meaning "Large Dwarf". It is a cultivar of the well-known Cavendish bananas. This group of bananas is distinguished from other groups by its AAA genotype. The AAA genotype refers to the fact that this group is a triploid variant of the species *M. acuminata*. There are 33 chromosomes present in the AAA cultivar and all produce seedless fruits through parthenocarpy (Ploetz, 2007) [2]. The Grand Naine has become one of the most popular varieties for commercial plantations. Its characteristic medium height and large fruit yields make it ideal for commercial agriculture. The moderate height allows easy harvesting and some resistance to wind throw (plants breaking due to strong winds). Plantations growing Grand Naine range from the tropical regions of Central America, Africa, India and Southeast Asia. In many tropical communities, entire local economies are based upon banana production and export.

Because of its importance as a staple crop as well as a cash crop, much botanical research has focused around the Grand Naine. (Anonymous, 2007) [3].

Materials & Methods

Krishi Vigyan Kendra, Saharsa, Bihar, India conducted front line demonstrations on banana cv. *G-9* during the year 2016-17, 2018-19 and 2019-20 in 3 different villages located in different blocks under KVK operational area. Totally 15 demonstrations in an area of 5.0 acre were conducted on banana crop on farmers field. The data on output of improved and local banana plots were recorded. The farmers were guided by KVK scientists in respect of package of practices to be followed during the crop season. Extension gap and Percent increase yield were calculated using following formula as suggested by Samui *et al.* (2000) [4].

$$\text{Percent increase yield} = \frac{\text{Demonstration yield - farmers yield}}{\text{Farmers yield}} \text{ x } 100$$

Extension gap = Demonstration yield- yield under existing practice

Yield attributing characters

The data presented in Table 1 revealed that under demo plot, the performance of yield attributing characters of banana was found to be substantially higher than that under control (farmer practices) during all the years (2016-17, 2018-19 and 2019-20). The plant height of banana under demo recorded were 161.11, 170.14 and 182.47 cm, in compared to control 153.54, 161.23 and 156.58 cm during 2016-17, 2018-19 and 2019-20 respectively. The cumulative effect of technological intervention over three years, revealed an average plant height were 171.24 cm in compared to control 157.12 cm. The plant girth of banana under demo recorded were 66.81, 74.47 and 80.20 cm in compared to control 57.33, 63.67 and 71.31 cm during 2016-17, 2018-19 and 2019-20 respectively. The cumulative effects of technological intervention over three years, revealed an average plant girth of banana were 73.83 cm in compared to control 64.10 cm. Similar results were also reported by Ahmed *et al*., 2010 [5], Anitha *et al*., 2005 [6], Badgujar *et al*. 2004 [7] and Singh 2010 [8].

The numbers of hands per bunch of banana under demo recorded were 8.01, 8.47 and 8.95 compared to control 6.15, 6.66 and 7.18 during 2016-17, 2018-19 and 2019-20 respectively. The cumulative effect of technological intervention over three years, revealed an average number of hands per bunch of 8.47, whereas in control 6.66. The numbers of fingers per hand of banana under demo recorded were 12.76, 13.91 and 13.64 in compared to control 11.01, 12.62 and 11.24 during 2016-17, 2018-19 and 2019-20 respectively. The cumulative effects of technological intervention over three years, revealed an average number of hands per bunch were 13.43, in compared to control 11.62. Similar results were also reported by Patil *et al.*, 2010 [10]; Anitha *et al*., 2005 [6]; Balasubrahmanyam *et al*., 2003 [11].

The bunch weight of banana under demo recorded were 16.74, 17.69 and 19.88 kg/bunch in compared to control 12.11, 14.54 and 16.35 kg/bunch during 2016-17, 2018-19 and 2019-20 respectively. The cumulative effect of technological intervention over three years, revealed an average bunch weight were 18.10 kg/bunch in compared to control 14.33 kg/bunch. The crop duration of banana under demo recorded were 358.33, 345.56 and 323.87 days, in compared to control 361.12, 357.15 and 345.25 days during 2016-17, 2018-19 and 2019-20 respectively. The cumulative effect of technological intervention over three years, revealed an average bunch weight were 342.59 days in compared to control 354.51 days. Similar results were also reported by Patel *et al*. (2011) [9] Nainwad *et al*. (2005) [12] Anitha *et al*. (2005) [6].

Yield and economics

The data presented in Table 2 revealed that under demo plot, the performance of banana yield was found to be substantially higher than that under control (farmer practices) during all the years (2016-17, 2018-19 and 2019-20). The yield of banana under demo recorded was 483, 489 and 503 q/ha during the year. The percent increased yield over local check due to technological intervention was to the tune of 15.00, 15.33 and 16.70 per cent and extension gap was 63, 65 and 72 q/ha over control (farmer practices). The cumulative effect of technological intervention over three years, revealed an average yield of demo plot was 491 q/ha, 15.68 per cent increased yield and 66 q/ha extension gap over control. The year-to-year fluctuations in yield and cost of cultivation can be explained on the basis of variations in prevailing social, economic and microclimatic condition of that particular village. Similar results were also reported by Patel *et al*. (2011) [9] Kumar *et al*. (2008) [13].

However, Economic indicators i.e. gross expenditure; gross returns, net returns and BC ratio of Front-Line Demonstration are presented in Table 2. The data clearly revealed that, the net returns from the demo plot were substantially higher than control plot, *i.e*. farmers practice during all the years of demonstration. Average net returns from demo plot were Rs 324966 /ha in compared to control i.e. Rs 261100 /ha. The gross expenditure from the demo plot were Rs. 117533/ha in compared to control Rs. 121400 /ha. The gross returns from the demo plot were Rs. 442500 /ha in compared to control Rs. 382500 /ha. Economic analysis of the yield performance revealed that benefit cost ratio of demonstration plots was observed significantly higher than control plot *i.e*., farmer practice. The benefit cost ratio of demonstrated 2.76, 2.73 and 2.78 as compared to control plots were 2.11, 2.19 and 2.13 during 2016-17, 2018-19 and 2019-20 respectively. The cumulative effect of technological intervention over three years, revealed an average benefit cost ratio were 2.76 in compared to control 2.25 (Singh, 2010) [8].

Table 1: Yield attributing characters of banana var. G-9 under FLD Programme

Year	Plant height (cm)		Plant girth (cm)		No. of hands/bunch		No. of fingers/hand		Crop duration (days)		Weight of bunch (kg)	
	Demo	Check	Demo	Check	Demo	Check	Demo	Check	Demo	Check	Demo	Check
2016-17	161.11	153.54	66.81	57.33	8.01	6.15	12.76	11.01	358.33	361.12	16.74	12.11
2018-19	170.14	161.23	74.47	63.67	8.47	6.66	13.91	12.62	345.56	357.15	17.69	14.54
2019-20	182.47	156.58	80.20	71.31	8.95	7.18	13.64	11.24	323.87	345.25	19.88	16.35
Average	171.24	157.12	73.83	64.10	8.47	6.66	13.43	11.62	342.59	354.51	18.10	14.33

Table 2: Yield and economics of banana var. G-9 under FLD Programme

Year	Yield (q/ha)		% increased yield over local check	Extension gap (q/ha)	Gross expenditure (Rs/ha)		Gross return (Rs/ha)		Net return (Rs/ha)		B:C ratio	
	Demo	Check			Demo	Check	Demo	Check	Demo	Check	Demo	Check
2016-17	483	420	15.00	63	115400	121300	434700	378000	319300	256700	2.76	2.11
2018-19	489	424	15.33	65	117700	119300	440100	381600	322400	262300	2.73	2.19
2019-20	503	431	16.70	72	119500	123600	452700	387900	333200	264300	2.78	2.13
Average	491	425	15.68	66	117533	121400	442500	382500	324966	261100	2.76	2.25

Reference

1. Anonymous. Department of Agriculture and Fisheries Information Services, 2010c, 1-2.
2. Ploetz RC. Banana and plantain²an overview with emphasis on Pacific island cultivars. Species Profiles for Pacific Island Agroforestry ver, 2007, 1.
3. Anonymous. Banana and plantain overview with emphasis on pacific island cultivars, 2007, 10.
4. Samui SK, Maitra S, Roy DK, Mondal AK, Sahan, D. Evaluation of front-line demonstration on groundnut (*Arachis hypogea* L). J of Indian Soc. of Coastal Agric. Res. 2000; 18(2):180-183.
5. Ahmed B, Mohammed A, Ihsan M. Effect of drip irrigation system and fertigation on growth, yield and quality of banana cv. Grand Naine. Second ruforium biennial meeting, 2010, 20-24.
6. Anitha R, Jeyakumar P, Durga D, Bangarusamy U. Effect of plant growth regulators and chemicals on morphological traits and yield of banana cv. Grand Naine. Madras Agric. J. 2005; 92(1-3):35-41.
7. Badgujar C, Dusane SM, Desmukh S. Influence of plant spacing on growth, maturity and yield of Grand Naine (AAA) banana. South Ind. Hort. 2004; 52(1-6):13-17.
8. Singh M. Evaluation and economics of different intercrops in banana. Ind. J Hort. 2010; 67(2):267-269.
9. Patel CM, Patel NL, Gaikwad SS, Patil SJ. Effect of post shooting treatments on yield and its attributes of banana cv. Grand Naine. Green Farming. 2011; 2(2):210-212.
10. Patil S, Solia B, Patil B. Prediction of fruit yield of banana using stem girth and yield attributes. Green Farming. 2010; 1(2):219.
11. Balasubrahmanyam V, Dhake A, Patil K, Moitra P, Daryapurkar S. Precission Farming of banana in Maharashtra. Precission farming in Horti, 2003, 114-123.
12. Nainwad R, Kullkarni N, Kalalbundi B. Extent of variation in growth and yield attributes of some tissue culture vs conventional sucker planted banana varieties. Karnataka J Agric. Sci. 2005; 18(1):221-222.
13. Kumar D, Panday V, Anjaneyulu K. Effect of planting density and nutrient management on growth, yield and quality of micro propagated banana cv. Rasthali. Indian J Hort. 2008; 65(3):272-276.